City of East Providence, Rhode Island

Department of Public Works, 60 Commercial Way, East Providence, RI 02914

Project Manual

Volume 1 of 1

City of East Providence, RI
Department of Public Works

Water Pollution Control Facility Improvements and Concrete Lining

December 2022

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EAST PROVIDENCE, RI
DEPARTMENT OF PUBLIC WORKS

WATER POLLUTION CONTROL FACILITY (WPCF)
IMPROVEMENTS AND CONCRETE LINING

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CITY OF EAST PROVIDENCE
DEPARTMENT OF PUBLIC WORKS
WATER POLLUTION CONTROL FACILITY IMPROVEMENTS AND CONCRETE LINING PROJECT
ADVERTISEMENT

REQUEST FOR PROPOSALS

BID OPENING THURSDAY, MARCH 2, 2023 AT 11:00AM
CITY OF EAST PROVIDENCE, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS

WATER POLLUTION CONTROL FACILITY
IMPROVEMENTS AND CONCRETE LINING

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the **Water Pollution Control Facility Improvements and Concrete Lining Project** will be received by the City of East Providence City Hall Controllers Office, Room 103, Attn: Ralph Mitchell, Procurement Specialist at 145 Taunton Avenue, East Providence, RI 02914 until 11:00 AM local time on **Thursday, March 2nd, 2023**, at which time the Bids received will be publicly opened and read aloud.

Work to be performed under this Contract includes, but is not limited to by-pass pumping to allow full wastewater structure access and dewatering, disinfection of wastewater structures, removal of degraded and unsound concrete from wastewater structures requiring rehabilitation, replacement of reinforcing steel in wastewater structures as applicable, restoration of concrete wastewater structures using an appropriate cementitious repair mortar, and installation of coating/lining system to protect restored concrete wastewater structures. The estimated construction cost for this project is approximately $2,500,000.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis, with additive alternative bid items as indicated in the Bid Form.

The Issuing Office for the Bidding Documents is: City Hall Controllers Office, Room 103, Attn: Ralph Mitchell, Procurement Specialist. Prospective Bidders may examine the Bidding Documents on the City's website, free of charge, at the following address: https://eastprovidenceri.gov/rfp

Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

A pre-bid conference will be held at **1:00 PM** local time on **Wednesday, January 18th, 2023** at Conference Room A, First Floor of East Providence City Hall, 145 Taunton Avenue, East Providence, RI 02914. A site visit at the Water Pollution Control Facility located at 1 Crest Avenue, Riverside, RI 02915 will follow the pre-bid conference held at City Hall. Attendance at the pre-bid conference is highly encouraged but is not mandatory.

Bid security shall be furnished in accordance with the Instructions to Bidders. Bidders shall submit proof of qualifications to perform the Work as described in the Instructions to Bidders.

The Contract Times will commence running as indicated in the General Conditions. Contract Times for completion and provisions on liquidated and special damages, if any, are indicated in the Agreement.

CITY OF EAST PROVIDENCE, RHODE ISLAND
BY: DANIEL BORGES
DIRECTOR OF PUBLIC WORKS

Engineer:

Arcadis U.S., Inc.
500 Edgewater Drive, Suite 511, Wakefield, MA 01880
Phone: (781) 213-4901

+ + END OF ADVERTISEMENT FOR BIDS + +

INSTRUCTIONS TO BIDDERS

EAST PROVIDENCE, RI
DEPARTMENT OF PUBLIC WORKS

WATER POLLUTION CONTROL FACILITY (WPCF)
IMPROVEMENTS AND CONCRETE LINING

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website address as indicated in the Advertisement or invitation to bid. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Electronic Documents

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information

that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work: (Complete the Qualifications Statement included in the Bidding Documents.)

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Bidder's state or other contractor license number, if applicable.

D. Subcontractor and Supplier qualification information.

E. Other required information regarding qualifications.

3.02 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

4.01 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.

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

5.01 *Site and Other Areas*

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

5.02 *Existing Site Conditions*

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

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.

b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.

c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will provide PDF electronic copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:

1. "City of East Providence, Rhode Island Wastewater System Improvements Water Pollution Control Facility Record Drawings" dated December 2012.

Owner will provide PDF electronic copies of these other Site-related documents available to any Bidder on request.

B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.

C. The other Site-related documents are not part of the Contract Documents.

D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

E. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.

C. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be made available upon request.

D. Bidders visiting the Site are required to arrange their own transportation to the Site.

E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the Owner or Engineer contact. Bidder must conduct the required Site visit during normal working hours.

F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

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

5.06 *Other Work at the Site*

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

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

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

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

A. Any questions regarding the Bid should be directed to Daniel Borges, Director of Public Works (401) 435-7701 dborges@eastprovidenceri.gov, or Erik Skadberg, PE, City Engineer (401) 435-7703 extension 1, eskadberg@eastprovidenceri.gov, no later than **Thursday, February 16th AT 2:00 PM**, local time.

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's

damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents 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 Engineer 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 Engineer until after the Effective Date of the Contract.

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

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 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.

11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the Work defined in the Contract Documents five days after Bid opening:

11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of

Award is given, request apparent Successful Bidder to submit an acceptable substitute, without an increase in Bid price.

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

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 ***Not Used.***

13.02 *Base Bid with Additional Quantities*

A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each additional quantity described in the Bidding Documents and as provided for in the Bid Form.

13.03 ***Not Used.***

13.04 ***Not Used.***

13.05 ***Not Used.***

13.06 *Allowances*

A. For Contingency Allowances, the Bid Price must include the amount established by the Owner on the Bid Form

13.07 ***Not Used.***

ARTICLE 14—SUBMITTAL OF BID

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

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the

notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned.

ARTICLE 16—OPENING OF BIDS

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

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

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

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of

the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

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

D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

E. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.

F. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.

1. The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder-specified time of Substantial Completion in calendar days times the rate for liquidated damages **$1,000** in dollars per day.

2. 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.

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for

those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

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

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

ARTICLE 20—SIGNING OF AGREEMENT

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

ARTICLE 21—STATUTORY AND FUNDING-FINANCING REQUIREMENTS

21.01 Not Applicable.

21.02 Not Applicable

ARTICLE 22—SALES AND USE TAXES

22.01 The City of East Providence is exempt from the Rhode Island Sales or Use Tax under the 1956 General Laws of the State of Rhode Island, Section 44-18-30, Para. 1, as amended. Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

BID FORM

CITY OF EAST PROVIDENCE, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS

WATER POLLUTION CONTROL FACILITY
IMPROVEMENTS AND CONCRETE LINING

TABLE OF ARTICLES

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

City of East Providence, Rhode Island
City Hall Controllers Office, Room 103, Attn: Ralph Mitchell, Procurement Specialist
145 Taunton Avenue
East Providence, Rhode Island 02914

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with Owner, by executing the Agreement 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 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. 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. Bidder will sign the Agreement and will furnish the required contract security, and other required documents within the time periods set forth in the Bidding Documents.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda.

Addendum No.	Addendum Date

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. 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 any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the

preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. 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.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATIONS

4.01 Bidder certifies that:

A. 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;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of the Paragraph 4.01.D;

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing 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;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

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

Lump Sum Bid Price, Item No. 1	$

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
2	Additional Repair Type 1	Square Foot	500	$	$
3	Additional Repair Type 2	Square Foot	500	$	$
4	Additional Repair Type 3	Linear Foot	250	$	$
5	Additional Concrete Lining	Square Foot	500	$	$
6	Additional Bypass Pumping	Day	25	$	$
7	Additional Testing Allowance	Each	1	$50,000	$50,000
				$	$
Total of All Unit Price Bid Items					$

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

Total of Lump Sum and Unit Price Bids = Total Bid Price $ _____

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General

Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages and special damages in the event of failure to complete the Work within the Contract Times. Bidder also accepts the provisions for performance damages, if any, included in the Contract Documents.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Required bid security.

B. Required Qualifications Statement with supporting data.

C. Listing of Subcontractors, Suppliers, and other individuals and entities required to be identified in this Bid.

D. Anti-Collusion Declaration.

ARTICLE 8 – DEFINED TERMS

8.01 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 9 – BID SUBMITTAL

9.01 This Bid submitted by:

BIDDER: [Indicate correct name of bidding entity]

_____

By: [Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

+ + END OF BID FORM + +

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:

Description *(Project Name— Include Location)*:

BOND

Bond Number:

Date:

Penal sum _____ $ _____

(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Addresses are to be used for giving any required notice.

Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid as determined by Owner for the work required by the Contract Documents, provided that:

1.1 If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the penal sum set forth on the face of this Bond, and

1.2 In no event shall Bidder's and Surety's obligation hereunder exceed the penal sum set forth on the face of this Bond.

1.3 Recovery under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

QUALIFICATIONS STATEMENT

Prepared by

Issued and Published Jointly by

QUALIFICATIONS STATEMENT

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. **SUBMITTED BY:**

   Official Name of Firm: _____

   Address: _____

   _____

   _____

2. **SUBMITTED TO:** _____

3. **SUBMITTED FOR:** _____

   Owner: _____

   Project Name: _____

   _____

   _____

   _____

   TYPE OF WORK: _____

   _____

   _____

4. **CONTRACTOR'S CONTACT INFORMATION**

   Contact Person: _____

   Title: _____

   Phone: _____

   Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

_____

_____

6. TYPE OF ORGANIZATION:

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

_____

_____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

_____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐ YES ☐ NO

If YES, attach as an Attachment details including project owner's contact information.

Has any corporate officer, partner, joint venture participant, or proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA Form 300A - Summary of Occupational Injuries and Illnesses for each of the past 5 years. When requested by Owner or Engineer after receipt of Bids, promptly submit OSHA Form 300 – Log of Work-Related Injuries and Illnesses, for each of the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last five years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20___

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES:_____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

+ + END OF QUALIFICATIONS STATEMENT + +

SECTION 00 45 13.1

ANTI-COLLUSION DECLARATION

The Bidder, by virtue of issuing a Bid certifies that Bidder has not divulged, discussed or compared the Bid with other Bidders and has not colluded with any other Bidder of parties to a Bid whomsoever. Bidder further certifies and agrees that premiums, rebates or gratuities are prohibited whether with, prior to, or after any delivery of material or services. Any such violation will result in the cancellation of this contract and the removal of offending parties from all Bid lists.

CONFLICT OF INTEREST

The Bidder and all sub-contractors shall disclose in writing as part of their Bid any possible or potential conflicts of interest which are known to, or reasonably should be known to the Bidder or sub-contractors, which may exist between their firms and the City of East Providence.

All Bidders and their subcontractors and business partners must disclose with their Bid, the name of any officer, director, agent or employee who is also an employee or family member of an employee of the City of East Providence.

Further, the Bidder must disclose the name of any City of East Providence employee or family member or any elected official who owns, directly or indirectly, an investment or other proprietary interest, in the firm or any of its parent company, subsidiaries or affiliates.

The Bidder and all sub-contractors and business partners shall disclose in writing as part of their Bid, any familial, personal or business relationships between members of Bidders, sub-contractor's or business partner's firms and members of the City of East Providence, whether or not there is any belief that the relationship might constitute a possible conflict of interests.

BIDDING FIRM:_____

SIGNATURE:_____ DATE:_____

PRINT NAME:_____ TITLE:_____

CITY OF EAST PROVIDENCE, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS

WATER POLLUTION CONTROL FACILITY
IMPROVEMENTS AND CONCRETE LINING

00 52 13

AGREEMENT

This Contract (the "Contract") is made and entered into by and between the City of East Providence, (the "City") and _____ (the "Contractor"). This Contract shall become effective on the date it is executed by the last party to execute it ("the Effective Date").

This Contract is for a project identified as "Water Pollution Control Facility Improvements and Concrete Lining" (the "Project").

For and in consideration of the mutual promises, covenants and agreements set forth herein, and for other good and valuable consideration, the sufficiency of which is hereby acknowledged, the City and the Contractor agree as follows:

ARTICLE 1
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows but not limited to by-pass pumping to allow full wastewater structure access and dewatering, disinfection of wastewater structures, removal and proper disposal of degraded and unsound concrete from wastewater structures requiring rehabilitation, removal and proper disposal of wash water and blast media, replacement of reinforcing steel in wastewater structures as applicable, restoration of concrete wastewater structures using an appropriate cementitious repair mortar, and installation of epoxy lining to protect restored concrete wastewater structures.

ARTICLE 2
DOCUMENTS INCORPORATED BY REFERENCE

This Contract includes the plans and specifications for the Project as identified thereon as such, plus the following:_____ all of which are hereby incorporated herein by reference and made a part hereof. Change Orders issued hereafter, and any other amendments executed by the City and the Contractor, shall become and be a part of this Contract. Documents not included or expressly contemplated in this Article 2 do not, and shall not, form any part of this Contract.

ARTICLE 3
REPRESENTATIONS OF THE CONTRACTOR

In order to induce the City to execute this Contract and recognizing that the City is relying thereon, the Contractor, by executing this Contract, makes the following express representation to the City:

(A) The Contractor is fully qualified to act as the contractor for the Project and has, and shall maintain, any and all licenses, permits or other authorizations necessary to act as the contractor for, and to construct, the Project;

(B) The Contractor has become familiar with the Project site and the local conditions under which the Project is to be constructed and operated;

(C) The Contractor has received, reviewed and carefully examined all the documents which make up this Contract, including, but not limited to, the plans and specifications, and has found them in all respects to be complete, accurate, adequate, consistent, coordinated and sufficient for construction;

(D) The Contractor is familiar with all Federal, State, municipal, and department laws, ordinances, orders, and regulations which may in any way affect the work of those employed therein, including, but not limited to, any special acts relating to the work or the Project of which it is a part;

(E) The Contractor is aware of the hazards involved in the work and the danger to life and property both evident and inherent, and that the Contractor will conduct the work in a careful and safe manner without injury to person or property.

ARTICLE 4
INTENT AND INTERPRETATION

With respect to the intent and interpretation of this Contract, the City and the Contractor agree as follows:

(A) This Contract, together with the Contractor's and Surety's performance and payment bonds for the Project, if any, constitute the entire and exclusive agreements between

the parties with reference to the Project, and said Contract supersedes any and all prior discussions, communications, representations, understandings, negotiations, or agreements. This Contract also supersedes any bid documents not incorporated herein pursuant to Article 2.

(B) Anything that may be required, implied or inferred by the documents which make up this Contract, or any one or more of them, shall be provided by the Contractor for the Contact Price;

(C) Nothing contained in this Contract shall create, nor be interpreted to create, privity or any other relationship whatsoever between the City and any person except the Contractor;

(D) When a word, term, or phrase is used in this Contract, it shall be interpreted or construed first, as defined herein; second, if not defined, according to its generally accepted meaning in the construction industry; and third, if there is no generally accepted meaning in the construction industry, according to its common and customary usage;

(E) The Contractor shall have a continuing duty to read, examine, review, compare and contrast each of the documents which make up this Contract, shop drawings, and other submittals and shall give written notice to the City of any conflict, ambiguity, error or omission which the Contractor may find with respect to these documents before proceeding with the affected work. The express or implied approval by the City of any shop drawings or other submittals shall not relieve the Contractor of the continuing duties imposed herein, nor shall any such approval be evidence of the Contractor's compliance with this Contract. HOWEVER, THE CITY MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO THE CONTRACTOR CONCERNING SUCH DOCUMENTS. The Contractor again hereby acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction, and that the Contractor has not, does not, and will not rely upon any representations or warranties by the City concerning such documents, as no such representations or warranties have been or are hereby made;

(F) In the event of any conflict, discrepancy, or inconsistency among any of the documents which make up this Contract, the following shall control:

(1) As between drawings and specifications, the specifications shall govern;

(2) As between figures given on plans and scale measurements, the figures shall govern;

(3) As between this document and the plans or specifications, this document shall govern.

ARTICLE 5
OWNERSHIP OF DOCUMENTS WHICH MAKE UP THE CONTRACT

The documents which make up this Contract, and each of them, as well as any other documents furnished by the City, shall remain the property of the City. The City shall provide the Contractor with a sufficient number of copies of the complete Contract as the City determines is necessary. The Contractor shall have the right to keep the Contractor's executed set; provided, however, that in no event shall the Contractor use, or permit to be used, any portion or all of such Contract on other projects without the City's prior written authorization. All sets in usable condition, with the exception of the Contractor's executed set, shall be returned to the City at the completion or cessation of the work or termination of the Contract.

ARTICLE 6
CONTRACTOR'S PERFORMANCE

The Contractor shall perform all of the work required, implied or reasonably inferable from this Contract including, but not limited to, the following:

(A) Construction of the Project;

(B) The furnishing of any required surety bonds and insurance;

(C) The provision and furnishing, and prompt payment thereof, of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, fuel, heat, light, cooling, or other utilities, required for construction and all necessary building permits and other permits required for the construction of the Project;

(D) The creation and submission to the City of detailed and comprehensive as-built drawings depicting all as-built construction. Said as-built drawings shall be submitted to the City upon final completion of the Project and receipt of same by the City shall be a condition precedent to final payment to the Contractor.

ARTICLE 7
TIME FOR CONTRACTOR'S PERFORMANCE

(A) The Contractor shall commence the performance of this Contract within ten (10) calendar days after the Notice to Proceed and shall diligently continue its performance to and until final completion of the Project (subject to a winter shutdown period if necessary as provided for in Article 8 Paragraph (L)). The Contractor shall accomplish Substantial Completion of the Project on or before the date established pursuant to Paragraphs (K) and (L) in Article 8.

(B) The Contractor shall pay the City the sum of one thousand Dollars ($1,000) per day for each and every calendar day of unexcused delay in achieving Substantial Completion beyond the date set forth herein for Substantial Completion. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at the time of executing this Contract. When the City reasonably believes that Substantial Completion will be inexcusably delayed, the City shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the City to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving Substantial Completion, or any part thereof, for which the City has withheld payment, the City shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages.

(C) The term "Substantial Completion," as used herein, shall mean that point as determined by the City at which the Project is at a level of completion in strict compliance with this Contract such that the City or its designee can enjoy beneficial use or occupancy of the Project being deemed substantially complete, and such partial use or occupancy shall not be evidence of Substantial Completion.

(D) All limitations of time set forth herein are material and are of the essence of this Contract.

ARTICLE 8
PAYMENTS TO CONTRACTOR

(A) The City shall pay, and the Contractor shall accept, as full and complete payment for the Contractor's timely performance of its obligations hereunder, the Contract Sum of ($). The price set forth in this Article 8 shall constitute the Contract Price, which shall not be modified except by Change Order as provided in this Contract.

(B) The City shall pay the Contract Price to the Contractor in accordance with the procedures set forth in this Article 8. On or before the 15th day of each month after commencement of performance, but no more frequently than once monthly, the Contractor may submit a Payment Request for the period ending the 31st day of the preceding month. Said Payment Request shall be in such format and include whatever supporting information as may be required by the City. Each Payment Request shall be signed by the Contractor and shall constitute the Contractor's representation that the quantity of work has reached the level for which payment is requested, that the work has been properly installed or performed in strict compliance with this Contract and that the Contractor knows of no reason why payment should not be made as requested. Thereafter, the City shall review the Payment Request and may also review the work at the project site or elsewhere to determine whether the quantity and quality of the work is as represented in the Payment Request and is as required by this Contract. The City shall approve in writing the amount which, in the opinion of the City, is properly owing to the Contractor. The payment of

the Contractor's invoice will be made no later than thirty (30) days after the receipt of the invoice.

(C) The City will retain a percentage of the progress or monthly payments claimed, including approved change orders. The retainage shall remain at five percent (5%) until seventy-five percent (75%) of the Contract is complete, as determined by the City. At that time if the City decides the Contractor is making adequate progress, the City may reduce retainage to two and one half percent (2.5%) of the dollar value of all work satisfactorily complete to date, including change orders. Any further reduction in the retainage amount shall be at the City's discretion. The retainage shall be paid by the City to the Contractor within ninety (90) days of the date the work is accepted by the City unless a dispute exists with respect to the work.

(D) Upon Substantial Completion, the City may reduce the amount of retainage to the final retainage of 1 % of the dollar value of all work satisfactorily completed to date, including approved change orders plus an additional retainage based on the City's estimate of the fair value of any punch list items and the cost of completing and/or correcting such incomplete or defective items or work. As these items are completed or corrected, they shall be paid for out of the retainage until Final Completion and Acceptance of Work is declared by the City. The final 1 % retainage shall be paid to the Contractor by the City within ninety (90) days of the date the work is accepted by the City unless a dispute exists with respect to the work.

(E) Upon Final Completion and Acceptance of Work, the City shall issue a certificate attached to the final payment request stating that the Work has been accepted by the City under the conditions of the Contract Documents. The entire balance to be due the Contractor shall be paid to the Contractor within ninety (90) days of Final Completion and Acceptance of Work.

(F) When payment is received from the City, the Contractor shall immediately pay all subcontractor, materialmen, laborers, and suppliers the amounts they are due for the work covered by such payment. In the event the City becomes informed that the Contractor has not paid a subcontractor, materialmen, laborer, or supplier as provided herein, the City shall have the right, but not the duty, to issue future checks and payment to the Contractor of amounts otherwise due hereunder naming the Contractor and any such subcontractor, materialmen, laborer, or supplier as joint payees. Such joint check procedure, if employed by the City, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the City to repeat the procedure in the future.

(G) Neither payment to the Contractor, utilization of the Project for any purpose by the City, nor any other act or omission by the City shall be interpreted or construed as an acceptance of any work of the Contractor not strictly in compliance with this Contract.

(H) The City shall have the right to refuse to make payment and, if necessary, may demand the return of a portion or all of the amount previously paid to the Contractor due to:

(1) The quality of a portion, or all, of the Contractor's work not being in accordance with the requirements of this Contract;

(2) The quantity of the Contractor's work not being as represented in the Contractor's Payment Request, or otherwise;

(3) The Contractor's rate of progress being such that, in the City's opinion, substantial or final completion, or both, may be inexcusably delayed;

(4) The Contractor's failure to use Contract funds, previously paid the Contractor by the City, to pay Contractor's Project-related obligations including, but not limited to, subcontractors, laborers and material and equipment suppliers;

(5) Claims made, or likely to be made, against the City or its property;

(6) Loss caused by the Contractor;

(7) The Contractor's failure or refusal to perform any of its obligations to the City.

In the event that the City makes a written demand upon the Contractor for amounts previously paid by the City as contemplated in this Paragraph (H), the Contractor shall promptly comply with such demand.

(I) When Substantial Completion has been achieved, the Contractor shall notify the City in writing and shall furnish to the City a listing of those matters yet to be finished. The City will thereupon conduct and inspection to confirm that the work is in fact substantially complete. Upon its confirmation that the Contractor's work is substantially complete, the City will so notify the Contractor in writing and will therein set forth the date of Substantial Completion. If the City, through its inspection, fails to find that the Contractor's work is substantially complete, and is required to repeat all, or any portion, of its Substantial Completion inspection, the Contractor shall bear the cost of such repeat inspection(s) which cost may be deducted by the City from any payment then or thereafter due to the Contractor.

(J) When the Project is finally complete and the Contractor is ready for final inspection, it shall notify the City thereof in writing. Thereupon, the City will perform a final inspection of the project. If the City confirms that the project is complete in full accordance with this Contract and the Contractor has performed all of its obligations to the City hereunder, the City will furnish a final Approval for Payment certifying that the project is complete and the Contractor is entitled to the remainder of the unpaid Contract Price, less any amount withheld pursuant to this Contract. If the City is unable to issue its final Approval for Payment and is required to repeat its final inspection of the Project,

the Contractor shall bear the cost of such repeat inspection(s), which costs may be deducted by the City from the Contractor's final payment.

(K) The Contractor is to begin work within ten (10) days after the date of the Notice to Proceed and shall complete the work within **450** consecutive days of notification of each assignment. If the Contractor fails to complete the work as set forth in this Paragraph (K), the Contractor shall pay the City the sum of one thousand Dollars **($1,000)** per day for each and every calendar day of unexcused delay in completing the work. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at or before the time of executing this Contract. When the City reasonably believes that the date of completion will be inexcusably delayed, the City shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the City to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving completion of the work, or any part thereof, for which the City has withheld payment, the City shall promptly release the Contractor those funds withheld, but no longer applicable, as liquidated damages.

(L) The time for completion noted above has been developed upon the assumption that the work may be suspended during winter shutdown if necessary. Winter shutdown shall be determined by the Director of Public Works for the City of East Providence. The time period specified for completion of the work in Paragraph (K) above shall be suspended during such winter shutdown. The contractor shall plan on winter shutdown period based upon these dates unless otherwise directed by the City. The winter shutdown dates are subject to change depending on the weather conditions. The City shall notify the Contractor in writing if there is a change in the winter shutdown period due to weather, environmental or other conditions which preclude the work from being executed in accordance with these documents.

(M) Prior to being entitled to receive final payment, and as a condition precedent thereto, the Contract shall furnish to the City, in the form and manner required by the City:

(1) An affidavit that all of the Contractor's obligations to subcontractors, laborers, equipment or material suppliers, or other third parties in connection with the Project, have been paid or otherwise satisfied;

(2) If required by the City, separate releases of lien or lien waivers from each subcontractor, lower tier subcontractor, laborer, supplier or other person or entity who has, or might have a claim against the City or the City's property;

(3) If applicable, consent(s) of surety to final payment;

(4) All product warranties, operating manuals, instruction manuals and other record documents, drawings and things customarily required of the

Contractor, or expressly required herein, as a part of or prior to Project closeout.

ARTICLE 9
MUNICIPAL POLICE TRAFFIC CONTROL

The cost of municipal police traffic control shall be paid in accordance with RIGL § 37-12-10. The Contractor shall be responsible for scheduling municipal police officers for traffic control purposes through the police department. If traffic control assignments are cancelled without twenty-four (24) hours notice, the Contractor is responsible to pay the City of East Providence for the hours police officers would have worked if it had not been for the untimely cancellation of the assignment. The City at its sole discretion may require such scheduling to be pre-approved by the Public Works Department. The Contractor is responsible for all highway safety equipment for traffic control purposes including but not limited to proper signage and traffic cones.

ARTICLE 10
CEASE AND DESIST ORDER

In the event the Contractor fails or refuses to perform the work as required herein, the City may instruct the Contractor to cease and desist from performing further work in whole or in part. Upon receipt of such instruction, the Contractor shall immediately cease and desist as instructed by the City and shall not proceed further until the cause for the City's instruction has been corrected, no longer exists, or the City instructs that the work resume. In the event the City issues instructions to cease and desist, and in the further event that the Contractor fails and refuses within seven (7) calendar days of receipt of same to provide adequate assurance to the City that the cause of such instructions will be eliminated or corrected, then the City shall have the right, but not the obligation, to carry out the work with its own forces, or with the forces of another contractor, and the Contractor shall be fully responsible and liable for the costs of performing such work by the City. The rights set forth herein are in addition to, and without prejudice to, any other rights or remedies the City may have against the Contractor.

ARTICLE 11
DUTIES, OBLIGATIONS AND RESPONSIBILITIES OF THE CONTRACTOR

In addition to any and all other duties, obligations and responsibilities of the Contractor set forth in this Contract, the Contractor shall have and perform the following duties, obligations and responsibilities to the City:

(A) The Contractor is again reminded of its continuing duties set forth in Article 4 Paragraph (E), which are by reference hereby incorporated in this Paragraph (A). The Contractor shall not perform work without adequate plans and specifications, or, as appropriate, approved shop drawings, or other submittals. If the Contractor performs work knowing or believing it involves an error, inconsistency or omission in the Contract without first providing written notice to the City and the Architect, the Contractor shall be responsible for such work and pay the cost of correcting same;

(B) All work shall strictly conform to the requirements of this Contract;

(C) The work shall be strictly supervised, the Contractor bearing full responsibility for any and all acts or omissions of those engaged in the work on behalf of the Contractor;

(D) The Contractor hereby warrants that all labor furnished under this Contract shall be competent to perform the tasks undertaken, that the product of such labor shall yield only first-class results, that all materials and equipment provided shall be new and of high quality, that the completed work will be complete, of high quality, without defects, and that all work strictly complies with the requirements of this Contract. Any work not strictly complying with the requirements of this Paragraph (D) shall constitute a breach of the Contractor's warranty;

(E) The Contractor shall obtain and pay for all required permits, fees and licenses customarily obtained by the Contractor. The Contractor shall comply will all legal requirements applicable to the work;

(F) The Contractor shall employ and maintain at the Project site only competent supervisory personnel.

(G) The Contractor shall keep an updated copy of this Contract at the Project sire. Additionally, the Contractor shall keep a copy of approved shop drawings and other submittals. All of these items shall be available to the City at all regular business hours. Upon final completion of the work, all of these items shall be finally updated and provided to the City and shall become property of the City.

(H) The Contractor shall maintain the Project site in a reasonably clean condition during performance of the work. Upon final completion, the Contractor shall thoroughly clean the Project site of all debris, trash and excess materials or equipment.

(I) At all times relevant to this Contract, the Contractor shall permit the City to enter upon the Project site and to review or inspect the work without formality or other procedure.

ARTICLE 12
DUTIES, OBLIGATIONS AND RESPONSIBILITIES OF THE CITY

(A) Except for permit fees, which are the responsibility of the Contractor, the City shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, and services performed pursuant to the Contract.

(B) If the Contractor fails to correct work which is not in accordance with the requirements of the contract, and persistently fails to carry out the work in accordance with the Contract, the City, by a written letter, may order the contractor to stop all work, or any portion thereof, until the cause of such order has been eliminated; however, the right of

the City to stop the work shall not give rise to a duty on the part of the city to exercise this right for the benefit of the Contractor or any other person or entity.

(C) Upon completion and acceptance of the work, the City shall issue a certificate attached to the final payment request that the work has been accepted by the City under the conditions of the Contract.

ARTICLE 13
"OR EQUAL" CLAUSE

(A) Whenever a material or article required is specified or shown on the drawings by using the name of the proprietary product of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design may be considered equal and satisfactory providing the material or article so proposed is of equal substance and function in the City's opinion. It shall not be purchased or installed without the City's written approval. In all cases new material shall be used in the project.

(B) If more than one brand, make of material, device, or piece of equipment is shown or specified, each should be regarded as the equal of the other. Any other brand, make of material, device, or equipment, which in the opinion of the City or its Authorized Representative, is the recognized equal of that specified (considering quality, workmanship and economy of operation), and is suitable for the purpose intended, may be accepted.

ARTICLE 14
INDEMNITY

The Contractor shall indemnify and hold the City harmless from any and all claims, liability, damages, loss, cost and expense of every type whatsoever including, without limitation, attorney's fees and expenses, in connection with the Contractor's performance of this Contract, provided that such claims, liability, damage, loss, cost or expense is due to sickness, personal injury, disease or death, or loss or destruction of tangible property (other than the work itself), including loss of use resulting therefrom, to the extent caused by the Contractor, or anyone for whose acts the Contractor may be liable, regardless of whether such liability, claim, damage, loss, cost or expense is caused in part by the City.

ARTICLE 15
CLAIMS BY THE CONTRACTOR

Claims by the Contractor against the City are subject to the following terms and conditions:

(A) All Contractor claims against the City shall be initiated by a written claim submitted to the City. Such claim shall be received by the City no later than seven (7) calendar days after the event, or the first appearance of the circumstances, causing the claim, and the same shall set forth in detail all known facts and circumstances supporting the claim;

(B) The Contractor and the City shall continue their performance hereunder regardless of the existence of any claims submitted by the Contractor.

(C) In the event the Contractor discovers previously concealed and unknown site conditions which are materially at variance from those typically and ordinarily encountered in the general geographical location of the Project, the Contract Price shall be modified either upward or downward, upon the written claim made by either party within seven (7) calendar days after the first appearance to such party of the circumstances. As a condition precedent to the City having any liability to the Contractor due to concealed and unknown conditions, the Contractor must give the City written notice of, and an opportunity to observe, such condition prior to disturbing it. The failure by the Contractor to give written notice and make the claim as provided by this Paragraph (C) shall constitute a waiver by the Contractor of any rights arising out of or relating to such concealed and unknown condition.

(D) In the event the Contractor seeks to make a claim for an increase in the Contract Price, as a condition precedent to any liability of the City thereof, the Contractor shall strictly comply with the requirements of Paragraph (A) above and such claim shall be made by the Contractor before proceeding to execute any additional or change work. Failure of the condition precedent to occur shall constitute a waiver by the Contractor of any claim for additional compensation.

(E) In connection with any claim by the Contractor against the City for compensation in excess of the Contract Price, any liability of the City for the Contractor's cost shall be strictly limited to direct cost incurred by the Contractor and shall in no event include indirect cost or consequential damages of the Contractor. The City shall not be liable to the Contractor for claims of third-parties including subcontractors, unless and until liability of the Contractor has been established therefor in a court of competent jurisdiction.

(F) In the event the Contractor shall be delayed in performing any task which at the time of the delay is then critical, or which during the delay becomes critical, as the sole result of any act or omission by the City or someone acting in the City's behalf, or by City-authorized Change Orders, unusually bad weather not reasonably anticipated, fire or other Acts of God, the date for achieving Substantial Completion, or, as applicable, final completion, shall be appropriately adjusted by the City upon the written claim of the Contractor to the City. A task is critical within the meaning of the this Paragraph (F) if, and only if, said task is on the critical path of the Project schedule so that delay in performing such task will delay the ultimate completion of the project. Any claim for an extension of time by the Contractor shall strictly comply with the requirements of Paragraph (A) above. If the Contractor fails to make such claim as required in this Paragraph (F), any claim for an extension of time shall be waived.

ARTICLE 16
SUBCONTRACTORS

Upon execution of this Contract, the Contractor shall identify to the City, in writing, those parties intended as subcontractors on the Project. The City shall, in writing, state any objections the City may have to one or more of such subcontractors. The Contractor shall not enter into a subcontract with an intended subcontractor with reference to whom the City objects. The Contractor shall not award work to a subcontractor(s) in excess of fifty (50) percent of the Contract Price, without prior written approval of the City. All subcontracts shall afford the Contractor rights against the subcontractor which correspond to those rights afforded to the City against the Contractor herein. Nothing contained in this Contract shall create any contractual relation between any subcontractor and the City.

ARTICLE 17
WAGE RATES

(A) There shall be paid to each laborer or mechanic of the Contractor or subcontractor engaged in the work on the Project under this Contract in the trade or occupation, an hourly wage pursuant to § 37-13-7 of the General Laws of the State of Rhode Island regardless of any contractual relationship which may be alleged to exist between the Contractor or any subcontractor and such laborers and mechanics.

(B) If, after the award of the Contract, it becomes necessary to employ any person in a trade or occupation not classified in the Contract, such person shall be paid at not less than a rate to be determined by the same authority which established the other wage rates for this Contract. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. The Contractor shall notify the City of his intention to employ persons in trades or occupations not classified in sufficient time for the City to obtain approved rates for such trades or occupations.

(C) The foregoing specified wage rates are minimum rates only, and the City will not consider any claims for additional compensation made by the Contractor because of payment by the Contractor of any wage rate in excess of the applicable rate contained in this Contract. All disputes in regard to the payment of wages in excess of those specified in this Contract, shall be adjusted by the Contractor.

(D) Except as may otherwise be required by law, all claims and disputes pertaining to the classification of labor employed on the Project under this Contract, shall be decided by the City's governing body or other duly designated official.

ARTICLE 18
CHANGE ORDERS

One or more changes to the work within the general scope of this Contract may be ordered by Change Order. The Contractor shall proceed with any such changes, and the same shall be accomplished in strict accordance with the following terms and conditions:

(A) Change Order shall mean a written order to the Contractor executed by the City after execution of this Contract, directing a change in the work and may include a change in the Contract Price or the time for the Contractor's performance, or any combination thereof;

(B) Any change in the Contract Price resulting from a Change Order shall be determine as follows:

(1) By mutual agreement between the City and the Contractor as evidenced by (a) the change in the Contract Price being set forth in the Change Order, (b) such change in the Contract Price, together with any conditions or requirements relating thereto, being initialed by both parties and (c) the Contractor's execution of the Change Order; or,

(2) If no mutual agreement occurs between the City and the Contractor, the change in the Contract Price, if any, shall be derived by determining the reasonable actual costs incurred or savings achieved, resulting from revisions in the work. Any such costs or savings shall be documented in the format, and with such content and detail as the City requires.

(C) The execution of a Change Order by the Contractor shall constitute conclusive evidence of the Contractor's agreement to the ordered changes in the work, this Contract as thus amended, the Contract Price and the time for performance by the Contractor. The Contractor, by executing the Change Order, waives and forever releases any claim against the City for additional time or compensation for matters relating to or arising out of or resulting from the work included within or affected by the executed Change Order.

(D) The Contractor shall notify and obtain the consent and approval of the Contractor's surety with reference to all Change Orders if such notice, consent or approval are required by the City, the Contractor's surety or law. The Contractor's execution of the Change Order shall constitute the Contractor's warranty to the City that the surety shall be conclusively deemed to have been notified of such Change Order and to have expressly consented thereto.

ARTICLE 19
DISCOVERING AND CORRECTING DEFECTIVE OR INCOMPLETE WORK

(A) In the event that the Contractor covers, conceals or obscures its work in violation of this Contract or in violation of a directive from the City, such work shall be uncovered and displayed for the City's inspection upon request, and shall be reworked at no cost in time or money to the City;

(B) If any of the work is covered, concealed or obscured in a manner not covered by Paragraph (A) above, it shall, if directed by the City be uncovered and displayed for the City's inspection. If the uncovered work conforms strictly with this Contract, the costs

incurred by the Contractor to uncover and subsequently, replace such work shall be borne by the City. Otherwise, such costs shall be borne by the Contractor;

(C) The Contractor shall, at no cost in time or money to the City, correct work rejected by the City as defective or failing to conform to this Contract. Additionally, the Contractor shall reimburse the City for all testing, inspection and other expenses incurred as a result thereof.

(D) In addition to its warranty obligations set forth elsewhere herein, the Contractor shall be specifically obligated to correct any and all defective or nonconforming work for a period of twelve (12) months following final completion upon written direction from the City.

(E) The City may, but in no event be required to, choose to accept defective or nonconforming work. In such event, the Contract Price shall be reduced by the greater of (1) the reasonable costs of removing and correcting the defective or nonconforming work, and (2) the difference between the fair market value of the Project as constructed and the fair market value of the project had it not been constructed in a manner as to include defective or nonconforming work. If the remaining portion of the unpaid Contract Price, if any, is insufficient to compensate the City for the acceptance of defective or nonconforming work, the Contractor shall, upon written demand from the City, pay the City such remaining compensation for accepting defective or nonconforming work.

ARTICLE 20
TERMINATION BY THE CONTRACTOR

If the City repeatedly fails to perform its material obligations to the Contractor for a period of thirty (30) days after receiving written notice from the Contractor of its intent to terminate hereunder, the Contractor may terminate performance of this Contract by written notice to the City. In such event, the Contractor shall be entitled to recover from the City as though the City had terminated the Contractor's performance under this Contract for convenience pursuant to Article 22 Paragraph (A) hereunder.

ARTICLE 21
CITY'S RIGHT TO SUSPEND CONTRACTOR'S PERFORMANCE

(A) The City shall have the right at any time to direct the Contractor to suspend its performance, or any designated part thereof, for any reason whatsoever, or without reason, for a cumulative period of up to thirty (30) calendar days. If any such suspension is directed by the City, the Contractor shall immediately comply with same.

(B) In the event the City directs a suspension of performance under this Article 21, through no fault of the Contractor, the City shall pay the Contractor as full compensation for such suspension the Contractor's reasonable costs, actually incurred and paid, of:

(1) Demobilization and remobilization, including such costs paid to subcontractors;
(2) Preserving and protecting work in place;
(3) Storage of materials or equipment purchased for the Project, including insurance thereon;
(4) Performing in a later, or during a longer, time frame than that contemplated by this Contract.

ARTICLE 22
TERMINATION BY THE CITY

The City may terminate this Contract in accordance with the following terms and conditions:

(A) The City may, for any reason whatsoever, terminate performance under this Contract by the Contractor for convenience. The City shall give written notice of such termination to the Contractor specifying when termination becomes effective. The Contractor shall incur no further obligations in connection with the work and the Contractor shall stop work when such termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The City may direct the Contractor to assign the Contractor's right, title and interest under termination orders or subcontracts to the City or designee. The Contractor shall transfer title and deliver to the City such completed or partially completed work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has. When terminated for convenience, the Contractor shall be compensated as follows:

1) The Contractor shall submit a termination claim to the City specifying the amounts due because of termination for convenience together with costs, pricing or other data required by the City. If the Contractor fails to file a termination claim within one (1) year from the effective date of termination, the City shall pay the Contractor, an amount derived in accordance with Paragraph (3) below;

2) The City and the Contractor may agree to the compensation, if any, due to the Contractor hereunder;

3) Absent agreement to the amount due to the Contractor, the City shall pay the Contractor the following amounts:

a) Contract prices for labor, materials, equipment and other services accepted under this contract;

b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the

Contractor's performance, plus a fair and reasonable allowance for jobsite overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it appears that the Contractor would not have profited or would have sustained a loss if the entire Contract would have been contemplated, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any;

c) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Paragraph (A) of this Article. These costs shall not include amounts paid in accordance with other provisions hereof.

The total sum to be paid the Contractor under this Paragraph (A) shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

(B) If the Contractor does not perform the work, or any part thereof, in a timely manner, supply adequate labor, supervisory personnel or proper equipment or materials, or if it fails to timely discharge its obligations for labor, equipment, and materials, or proceeds to disobey applicable law, or otherwise commits a violation of a material provision of this Contract, then the City, in addition to any right it may have against the Contractor or others, may terminate the performance of the Contractor and assume possession of the Project site and of all materials and equipment at the site and may complete the work. In such case, the Contractor shall not be paid further until the work is complete. After final completion has been achieved, if any portion of the Contract Price, as it may be modified hereunder, remains after the cost to the City of completing the work, including all costs and expenses of ever nature incurred, has been deducted by the City, such remainder shall belong to the Contractor. Otherwise, the Contractor shall pay and make whole the City for such cost. This obligation for payment shall survive the termination of the Contract. In the event the employment of the Contractor is terminated by the City for cause pursuant to this Paragraph (B) and is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under Paragraph (A) of this Article and the provision of Paragraph (A) shall apply.

ARTICLE 23
INSURANCE

The Contractor shall carry and maintain the following insurance coverages at his own expense:

(A) All insurance for this Contract shall be written by a company (or companies) acceptable to the City and all policies or certificates shall be submitted to the City for examination prior to commencement of operations by the Contractor. In the event any policy or certificate, the amount of insurance, or the company writing same are not satisfactory to the City, the Contractor shall secure other policies or certificates in form and amount with a company satisfactory to the City. The Contractor shall not permit policies to be changed, cancelled, or to lapse and all policies shall include a clause to the effect that the policy shall not be subject to cancellation or a reduction in the limits of liability or amounts of insurance until notice has been sent by mail to the City stating when, (not less than thirty days thereafter) such cancellation or reduction shall be effective. All certificates of insurance shall be delivered to the City and contain true transcripts from the policy or policies authenticated by the proper officer of the insurer evidencing in particular those insured, the extent of the insurance, the location and operations to which the insurance applies, the expiration date and the above mentioned notice as to the location and operations involved.

If any part of the work is sublet, similar insurance shall be provided by or in behalf of the subcontractors to cover their operations. The Contractor shall be charged with the responsibility for insurance protection for all his subcontract operations and should the Contractor's policy not cover each and every subcontractor, certificates of insurance acceptable to the City covering each and every subcontractor shall be filed with said City prior to the commencement of subcontract operations.

(B) Contractor's Liability Insurance.

Liability insurance shall include all major divisions of coverage and be on a comprehensive general liability basis including:

Premises- Operations (including X-C-U)
Independent Contractor's protective
Products & completed operations
Blanket Contractual
Owned, non-owned & hired motor vehicles
Broad form coverage for property damage (including explosion, collapse & underground)

(C) The insurance required by Paragraph (B) above shall be written for not less than the following, or greater if required by Law:

(1) Workers' Compensation:
a.) State of Rhode Island- Statutory
b.) Employer's Liability

(2) Comprehensive General Liability (including Premises Operations; Independent Contractor's Protective; Products & Completed Operations; Broad Form Property Damage):

a.) Bodily Injury:
(i) $1,000,000- Each Occurrence
(ii) $1,000,000- Annual Aggregate

b.) Property Damage:
(i) $1,000,000- Each Occurrence
(ii) $1,000,000- Annual Aggregate

c.) Products & Complete Operations to be maintained for one (1) year after final payment.

d.) Property Damage Liability Insurance will provide X, C, or U coverage as applicable.

(3) Contractor's Liability:
a.) Bodily Injury:
(i) $1,000,000- Each Occurrence

b.) Property Damage:
(i) $1,000,000- Each Occurrence
(ii) $1,000,000- Annual Aggregate

(4) Personal Injury, with Employment Exclusion deleted:
a.) $1,000,000- Annual Aggregate

(5) Comprehensive Automobile Liability:
a.) Bodily Injury:
(i) $500,000- Each Person
(ii) $1,000,000- Each Occurrence

b.) Property Damage:
(i) $1,000,000- Each Occurrence

c.) Special Hazards:
(i) $1,000,000- Each Occurrence

(6) Property Insurance:

The Contractor shall purchase and maintain property insurance upon the entire Work at the site to full insurable value thereof. This insurance shall include the interests of the City, the Contractor, Subcontractors and Subcontractors in the Work shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief.

(D) Insurance Covering Special Hazards:

Special hazards shall be covered by rider or riders to the Public Liability and Property Damage Insurance policy or policies herein above required to be furnished by the Contractor or by separate policies of insurance in the amounts stated in Paragraph (C) (5) (c) of this Article.

(1) Property Damage Liability arising out of the collapse of or injury to any building or structure due to excavation (including burrowing, filling or backfilling in connection therewith), tunneling, pile driving, cofferdam work, or caisson work; or moving, shoring, underpinning, razing or demolition of any building or structure, or removal or rebuilding of any structural support thereof.

(2) Property Damage Liability for injury to or destruction of property arising directly or indirectly from blasting or explosions, however caused, other than explosions of air or steam vessels, piping under pressure, prime movers, machinery, or power transmitting equipment.

(3) Property Damage Liability for injury to or destruction of wires, conduits, pipes, mains, sewers, or other similar property, or any apparatus in connection therewith below the surface of the ground arising from and during the use of mechanical equipment for the purpose of excavating or drilling within project limits; injury to or destruction of property at any time resulting therefrom.

(4) The Contractor shall require similar insurance in such amounts to be taken out and maintained by each subcontractor.

(E) “ALL RISK” Insurance:

The Contractor shall acquire and maintain “All Risk” type Builder’s Insurance. This insurance shall be in an amount equal to 100% of the insurable portion of the Project, and shall be for the benefit of the City, the Contractor, and each subcontractor as their interest may respectively appear.

ARTICLE 24
SURETY BONDS

The Contractor shall be licensed to do business in the State of Rhode Island and shall furnish separate performance and payment bonds to the City. Each bond shall set forth a penal sum in an amount of not less than the Contract Price. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the Contractor shall be in form suitable to the City and shall be executed by a surety, or sureties, reasonably acceptable to the City.

ARTICLE 25
PATENTS

The Contractor shall pay all applicable royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights, and save the City harmless from loss on account thereof, except that the City shall be responsible for any such loss on when a particular process, design, or product of a manufacturer(s) is specified. However, if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, the Contractor shall be responsible for such loss unless the Contractor promptly gives such information to the City.

ARTICLE 26
APPRENTICES

Apprentices shall be permitted to work only under a bona fide apprenticeship program registered with a State Apprenticeship Council which is recognized by the Federal Committee of Apprenticeship, United States Department of Labor; or if no such Council exists in a State, under a program registered with the Bureau of Apprenticeship, United States Department of Labor.

ARTICLE 27
ASSIGNMENTS

The Contractor shall not assign the whole or any part of this Contract, or any monies due or to become due hereunder, without the written consent of the City. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms or corporations for services rendered or materials supplied for the performance of work called for in this Contract.

ARTICLE 28
APPLICABLE LAW

The law is hereby agreed to be the Law of the State where the Project is situated.

ARTICLE 29
SUCCESSORS AND ASSIGNS

Each party binds itself, its successors, assigns, executors, administrators or other representatives to the other party hereto and to successors, assigns, executors, administrators or other representatives of such party in connection with all terms and conditions of this Contract.

CITY	**CONTRACTOR**
The City of East Providence 145 Taunton Avenue East Providence, RI 02914	_____ _____ _____
By: _____ (Signature)	By: _____ (Signature)
_____ (Printed Name and Title) Roberto DaSilva Mayor	_____ (Printed Name and Title)
_____ (Date of Execution)	_____ (Date of Execution)

PERFORMANCE BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name:	Description *(name and location)*:
Mailing address *(principal place of business)*:	Contract Price:
	Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
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 applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

    3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

    3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

    3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

    5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

    5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

    5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

    5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

   7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

    14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows: None.

PAYMENT BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name:	Description *(name and location)*:
Mailing address *(principal place of business)*:	Contract Price:
	Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
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 applicable.

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

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

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

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

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

16.1.4. A brief description of the labor, materials, or equipment furnished;

16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows: None.

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

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

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

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

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

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

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

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

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

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

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

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

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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

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

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

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

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

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

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

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

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

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

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

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

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

1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

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

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

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

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

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

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

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

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

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

5.01 *Availability of Lands*

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

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

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

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

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

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

3. Technical Data contained in such reports and drawings.

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

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

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

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

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

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

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

a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

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

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

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

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

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

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

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

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

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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

a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

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

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

of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

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

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

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

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

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

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

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

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

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

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

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

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

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

7.03 *Labor; Working Hours*

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

B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

    a. will certify that the proposed substitute item will:

        1) perform adequately the functions and achieve the results called for by the general design;

        2) be similar in substance to the item specified; and

        3) be suited to the same use as the item specified.

    b. will state:

        1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

        2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

        3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

    c. will identify:

        1) all variations of the proposed substitute item from the item specified; and

        2) available engineering, sales, maintenance, repair, and replacement services.

    d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

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

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

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

7.10 *Taxes*

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

7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give w ritten notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

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

7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

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

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

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

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

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

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. Use or occupancy of the Work or any part thereof by Owner;

5. Any review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

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

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

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

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

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

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

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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

10.05 *Determinations for Unit Price Work*

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

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

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

10.07 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

10.08 *Compliance with Safety Program*

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

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

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

B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

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

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

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

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

11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

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

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

    a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

    b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

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

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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

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

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

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

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

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

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.

5. Other costs consisting of the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

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

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

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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

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

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

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

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

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

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

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

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

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

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 *Progress Payments*

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

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

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

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

    a. to supervise, direct, or control the Work;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

    e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, requiring correction or replacement;

    b. the Contract Price has been reduced by Change Orders;

    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

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

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

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

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

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

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all duly pending Change Proposals and Claims; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

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

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

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

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

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

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

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

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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

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

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, “Paragraph SC-4.05.”

Article 1—**DEFINITIONS AND TERMINOLOGY**

SC-1.01.A.16 Add the following to Paragraph 1.01.A.16:

The terms “Contractor” and “CONTRACTOR” have the same meaning.

SC-1.01.A.22 Add the following to Paragraph 1.01.A.22:

The terms “Engineer” and “ENGINEER” have the same meaning.

SC-1.01.A.30 Add a new sentence to Paragraph 1.01.A.30 that is to read as follows:

The terms “Owner” and “OWNER” have the same meaning.

SC-1.01.A.40 Add a new sentence to Paragraph 1.01.A.40 that is to read as follows:

Trucking, shipping, and delivery firms, consultants, and entities performing testing or inspection retained by Contractor or any Subcontractor are considered to be Subcontractors.

SC-1.01.A.45 Add a new sentence to Paragraph 1.01.A.45 that is to read as follows:

Entities that rent construction equipment or machinery, but are not incorporated into the Work, are considered to be Suppliers. If such rental entity furnishes both equipment and one or more personnel to operate and maintain the equipment, such entity is a Subcontractor.

Article 2—**PRELIMINARY MATTERS**

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

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

2.02 *Copies of Documents*

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

A. The Owner shall provide the Contractor with a sufficient number of copies of the complete Contract as the Owner determines is necessary.

2.06 *Electronic Transmittals*

SC-2.06 Delete Paragraph 2.06.B in its entirety and insert the following in its place:

B. Electronic Means are established in Specification Section 01 31 26, Electronic Document Protocol.

Article 3—**CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

3.01 *Intent*

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

Article 4—**COMMENCEMENT AND PROGRESS OF THE WORK**

4.05 *Delays in Contractor's Progress*

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

4. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.

Article 5—**SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS**

5.03 *Subsurface and Physical Conditions*

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

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

Report Title	Date of Report	Technical Data
NA	NA	NA

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

Drawings Title	Date of Drawings	Technical Data
City of East Providence, Rhode Island Wastewater System Improvements Water Pollution Control Facility Record Drawings	December 2012	Record Drawings

G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents as requested from the Owner and Engineer.

Article 6—**BONDS AND INSURANCE**

6.01 *Performance, Payment, and Other Bonds*

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

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

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

6.02 *Insurance—General Provisions*

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

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

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

3. For all Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require policy limits in accordance with the Contract.

6.03 *Contractor's Insurance*

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

D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability policies must include additional insureds including all Subcontractors, Suppliers, Engineer, Consulting Engineer and other individuals or entities identified herein, and the officers, directors, members, partners, employees, agents and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured, additional insured, or loss payee as their interest may appear.

E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	**Policy limits of not less than:**
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Employer's Liability	
Each accident	$1,000,000
Each employee	$1,000,000
Policy limit	$1,000,000

F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:

1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
2. damages insured by reasonably available personal injury liability coverage, and
3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
    a. Such insurance must be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Severability of interests and no insured-versus-insured or cross-liability exclusions.

4. Underground, explosion, and collapse coverage.

5. Personal injury coverage.

6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).

2. Any exclusion for water intrusion or water damage.

3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.

4. Any exclusion of coverage relating to earth subsidence or movement.

5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).

6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

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

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

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	$500,000
Each Accident	$1,000,000
Property Damage	
Each Accident	$1,000,000
Special Hazards	
Each Accident	$1,000,000

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

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	$3,000,000
General Aggregate	$3,000,000

L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of **$3,000,000** after accounting for partial attribution of its limits to underlying policies, as allowed above.

M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence/Claim	$1,000,000
General Aggregate	$1,000,000

N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable

professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

Contractor's Professional Liability	**Policy limits of not less than:**
Each Claim	$500,000
Annual Aggregate	$500,000

O. *Railroad Protective Liability Insurance:* Not Applicable.

P. *Unmanned Aerial Vehicle Liability Insurance:* Not Applicable.

Q. *Other Required Insurance:* No additional insurance required.

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

F. *Builder's Risk Requirements:* The builder's risk insurance must:

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

    a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.

    b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.

2. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for

the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).

4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of $**100,000**.

5. extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of $**100,000**.

6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.

7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.

8. include performance/hot testing and start-up, if applicable.

9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.

10 include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:

    a. **City of East Providence, Veolia and Arcadis U.S., Inc.**

11. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:

    a. **None.**

12. If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of $**100,000**.

13. In addition to the coverage sublimits stated above, the following coverages are also subject to sublimits, as follows:

    a. **Not applicable.**

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

G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum

deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

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

H. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.

1. The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of no more than $**5,000** for direct physical loss in any one occurrence.

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

A. *Installation Floater*

1. Contractor shall provide and maintain installation floater insurance on a broad form or "all risk" policy providing coverage for materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work ("Covered Property"). Coverage under the Contractor's installation floater will include loss from covered "all risk" causes (perils) to Covered Property:

a. of the Contractor, and Covered Property of others that is in Contractor's care, custody, and control;

b. while in transit to the Site, including while at temporary storage sites;

c. while at the Site awaiting and during installation, erection, and testing;

d. continuing at least until the installation or erection of the Covered Property is completed, and the Work into which it is incorporated is accepted by Owner.

2. The installation floater coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable.

3. The installation floater coverage will be in an amount sufficient to protect Contractor's interest in the Covered Property. The Contractor will be solely responsible for any deductible carried under this coverage.4. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

Article 7—**CONTRACTOR'S RESPONSIBILITIES**

7.02 *Supervision and Superintendence*

SC-7.02 Amend Paragraph 7.02.B of the General Conditions by adding the following sentence:

Unless the Owner otherwise agrees in writing, the superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

7.03 *Labor; Working Hours*

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

1. Regular working hours will be 7:00 AM to 4:00 PM Monday through Friday. Work after 4:00 PM will only be allowed with prior approval by the Owner. No work shall take place on Saturdays and Sundays unless approved by the Owner.
2. No work shall take place on the Owner's legal holidays, which are as follows:
    - Memorial Day (Monday, May 39, 2023)
    - Independence Day (Thursday, July 4, 2023)
    - Victory Day (Monday, August 14, 2023)
    - Labor Day (Monday, September 4, 2023)
    - Columbus Day (Monday, October 9, 2023)
    - Election Day (Wednesday, November 8, 2023)
    - Veterans Day (Monday, November 13, 2023)
    - Thanksgiving Day (Thursday, November 23, 2023)
    - Christmas Day (Monday, December 25, 2023)

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

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

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

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

7.10 *Taxes*

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

A. Owner is exempt from payment of sales and compensating use taxes of the State of Rhode Island and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

7.13 *Safety and Protection*

SC-7.13 Amend the second sentence of Paragraph 7.13.G by deleting the words "…the Supplementary Conditions or Specifications." and replace with the words Specification Section 01 35 23, Safety Requirements".:

7.14 *Hazard Communication Programs*

SC-7.14 Add the following new paragraph immediately after Paragraph 7.14.A:

B. Contractor shall provide a centralized location for the maintenance of the safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the safety data sheets or other hazard communication information shall be readily accessible to the employees of all employers on the Site.

Article 8—**OTHER WORK AT THE SITE**

Article 9—**OWNER'S RESPONSIBILITIES**

9.13 *Owner's Site Representative*

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

9.13 *Owner's Site Representative*

A. Owner will furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work.

Article 10—**ENGINEER'S STATUS DURING CONSTRUCTION**

10.03 *Resident Project Representative*

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

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

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

b. Observe whether any Work in place appears to be defective.

c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

Article 11—**CHANGES TO THE CONTRACT**

No suggested Supplementary Conditions in this Article.

Article 12—**CLAIMS**

Sc-12.01 Add the following new paragraph immediately after Paragraph 12.01.D.3:

4, The mediation will be held in the locality where the Project is located unless another location is mutually agreed upon by the parties.

Article 13—**COST OF WORK; ALLOWANCES, UNIT PRICE WORK**

13.01 *Cost of the Work*

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

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of Rental Rate Blue Book for Construction Equipment.

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

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

13.03 *Unit Price Work*

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

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

   a. the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

   b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such

other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

Article 14—**TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCCEPTANCE OF DEFECTIVE WORK**

No suggested Supplementary Conditions in this Article.

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

15.03 *Substantial Completion*

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

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

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

No suggested Supplementary Conditions in this Article.

Article 17—**FINAL RESOLUTIONS OF DISPUTES**

17.02 *Arbitration*

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

17.02 *Arbitration*

A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of $100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.

D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.

E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.

F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.

G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

   1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;

   2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;

   3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and

   4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.

H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

Article 18—**MISCELLANEOUS**

SC-18.11 *Confidential Information*

A. All Drawings, Specifications, technical data, and other information furnished to Contractor either by Owner or Engineer or developed by Contractor or others in connection with the Work are, and will remain, the property of Owner or Engineer, and shall not be copied or otherwise reproduced or used in any way except in connection with the Work, or disclosed to third parties or used in any manner detrimental to the interests of Owner or Engineer.

B. The following information is not subject to the above confidentiality requirements:

1. information in the public domain through no action of Contractor in breach of the Contract Documents; or
2. information lawfully possessed by Contractor before receipt from Owner or Engineer; or
3. information required to be disclosed by Laws or Regulations, or by a court or agency of competent jurisdiction. However, in the event Contractor shall be so required to disclose such information, Contractor shall, prior to disclosure, provide reasonable notice to Owner and Engineer, who shall have the right to interpose all objections Owner may have to the disclosure of such information.

SC-18 Add the following new paragraph after Paragraph 18:

A. Contractor shall not disclose to any third party the nature of its Work on the Project, nor engage in publicity or public media disclosures with respect to the Project without the prior written consent of Owner.

SECTION 01 11 13

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This Section includes the following Articles:

Article	Title
1.1	Section Includes
1.2	Location and Description of Work
1.3	Other Construction Contracts
1.4	Work by Others
1.5	Work by OWNER
1.6	Sequence and Progress of Work
1.7	CONTRACTOR's Use of Site
1.8	Easements and Rights-of-Way
1.9	Notices to Owners and Authorities of Properties Adjacent to the Work

1.2 LOCATION AND DESCRIPTION OF WORK

A. The Work is located at the East Providence Water Pollution Control Facility (WPCF) at Crest Avenue, Riverside, RI 02915.

B. The Work to be performed under this Contract includes, but is not limited to, constructing the Work described below in accordance with the Contract Documents. The Work includes, but is not limited to, the following:
   1. By-pass pumping to allow full wastewater structure access and dewatering.
   2. Disinfection of wastewater structures.
   3. Removal of degraded and unsound concrete from wastewater structures requiring rehabilitation.
   4. Replacement of reinforcing steel in wastewater structures as applicable.
   5. Restoration of concrete wastewater structures using an appropriate cementitious repair mortar.
   6. Installation of epoxy lining to protect restored concrete wastewater structures.
   7. Installation of Watchemoket Pump Station force main bypass.
   8. Replacement of headworks channel bypass slide gate.
   9. Replacement of headworks manual channel isolation gates.
   10. Coordination with the Owner, the Owner's Contract Operations Firm (Veolia), the Engineer and the Department of Environmental Management. The WPCF must comply with their permit at all times.

C. Contracting Method: The Project shall be constructed under one prime Contract.

D. Hazardous Environmental Conditions:
   1. To the best of Owner's knowledge, information, and belief, the water

pollution control facility was constructed in the 1950s with upgrades completed in the 1970s and 1990s to add additional primary clarifiers and secondary treatment. The 1970s work also included converting the two anaerobic sludge digester tanks to sludge storage tanks. More upgrades were completed in the 2010s with a Design/Build contract that included a BNR upgrade, SCADA upgrades, and collection system improvements. At the site there are asbestos tiles throughout the Administration Building. Prior to the establishment of the water pollution control facility in the 1950s the site was a marina.

1.3 OTHER CONSTRUCTION CONTRACTS

A. The OWNER, through its Contract Operations firm Veolia, is in the process of installing covers on the primary clarifiers (settling tanks). The CONTRACTOR shall coordinate the work of this Contract with the OWNER to minimize impacts to both projects.

1.4 WORK BY OTHERS

A. It is anticipated that no work performed by others has the potential to affect the work completed by the CONTRACTOR under this contract, except as indicated in paragraph 1.3.

1.5 WORK BY OWNER

A. OWNER, through its Contract Operations firm Veolia, will perform the following in connection with the Work:
   1. Operate all existing valves, gates, pumps, equipment, and appurtenances that will affect OWNER's operation, unless otherwise specified or indicated.

1.6 SEQUENCE AND PROGRESS OF WORK

A. Requirements for sequencing and coordinating with OWNER's operations, including maintenance of facility operations during construction, and requirements for tie-ins and shutdowns, are in Section 01 14 16, Coordination with Owner's Operations.

1.7 CONTRACTOR'S USE OF SITE

A. CONTRACTOR shall share use of the Site with other contractors and others specified in Article 1.3 of this Section and others as specified in Article 1.4 of this Section. The OWNER's Contract Operations firm shall identify acceptable locations on-site to temporarily store construction materials and equipment.
B. Move stored materials and equipment that interfere with operations of OWNER, other contractors, and others performing work for OWNER.
C. Limits on CONTRACTOR's use of the Site are:
   1. As indicated in Section 01 14 19, Use of Site.

2. Do not use the Site for operations other than those required for the Project.

1.8 EASEMENTS AND RIGHTS-OF-WAY

A. General:
   1. Easements and rights-of-way required for the permanent improvements included in the Work will be provided by OWNER in accordance with the General Conditions and Supplementary Conditions.
   2. Confine construction operations within OWNER's property, public rights-of-way, easements obtained by OWNER, and limits shown, and property for which CONTRACTOR has made arrangements directly with property owner(s).
   3. Use care in placing construction tools, equipment, excavated materials, and materials and equipment to be incorporated into the Work to avoid damaging property and interfering with traffic.
   4. Do not enter private property outside the construction limits without permission from the owner of the property.

1.9 NOTICES TO OWNERS AND AUTHORITIES OF PROPERTIES ADJACENT TO THE WORK

A. Notify owners of adjacent property and utility owners when prosecution of the Work may affect their property, facilities, or use of property.
B. When it is necessary to temporarily obstruct access to property, or when utility service connection will be interrupted, provide notices sufficiently in advance to enable affected persons to provide for their needs. Such notifications shall comply with Laws and Regulations and, whether delivered orally or in writing, shall include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.
C. Notify utility owners and other concerned entities not less than 72 hours prior to cutting or closing streets or other traffic areas or excavating near Underground Facilities or exposed utilities.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 14 16

COORDINATION WITH OWNER'S OPERATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes requirements for coordinating with OWNER's operations during the Project, and includes requirements for tie-ins and shutdowns necessary to complete the Work without impact on OWNER's operations except as allowed in this Section.
   2. CONTRACTOR shall provide all labor, materials, equipment, tools, and incidentals shown, specified, and required to coordinate with OWNER's operations during the Work in accordance with this Section.
   3. The OWNER, through their Contract Operations firm, maintains an Authorization to Discharge Under the Rhode Island Pollutant Discharge Elimination System for the East Providence Water Pollution Control Facility, 1 Crest Avenue, East Providence, Rhode Island 02915 to the Providence River as issued by the Rhode Island Department of Environmental Management. Compliance with this permit is required throughout the Work of this Contract. **Should a violation occur due to the negligence of the CONTRACTOR, the CONTRATOR shall be responsible for any fines associated with the violation.**
   4. The East Providence Pollution Control Facility is permitted for a discharge of 14.2 MGD (maximum month, average day). An average flows during a dry period range between 6 – 10 MGD. During extreme wet weather the facility has discharged greater than 14.2 MGD as a maximum day. **The CONTRACTOR to provide bypass pumping for 19.9 MGD maximum day with a peak hour of 26.4 MGD**
   5. The CONTACTOR shall assume that there will be six (6) occasions when the CONTRACTOR will be informed by the OWNER that a shutdown or bypass cannot occur or Work cannot continue due to predicated high wastewater flows. The CONTRACTOR shall demobilize from the work space, remove all equipment and materials from the workspace. Subsequent to the high wastewater flows (wet weather event), the CONTRACTOR shall remobilize to the work space, dewater, re-establish temporary bypass and disinfect channels or structures before resuming work. Any rework as a result of the Work shutdown/wet weather event shall be performed by the CONTRACTOR at no additional cost to the OWNER.

B. Coordination:
   1. Review construction procedures under other Specifications sections and coordinate Work that will be performed with or before the Work specified in this Section.

C. Related Sections:
   1. Section 01 11 13, Summary of Work.
   2. Section 01 51 41, Temporary Pumping.
   3. Section 01 73 29, Cutting and Patching.
   4. Section 01 73 24, Connections to Existing Facilities.
   5. Section 03 00 05, Concrete
   6. Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
   7. Section 03 37 13, Shotcrete
   8. Section 09 85 00, Concrete Resurfacing and Lining
   9. Section 43 26 21, Aluminum Hand Pull Gates
   10. Section 43 26 23, Stainless Steel Slide Gates

D. Except for shutdowns specified in this Section, perform the Work such that OWNER's facilities remain in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not: impede OWNER's production or processes, create potential hazards to operating equipment and personnel, reduce the quality of the facility's products or effluent, cause odors or other nuisances, or affect the public health, safety, and convenience.

E. Work not specifically covered in this Section or in referenced Sections may, in general, be completed, within the Contract Times, at any time during regular working hours in accordance with the Contract Documents, subject to the requirements in this Section.

F. As a substitute to the procedures specified in this Section, CONTRACTOR may propose providing additional temporary facilities that can eliminate or mitigate a constraint without additional cost to OWNER, provided such additional temporary facilities: do not present hazards to the public, personnel, structures, and equipment; that such additional temporary facilities do not adversely affect OWNER's ability to comply with Laws and Regulations, permits, and operating requirements; that such temporary facilities do not generate or foster the generation of odors and other nuisances; and that requirements of the Contract Documents are fulfilled.

G. Coordinate shutdowns with OWNER and ENGINEER. When possible, combine multiple tie-ins into a single shutdown to reduce impacts on OWNER's operations and processes.

H. Operation of Existing Systems and Equipment during the Work:
   1. Do not shut off or disconnect existing operating systems or equipment, unless accepted by ENGINEER in writing.
   2. Operation of existing systems and equipment will be by OWNER unless otherwise specified or indicated.
   3. Where necessary for the Work, CONTRACTOR shall seal or bulkhead OWNER-operated gates and valves to prevent leakage that may affect the Work, OWNER's operations, or both.

4. Provide temporary watertight plugs, bulkheads, and line stops as required. After completing the Work, remove seals, plugs, bulkhead, and line stops, if applicable, to satisfaction of ENGINEER.

I. Bypassing:
   1. Proposed bypassing plans can be found in the Contract Drawings.

K. Requirements for temporary pumping are in Section 01 51 41, Temporary Pumping. Requirements for temporary pumping associated with specific shutdowns are indicated in this section and the Contract Drawings.

1.2 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Substitute Sequence Submittal: When deviation from specified sequence or procedures is proposed, furnish submittal explaining in detail the proposed sequence or procedures and associated effects, including evidence that OWNER's operations will not be adversely affected, to an extent greater than originally contemplated in the Contract Documents, by proposed substitution. List benefits of proposed substitution, including benefits to Progress Schedule. Submit in accordance with Section 01 25 00, Substitution Procedures, and other requirements of the Contract Documents regarding substitution requests.

B. Informational Submittals: Submit the following:
   1. Shutdown Planning Submittal:
      a. For **each** shutdown, submit an inventory of labor, materials, and equipment required to perform the shutdown and tie-in tasks, an estimate of time required to accomplish the complete shutdown including time for OWNER to take down and start up existing equipment, systems, or conduits, and written description of steps required to complete the Work associated with the shutdown.
      b. Furnish submittal to ENGINEER not less than 30 days prior to proposed shutdown start date. Do not start shutdown until obtaining ENGINEER's acceptance of shutdown planning submittal.
      c. **Shutdown submittals are also subject to review, comment and approval by the Rhode Island Department of Environmental Management.**
   2. Shutdown Notification: After ENGINEER's acceptance of shutdown planning submittal and prior to starting the shutdown, submit written notification to OWNER and ENGINEER of date and time each shutdown is to start. Submit notification not less than 72 hours in advance of each shutdown.

1.3 GENERAL CONSTRAINTS

A. **Work on the Aeration Tank Splitter Structure must be completed between November 1 and April 15 to ensure the splitter structure is back online by April 30th in order to comply with the permitted Total Nitrogen limits of the WPCF.**

B. Indicated in the Contract Documents are the sequence and shutdown durations, where applicable, for OWNER'S equipment, systems, and conduits (including piping and ducting) that are to be taken out of service temporarily for the Work. New materials, equipment, and systems may be used by OWNER after the specified field quality controls and testing are successfully completed and the materials or equipment are Substantially Complete in accordance with the Contract Documents.

C. The following constraints apply to coordination with OWNER's operations:
   1. Operational Access: OWNER'S personnel shall have access to equipment and areas of the facility that remain in operation.
   2. Temporary Partitions and Enclosures: Provide temporary partitions and enclosures necessary to maintain dust-free, heated, and ventilated spaces in areas of the facility that are adjacent to the Work and that must be kept operational. Comply with Section 01 51 05, Temporary Utilities.
   3. Schedule and perform equipment and system start-ups for Monday through Thursday. Equipment and systems shall not be placed into operation on Friday, Saturday, and Sunday without prior approval of OWNER, unless specifically indicated otherwise in the Contract Documents.
   4. Dead End Valves or Conduits: Provide blind flanges, watertight bulkheads, or valve at temporary and permanent terminuses of conduits, including piping and ducting. Blind flanges and bulkheads shall be suitable for the service and braced and blocked, as required, or otherwise restrained as directed by ENGINEER. Temporary valves shall be suitable for their associated service. Where valve is provided at permanent terminus of conduit, including piping or ducting, also provide on downstream side of valve a blind flange with drain/flushing connection.
   5. OWNER will assist CONTRACTOR in dewatering process tanks, basins, conduits, and other work areas to be dewatered for shutdowns. Maintain clean and dry work area by pumping and properly disposing of fluid and other material that accumulates in work areas.
   6. Draining and Cleaning of Conduits, Tanks, and Basins:
      a. Unless otherwise shown or indicated, CONTRACTOR shall dewater process tanks, basins, conduits (including piping) at beginning of each shutdown. Flush, wash down, and clean tanks, basins, conduits (including piping), and other work areas.
      b. CONTRACTOR shall remove liquids and solids and dispose of them at appropriate location at the Site as directed by ENGINEER. Unless otherwise specified or indicated, contents of tanks, basins, and conduits (including piping) undergoing modifications shall be transferred to

existing process tanks or conduits at the Site with capacity sufficient to accept such discharges, using hoses, temporary piping, temporary pumps, or other means provided by CONTRACTOR. Discharge of fluids across floors is not allowed.

c. If drainage point is not available on the conduit (including piping) to be drained, provide a wet tap using tapping saddle and valve or other method approved by ENGINEER. Uncontrolled spillage of contents of conduits (including piping) is not allowed.

d. Spillage shall be brought to ENGINEER's attention immediately, both verbally and in writing, and reported in accordance with Laws and Regulations. CONTRACTOR shall wash down spillage to floor drains or sumps or other appropriate location and flush the system to prevent clogging and odors. If spillage is not suitable for discharge to the drainage system, such as chemical spills, as determined by ENGINEER, CONTRACTOR shall remove spillage by other method, such as vactor truck, sorbents, or other method acceptable to ENGINEER.

1.4 SEQUENCE OF WORK

A. Perform the Work in the indicated sequence. Certain phases or stages of the Work may require working 24-hour days or work during hours outside of regular working hours. Work may be accelerated from a later stage to an earlier stage if OWNER's operations are not adversely affected by proposed sequence change, with ENGINEER's acceptance. Stages specified in this Article 1.4 are not sequence-dependent and are listed based on process flow at the Water Pollution Control Facility.

B. Stage I: Watchemoket Pump Station Force Main Bypass. See C-003: Bypass Plan I and C-009 Bypass Details II for requirements. This bypass will be needed to facilitate the rehabilitation and lining of headworks channel, Compartment A as indicated on C-008.

B. Stage II: Headworks Bypass Slide Gate. See C-008: Bypass Details I for location and details. The existing Headworks Bypass Slide Gate is not operable. This slide gate isolates a 36-inch reinforced concrete pipe which can be used to bypass screened wastewater to the Primary Clarifier Splitter structure. This bypass will be needed to facilitate the rehabilitation and lining of headworks channel, Compartment D as indicated on C-008. Note channel isolation will be required to perform this work. Installation of manual hand pull gates HP-3 and HP-4 may be installed at the same time.

B. Stage III: Headworks influent channels and structures. See C-003: Bypass Plan I and C-008 Bypass Details I for isolation of tankage to allow for concrete rehabilitation and lining. Note channel isolation will be required to perform this work. Installation of manual hand pull gates HP-1 and HP-2 may be installed at the same time. The headworks may be isolated into the following compartments:

- Compartment A: Main Influent Channel – Provide lining terminations around pipe penetrations.
- Compartment B: Main Influent Channel at Screen – Perform concrete rehabilitation and lining with the existing Raw Wastewater Screen (RWW.SCR-1) in place. Provide straight lining terminations at equipment anchor points.
- Compartment C: West Bypass Channel – Remove in channel grinder, screw conveyor and appurtenances prior to performing concrete rehabilitation and concrete lining work. Re-install channel grinder, screw conveyor and appurtenances.
- Compartment D: Common Channel between screen and grit chambers.
- Compartment E: East Grit Chamber and corresponding upstream compartment – Work to be performed on one grit chamber at a time. Remove and reinstall covers as needed to facilitate the work. Existing grit screw conveyor and elevator buckets shall remain. Provide straight lining terminations at equipment locations.
- Compartment F: West Grit Chamber and corresponding upstream compartment – Work to be performed on one grit chamber at a time. Remove and reinstall covers as needed to facilitate the work. Existing grit screw conveyor and elevator buckets shall remain. Provide straight lining terminations at equipment locations.
- Compartment G: Headworks Effluent Channel – Remove and reinstall covers as needed to facilitate the work.

C. Stage IV: Headworks effluent channels downstream of the West and East Grit Chamber outfall gates (Compartment G) and the Primary Clarifier Splitter Structure. See C-004: Bypass Plan II for concrete rehabilitation and lining summary.

D. Stage V: Primary Clarifiers (Settling Tanks) 1 & 2 Effluent Channels and Manhole. See C-005: Bypass Plan III for concrete rehabilitation and lining summary.

E. Stage VI: Primary Clarifier (Settling Tanks) 3 & 4 Effluent Channels and Manhole. See C-006: Bypass Plan IV for concrete rehabilitation and lining summary.

F. Stage VII: Primary Clarifier Raised Manhole and Aeration Tanks Splitter Box Structure. See C-007: Bypass Plan V for concrete rehabilitation and lining summary. **Refer to Paragraph 1.3 for constraint related to this structure.**

1.5 TIE-INS

Table 01 14 16-A in this Section lists connections by CONTRACTOR to existing facilities. Table 01 14 16-A may not include all tie-ins required for the Work; CONTRACTOR shall perform tie-ins required to complete the Work as shown or indicated regardless of whether tie-in is indicated in Table 01 14 16-A. For tie-ins not indicated in Table 01 14 16-A, obtain requirements for tie-ins from ENGINEER by requesting an interpretation or clarification.

1.6 SHUTDOWNS

A. General:
   1. Terminology: A “shutdown” is when a portion of the normal operation of OWNER’s facility, whether equipment, systems, conduit (including piping and ducting), has to be temporarily suspended or taken out of service to perform the Work.
   2. Work that may interrupt normal operations shall be accomplished at times convenient to OWNER unless otherwise indicated in the Contract Documents. Any shutdown requires a minimum of 48 hours notice prior to the planned shutdown and must be coordinated with both the OWNER and ENGINEER.
   3. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, materials, equipment, spare parts, both temporary and permanent, necessary to successfully perform the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to commencing the associated shutdown. Demonstrate to ENGINEER’s satisfaction that CONTRACTOR has complied with such requirements before commencing the shutdown.
   4. If CONTRACTOR’s operations cause an unscheduled interruption of OWNER’s operations, immediately re-establish satisfactory operation for OWNER.
   5. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of OWNER’s facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by CONTRACTOR if, in ENGINEER’s opinion, CONTRACTOR did not comply with requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in performing the Work and complying with applicable permits, Laws, and Regulations.
   6. Shutdowns shall be in accordance with Table 01 14 16-B of this Section. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns.
   7. Temporary, short-term shutdowns of smaller conduits (including piping and ducting), equipment, and systems may not be included in Table 01 14 16-B. Coordinate requirements for such shutdowns with ENGINEER and OWNER. Where necessary, obtain ENGINEER’s interpretation or clarification before proceeding.

B. Shutdowns of Electrical Systems:
   1. Comply with Laws and Regulations, including the National Electric Code.
   2. CONTRACTOR shall lock out and tag circuit breakers and switches operated by OWNER and shall verify that affected cables and wires are de-energized to ground potential before shutdown Work is started.
   3. Upon completion of shutdown Work, remove the locks and tags and notify ENGINEER that facilities are available for use.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL

A. In addition to requirements of this Section, comply with Section 01 73 29, Cutting and Patching, and Section 01 73 24, Connections to Existing Facilities, and other Contract Documents applicable to Work associated with shutdowns, tie-ins, temporary pumping (where applicable), and similar work.

3.2 DETAILED SHUTDOWN REQUIREMENTS

A. Bypass Plan I: **Headworks**
   1. General:
      a. Affected Equipment Operating Prior to Shutdown: Headworks Fine Screen and Wash Press, Headworks Screenings Grinder and Screw Auger, Grit Removal via Screw Conveyors.
      b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Section.
      c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this Section.
      d. Impact on Other Equipment and Processes: None. Headworks treatment for screenings and grit removal is required throughout the Work. There may be instanced during the Headworks rehabilitation when grit removal will occur in the Primary Clarifiers. Flow through capacity of the headworks may be reduced during flow diversions.
   2. Temporary Pumping and Flow Diversion: Provide temporary pumping system and flow diversion, including controls, as follows:
      a. Purpose: Provide a dry work environment for Headworks influent channels and structures in order to complete concrete restoration and concrete lining per the Contract Documents. Temporary pumping is required to perform Work in Compartments A and G. CONTRACTOR may be able to divert flow within headworks to perform Work in other compartments.
      b. System Capacity: **14.2 MGD (permitted, maximum month, average day); 19.9 MGD (maximum day); 26.4 MGD (peak hour) wet weather flows**.
      c. Fluid Pumped: Raw and screened wastewater.
      d. Controls: Provide a complete control system to prevent surcharging at any of the headworks influents.
      e. Flow Diversion: Refer to Sheet C-008: Bypass Details I for required flow diversions for each compartment at the Headworks.
         1. There are three wastewater influent pipes to the headworks.

i. Watchemoket Pump Station Force Main – New 24-inch permanent bypass piping to be installed as indicated. Temporary bypass connection required to divert flow.
ii. Raw Wastewater Pump Station Force Main – Flows from the Raw Wastewater Pump Station can be diverted using an existing 6-inch at grade bypass connection. Bypass pumping is required for a 40-foot suction lift.
iii. Silver Street Sewer and Barrington Flows Gravity Sewer – Bypass pumping is required for a 30-foot lift.

f. Suction Location: As indicated.
g. Discharge Location: Upstream of Raw Wastewater Screen in Compartment B and/or upstream of the in-channel grinder in Compartment C as available per the Work.
h. Flow Meter: Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day, 6-months historical trending recorded every minute, and providing 4 to 20 mA dc output signal to transmit flow rate to a wireless communication device indicating high alarms.
i. CONTRACTOR is responsible for removal and reinstallation of covers on the Aerated Grit Chambers, grates on the Headworks Influent Channels, and any other structure covers that require removal for proper bypass and structure rehabilitation.
j. CONTRACTOR shall provide leak prevention measures such as temporary stop logs, steel plates, sand bags, inflatable plugs, and sump pumps in order to maintain a dry work space.

3. Prior to Shutdown:
   a. Obtain ENGINEER's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
   b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
   c. Assist OWNER in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
   d. Coordinate other tie-ins to be performed simultaneously.
   e. Install, check, and test the temporary flow diversion system.
4. During Shutdown:
   a. Place flow diversion or temporary pumping system into operation.
   b. Dewater and decontaminate the Headworks compartment planned for Work.
   c. Rehabilitate the concrete structure as per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   d. Prepare the concrete structure for lining, line the structure, and conduct inspections per the Contract Drawings and the following specifications:

- Section 03 00 05, Concrete
- Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
- Section 03 37 13, Shotcrete
- Section 09 85 00, Concrete Resurfacing and Lining

e. With OWNER, return equipment and system to operation.

5. Following Shutdown:
   a. Verify functionality of equipment and systems.
   b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
   c. Repair joints that are not watertight or gastight, as applicable.
   d. Remove temporary pumping system and appurtenances.

B. Bypass Plan II: **Headworks Effluent Channel and Primary Clarifier Splitter Structure**

1. General:
   a. Affected Equipment Operating Prior to Shutdown: None
   b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Section.
   c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this Section.
   d. Impact on Other Equipment and Processes: Wastewater flows will need to be distributed to Primary Clarifiers through bypass pumping rather than conveyed through the Primary Clarifier Splitter Structure.
2. Temporary Pumping: Provide temporary pumping system, including controls, as follows:
   a. Purpose: Provide a dry work environment for Structure 2 – Primary Clarifier Splitter Structure and Headworks effluent channel in order to complete concrete restoration and concrete lining per the Contract Documents.
   b. System Capacity: **14.2 MGD (permitted, maximum month, average day); 19.9 MGD (maximum day); 26.4 MGD (peak hour) wet weather flows.**
   c. Fluid Pumped: Screened wastewater.
   d. Controls: Provide a complete control system to maintain the liquid level in the suction chamber **(Headworks Aerated Grit Chamber)** between **elevation 18.60 and elevation 21.60**.
   e. Suction Location: Headworks Aerated Grit Chambers. Ensure outlet gates of grit chambers are shut and control measures are taken to prevent wastewater leakage to the structure being rehabilitated. West Grit Chamber is approximately 14.5’ deep and East Grit Chamber is approximately 16.04’ deep.
   f. Discharge Location: Primary Clarifier 1 & 2 Influent Channels, which are approximately 4.64’ deep and/or to Primary Clarifiers 3 & 4. Discharge will be directly into the tanks 3 & 4, rather than into an influent channel or pipe connection. Provide isolation valves to direct

flow to either or both locations. During peak flow and wet weather scenarios, bypass discharge may be sent to all four Primary Clarifiers, at the discretion of the OWNER.

g. Plug all wastewater influents and effluents at the structure(s) being rehabilitated to ensure no wastewater leakage into the dry and decontaminated structure(s).

h. Flow Meter: Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day, 6-months historical trending recorded every minute, and providing 4 to 20 mA dc output signal to transmit flow rate to a wireless communication device indicating high alarms.

i. CONTRACTOR is responsible for removal and reinstallation of covers on the Aerated Grit Chambers, manhole cover at the Primary Clarifier Splitter Structure, grates on the Primary Clarifier 1 & 2 Influent Channels, and any other structure covers that require removal for proper bypass and structure rehabilitation.

j. CONTRACTOR shall secure all bypass equipment and piping in order to prevent leaks and damage to surrounding equipment and property.

3. Prior to Shutdown:
   a. Obtain ENGINEER's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
   b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
   c. Assist OWNER in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
   d. Coordinate other tie-ins to be performed simultaneously.
   e. Install, check, and test the temporary pumping system.
4. During Shutdown:
   a. Place temporary pumping system into operation.
   b. Dewater and decontaminate the Primary Clarifier Splitter Structure.
   c. Rehabilitate and inspect the concrete structure per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   d. Prepare the concrete structure for lining, line the structure, and conduct inspections per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   e. With OWNER, return equipment and system to operation.
5. Following Shutdown:
   a. Verify functionality of equipment and systems.

b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
c. Repair joints that are not watertight or gastight, as applicable.
d. Remove temporary pumping system and appurtenances.

C. Bypass Plan III: **Primary Clarifiers 1 & 2 Effluent Channels and Effluent Manhole**

1. General:
   a. Affected Equipment Operating Prior to Shutdown: None
   b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Section.
   c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this Section.
   d. Impact on Other Equipment and Processes: Wastewater flows will be diverted to Primary Clarifier 3 & 4. If bypass pumping is required due to wet weather and high flows, scum and sludge removal of these bypass flows may be altered.
2. Temporary Pumping and Flow Diversion: Provide temporary pumping system and flow diversion, including controls, as follows:
   a. Purpose: Provide a dry work environment for Structure 3 – Primary Clarifier 1 & 2 Effluent Channel and Structure 4 – Primary Clarifier 1 & 2 Effluent Manhole in order to complete concrete restoration and concrete lining per the Contract Documents.
   b. System Capacity: **14.2 MGD (permitted, maximum month, average day); 19.9 MGD (maximum day); 26.4 MGD (peak hour) wet weather flows**.
   c. Fluid Pumped: Screened wastewater.
   d. Controls: Provide a complete control system to maintain the liquid level in the suction chamber **(Primary Clarifier Splitter Structure)** between **elevation 19.86 and elevation 21.95**.
   e. Flow Diversion: Divert flow to Primary Clarifier 3 & 4 through closing gates on Primary Clarifier 1 & 2 Influent Channel. Closing these gates will prevent wastewater flows from entering Primary Clarifier 1 & 2 through the Primary Clarifier Splitter Structure.
   f. Suction Location: Primary Clarifier Splitter Structure, which is approximately 10.15’ deep. Bypass is to be utilized for flows exceeding the capacity of Primary Clarifier 3 & 4 **(6 MGD)** and/or upon request of the OWNER.
   g. Discharge Location: Primary Clarifier Raised Manhole, which is approximately 24’ deep. Bypass is to be utilized for flows exceeding the capacity of Primary Clarifier 3 & 4 **(6 MGD)** and/or upon request of the OWNER.
   h. Plug all wastewater influents and effluents at the structure(s) being rehabilitated to ensure no wastewater leakage into the dry and decontaminated structure(s).

i. Flow Meter: Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day, 6-months historical trending recorded every minute, and providing 4 to 20 mA dc output signal to transmit flow rate to a wireless communication device indicating high alarms.

j. CONTRACTOR is responsible for removal of the manhole cover at the Primary Clarifier Splitter Structure, covers on the Primary Clarifier 1 & 2 Effluent Channels, manhole cover on the Primary Clarifier 1 & 2 Effluent Manhole, manhole cover on the Primary Clarifier Raised Manhole, and any other structure covers that require removal for proper bypass and structure rehabilitation.

k. CONTRACTOR shall secure all bypass equipment and piping in order to prevent leaks and damage to surrounding equipment and property.

l. OWNER is responsible for relocation of the peroxide chemical tank and dosing pumps at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.

m. OWNER to take water quality sampler offline and relocate, if needed, at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.

3. Prior to Shutdown:
   a. Obtain ENGINEER's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
   b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
   c. Assist OWNER in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
   d. Coordinate other tie-ins to be performed simultaneously.
   e. Install, check, and test the temporary pumping system.
4. During Shutdown:
   a. Place temporary pumping system into operation.
   b. Dewater and decontaminate the Primary Clarifier 1 & 2 Effluent Channels and Manhole.
   c. Rehabilitate and inspect the concrete structures per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   d. Prepare the concrete structure for lining, line the structure, and conduct inspections per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   e. With OWNER, return equipment and system to operation.

5. Following Shutdown:
    a. Verify functionality of equipment and systems.
    b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
    c. Repair joints that are not watertight or gastight, as applicable.
    d. Remove temporary pumping system and appurtenances.

D. Bypass Plan IV: **Primary Clarifiers 3 & 4 Effluent Channels and Effluent Manhole**
1. General:
    a. Affected Equipment Operating Prior to Shutdown: None
    b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Section.
    c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this Section.
    d. Impact on Other Equipment and Processes: Wastewater flows will be diverted to Primary Clarifier 1 & 2. If bypass pumping is required due to wet weather and high flows, scum and sludge removal of these bypass flows may be altered.
2. Temporary Pumping and Flow Diversion: Provide temporary pumping system and flow diversion, including controls, as follows:
    a. Purpose: Provide a dry work environment for Structure 5 – Primary Clarifier 3 & 4 Effluent Channel and Structure 6 – Primary Clarifier 3 & 4 Effluent Manhole in order to complete concrete restoration and concrete lining per the Contract Documents.
    b. System Capacity: **14.2 MGD (permitted, maximum month, average day); 19.9 MGD (maximum day); 26.4 MGD (peak hour) wet weather flows**.
    c. Fluid Pumped: Screened wastewater.
    d. Controls: Provide a complete control system to maintain the liquid level in the suction chamber **(Primary Clarifier 1 & 2 Effluent Manhole)** between **elevation 19.86 and elevation 21.25.**
    e. Flow Diversion: Divert flow to Primary Clarifier 1 & 2 through closing valves on Primary Clarifier 3 & 4 Influent Piping. Closing these valves will prevent wastewater flows from entering Primary Clarifier 3 & 4 through the Primary Clarifier Splitter Structure.
    f. Suction Location: Primary Clarifier 1 & 2 Effluent Channel and/or Manhole, which is approximately 8’ deep.
    g. Additional bypass suction at the Primary Clarifier Splitter Structure is to be utilized for flows exceeding the capacity of Primary Clarifier 1 & 2 **(6 MGD)** and/or upon request of the OWNER.
    g. Discharge Location: Primary Clarifier Raised Manhole, which is approximately 24’ deep. Bypass is to be utilized for flows exceeding the capacity of Primary Clarifier 1 & 2 **(6 MGD)** and/or upon request of the OWNER.

h. OWNER is responsible for scum and sludge pumping operations to ensure material is not pumped or discharged into Primary Clarifier 3 & 4 during rehabilitation.
i. Plug all wastewater influents and effluents at the structure(s) being rehabilitated to ensure no wastewater leakage into the dry and decontaminated structure(s).
j. Flow Meter: Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day, 6-months historical trending recorded every minute, and providing 4 to 20 mA dc output signal to transmit flow rate to a wireless communication device indicating high alarms.
k. CONTRACTOR is responsible for removal of the manhole cover at the Primary Clarifier Splitter Structure, covers on the Primary Clarifier 3 & 4 Effluent Channels, manhole cover on the Primary Clarifier 3 & 4 Effluent Manhole, manhole cover on the Primary Clarifier Raised Manhole, and any other structure covers that require removal for proper bypass and structure rehabilitation.
l. CONTRACTOR shall secure all bypass equipment and piping in order to prevent leaks and damage to surrounding equipment and property.
m. OWNER is responsible for relocation of the peroxide chemical tank and dosing pumps at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.
n. OWNER to take water quality sampler offline and relocate, if needed, at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.

3. Prior to Shutdown:
   a. Obtain ENGINEER's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
   b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
   c. Assist OWNER in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
   d. Coordinate other tie-ins to be performed simultaneously.
   e. Install, check, and test the temporary pumping system.
4. During Shutdown:
   a. Place temporary pumping system into operation.
   b. Dewater and decontaminate the Primary Clarifier 3 & 4 Effluent Channels and Manhole.
   c. Rehabilitate and inspect the concrete structures per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining
   d. Prepare the concrete structure for lining, line the structure, and conduct inspections per the Contract Drawings and the following specifications:

- Section 03 00 05, Concrete
- Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
- Section 03 37 13, Shotcrete
- Section 09 85 00, Concrete Resurfacing and Lining

e. With OWNER, return equipment and system to operation.

5. Following Shutdown:
   a. Verify functionality of equipment and systems.
   b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
   c. Repair joints that are not watertight or gastight, as applicable.
   d. Remove temporary pumping system and appurtenances.

E. Bypass Plan V: **Primary Clarifier Raised Manhole and Aeration Tank Splitter Box Structure**

1. General:
   a. Affected Equipment Operating Prior to Shutdown: None
   b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Section.
   c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this Section.
   d. Impact on Other Equipment and Processes: Wastewater flows will be evenly distributed to the four Aeration Tanks through bypass pumping rather than through diversion in the Aeration Tanks Splitter Box Structure.
2. Temporary Pumping: Provide temporary pumping system, including controls, as follows:
   a. Purpose: Provide a dry work environment for Structure 7 – Primary Clarifier Raised Manhole and Structure 8 – Aeration Tanks Splitter Box Structure in order to complete concrete restoration and concrete lining per the Contract Documents.
   b. System Capacity: **14.2 MGD (permitted, maximum month, average day); 19.9 MGD (maximum day); 26.4 MGD (peak hour) wet weather flows**.
   c. Fluid Pumped: Screened wastewater.
   d. Controls: Provide a complete control system to maintain the liquid level in the suction chamber **(Primary Clarifier 3 & 4 Effluent Manhole)** between **elevation 19.86 and elevation 21.25.**
   e. Suction Location: Primary Clarifier Effluent Channels and Manholes, which are approximately 8’ deep. Bypass must provide <u>equal flow to all four Aeration Tanks.</u>
   f. Discharge Location: Pre-anoxic zone of each Aeration Tank. Discharge must be distributed evenly among all four Aeration Tanks. Bypass piping can be place along catwalk of each structure, however the catwalk must remain passable for plant operations.

g. Plug all wastewater influents and effluents at the structure(s) being rehabilitated to ensure no wastewater leakage into the dry and decontaminated structure(s).
h. Utilize Aeration Tanks Splitter Box Structure gates to prevent backflow from the Aeration Tanks. Coordinate with OWNER the usage and existing conditions of these gates. If gates are inoperable, coordinate with OWNER plugging the Aeration Tank influent pipe with a flow-through inflatable plug.
i. Flow Meter: Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day, 6-months historical trending recorded every minute, and providing 4 to 20 mA dc output signal to transmit flow rate to a wireless communication device indicating high alarms.
j. CONTRACTOR is responsible for removal of the manhole cover at the Primary Clarifier Raised Manhole, access plates on the Aeration Tanks Splitter Box Structure, covers on the Primary Clarifier Effluent Channels and Manholes, and any other structure covers that require removal for proper bypass and structure rehabilitation.
k. CONTRACTOR shall secure all bypass equipment and piping in order to prevent leaks and damage to surrounding equipment and property.
l. OWNER is responsible for relocation of the peroxide chemical tank and dosing pumps at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.
m. OWNER to take water quality sampler offline and relocate, if needed, at the Primary Clarifier Effluent Channels in order to free up this location for rehabilitation.

3. Prior to Shutdown:
   a. Obtain ENGINEER's acceptance of proposed shutdown planning submittal and shutdown notification submittal.
   b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
   c. Assist OWNER in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
   d. Coordinate other tie-ins to be performed simultaneously.
   e. Install, check, and test the temporary pumping system.
4. During Shutdown:
   a. Place temporary pumping system into operation.
   b. Dewater and decontaminate the Primary Clarifier Raised Manhole and Aeration Tanks Splitter Box Structure.
   c. Rehabilitate and inspect the concrete structures per the Contract Drawings and the following specifications:
      - Section 03 00 05, Concrete
      - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
      - Section 03 37 13, Shotcrete
      - Section 09 85 00, Concrete Resurfacing and Lining

d. Prepare the concrete structure for lining, line the structure, and conduct inspections per the Contract Drawings and the following specifications:
    - Section 03 00 05, Concrete
    - Section 03 01 30, Repair and Rehabilitation of Cast-In-Place Concrete
    - Section 03 37 13, Shotcrete
    - Section 09 85 00, Concrete Resurfacing and Lining

e. With OWNER, return equipment and system to operation.

5. Following Shutdown:
    a. Verify functionality of equipment and systems.
    b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
    c. Repair joints that are not watertight or gastight, as applicable.
    d. Remove temporary pumping system and appurtenances.

3.3 SCHEDULES

A. The schedules indicated below, attached following this Section's "End of Section" designation, are part of this Specifications Section:
    1. Table 01 14 16-A, Schedule of Tie-ins.
    2. Table 01 14 16-B, Schedule of Shutdowns.

+ + END OF SECTION + +

TABLE 01 14 16-A SCHEDULE OF TIE-INS					
Tie-In No.	**New Line Size and Service**	**Existing (Connecting) Line Size & Service**	**Tie-In Building/Location**	**Construction Stage**	**Remarks**
1	Watchemoket Pump Station Force Main Bypass	24-inch	24-inch, See C-003	I	Wet Tap Existing Force Main

TABLE 01 14 16-B

SCHEDULE OF SHUTDOWNS

Shut- down No.	Process Equipment and Service Lines Out-of-Service During Shutdown	Process Equipment In Operation During Shutdown	Tie-In Nos.	Duration of Bypass Pumping
I – Compartment A	Headworks main influent channel. Watchemoket Pump Station Force Main, Raw Wastewater Force Main and Silver Street Sewer and Barrington Flows to be temporarily bypassed.	All equipment and systems	None	80 working days (flow diversion only, no bypass pumping anticipated)
I – Compartment B	Headworks main influent channel; raw wastewater fine screen in main influent channel	All other equipment and systems	None	80 working days (flow diversion only, no bypass pumping anticipated)
I – Compartment C	Headworks west bypass channel; channel monster for screenings in west bypass channel	All other equipment and systems	None	
I – Compartment D	Common Channel between screen and grit chambers.	All equipment and systems	None	
I – Compartment E	Headworks East Grit Chamber	All other equipment and systems	None	
I – Compartment F	Headworks West Grit Chamber	All other equipment and systems	None	
I – Compartment G	Headworks channel downstream of East and West Grit Chambers	All equipment and systems	None	
II	Primary Clarifier Splitter Structure; Primary Clarifiers 3 & 4 (flow based); Headworks channel downstream of East and West Grit Chambers (Compartment G)	All equipment and systems	None	40 working days
III	Primary Clarifier 1 & 2 tanks, scum removal system, sludge removal system; peroxide tank and dosing pumps; Primary Clarifier Effluent water quality sampler	All other equipment and systems	None	55 working days
IV	Primary Clarifier 3 & 4 tanks, scum removal system, sludge removal system; peroxide tank and dosing pumps; Primary Clarifier Effluent water quality sampler	All other equipment and systems	None	55 working days
V	Primary Clarifier Raised Manhole; Aeration Tanks Splitter Box Structure; peroxide tank and dosing pumps; Primary Clarifier Effluent water quality sampler	All other equipment and systems	None	70 working days

SECTION 01 14 19

USE OF SITE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes requirements for use of the Site during the Project, and includes requirements for use of existing facilities, as applicable.
   2. CONTRACTOR shall provide all labor, materials, equipment, tools, and incidentals shown, specified, and required to comply with restrictions on CONTRACTOR's use of the Site and other areas.
   3. Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions, regarding the CONTRACTOR's use of the Site and other areas.

1.2 USE OF PREMISES

A. Limit use of premises at the Site to work areas shown or indicated on the Drawings and as specified in this Section. Do not disturb portions of the Site beyond areas of the Work.
   1. Limits:
      a. Confine storage of materials and equipment, and locations of temporary facilities to the following areas:
         1) Southwest parking lot behind the Administration Building and as indicated on the Drawings.
      b. Do not enter the following areas:
         1) Coordinate with OWNER for do not enter locations and where materials, equipment, and construction activities cannot take place.

B. Use of Existing Buildings and Structures: Maintain existing buildings and structures in weather-tight condition throughout construction unless otherwise indicated in the Contract Documents. Protect buildings, structures, and occupants during construction.
   1. Use of Existing Utilities, Sanitary Facilities, and First-aid Facilities: Refer Section 01 51 05, Temporary Utilities.
   2. Use of Existing Elevators:
      a. None.
   3 Use of Existing Hoisting Equipment and Access to Work Areas for Loading:
      a. CONTRACTOR must provide hoisting equipment and scaffolding for access to Work Areas and for construction activities. Do not load hoisting equipment beyond posted capacity.

C. Promptly repair damage to premises caused by construction operations. Upon completion of the Work, restore premises to specified condition; if condition is not specified, restore to pre-construction condition.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Items listed starting in Article 1.4 of this Section refer to and are the same pay items listed in the Bid Form and constitute all pay items for completing the Work.
   2. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant or facility services, CONTRACTOR's or ENGINEER's field offices, layout surveys, Project signs, sanitary requirements, testing, safety provisions and safety devices, submittals and record drawings, water supplies, power and fuel, maintenance of traffic, removal of waste, security, coordination with OWNER's operations, information technology (including hardware, software, and services) required during construction, commissioning where specified, bonds, insurance, or other requirements of the General Conditions, Supplementary Conditions, Division 01 Specifications, and other requirements of the Contract Documents.
   3. Compensation for all services, items, materials, and equipment shall be included in prices stipulated for lump sum and unit price pay items listed in this Section and included in the Contract.

B. Each lump sum and unit price, as bid, shall include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

1.2 ENGINEER'S ESTIMATE OF QUANTITIES

A. ENGINEER's estimated quantities for items of Unit Price Work, as included in the Contract, are approximate only and are included solely for purpose of comparing Bids and pricing. OWNER does not expressly or by implication agree that nature of materials encountered below the ground surface or actual quantities of material encountered or required will correspond with the quantities included in the Contract at the time of award and reserves the right to increase or decrease quantities, and to eliminate quantities, as OWNER may deem necessary.

B. CONTRACTOR and OWNER will not be entitled to adjustment in unit prices as a result of change in estimated quantity and agree to accept the unit prices accepted in the Bid as complete and total compensation for additions or deductions caused by existing conditions, changes or alterations in the Unit Price Work directed by OWNER.

1.3 RELATED PROVISIONS

A. Payments to CONTRACTOR: Refer to General Conditions, Supplementary Conditions, Agreement, and Section 01 29 76, Progress Payment Procedures.

B. Changes in Contract Price: Refer to General Conditions, Supplementary Conditions, and Section 01 26 00, Contract Modification Procedures.

C. Schedule of Values: Refer to General Conditions, Supplementary Conditions, and Section 01 29 73, Schedule of Values.

1.4 GENERAL CONSTRUCTION

A. Item 1 – General Construction:

1. Measurement and Payment: Lump sum payment for Item 1 will be full compensation for completing the Work, as shown or indicated under Division 01 through Division 49. Additional work items that CONTRACTOR may be ordered by ENGINEER to perform are described below.

B. Item 2 – Additional Repair Type 1 Exposed Aggregate
1. Measurement: Additional quantities will be measured for payment on the basis of square footage confirmed by ENGINEER in writing for quantities beyond what is included in the Contract. This is a standalone item for additional concrete repairs 0 – 3/4-inches in depth as indicated and specified.
2. Payment: Unit price per square foot for Item 2 will be full compensation for all additional quantities of Repair Type 1 Exposed Aggregate as confirmed by ENGINEER, and not specifically included under other items or contracts.

C. Item 3 – Additional Repair Type 2 Surface Repairs
1. Measurement: Additional quantities will be measured for payment on the basis of square footage confirmed by ENGINEER in writing for quantities beyond what is included in the Contract. This is a standalone item for additional concrete repairs 0 – 4-inches as indicated and specified.
2. Payment: Unit price per square foot for Item 3 will be full compensation for all additional quantities of Repair Type 2 Surface Repairs as confirmed by ENGINEER, and not specifically included under other items or contracts.

D. Item 4 –Additional Repair Type 3 Cracks
1. Measurement: Additional quantities will be measured for payment on the basis of linear footage confirmed by ENGINEER in writing for quantities beyond what is included in the Contract. This is a standalone item for additional crack repair as indicated and specified.
2. Payment: Unit price per linear foot for Item 4 will be full compensation for all additional quantities of Repair Type 3 Cracks confirmed by ENGINEER, and not specifically included under other items.

E. Item 5 –Additional Concrete Lining, Surface Preparation, Repair and Testing
   1. Measurement: Additional quantities will be measured for payment on the basis of square footage confirmed by ENGINEER in writing for quantities beyond what is included in the Contract. This is a standalone item for additional concrete lining, surface preparation, repair and testing as indicated and specified in Section 08 85 00, Concrete Resurfacing and Lining.
   2. Payment: Unit price per square foot for Item 5 will be full compensation for all additional quantities of Concrete Lining, Surface Preparation, Repair and Testing as confirmed by ENGINEER, and not specifically included under other items or contracts.

F. Item 6 – Additional Temporary Bypass Pumping
   1. Measurement: Additional bypass pumping services for additional work as part of Items 2, 3, 4 and 5 will be measured for payment on the basis of additional days confirmed by ENGINEER in writing for quantities beyond what is included in the Contract as specified in Table 01 14 16-B, Section 01 14 16, Coordination with Owner's Operations.
   2. Payment: Unit price per day for Item 6 will be full compensation for all additional days required for bypass pumping as confirmed by ENGINEER, and not specifically included under other items.

G. Item 7 – Additional Testing Allowance
   1. Measurement: Additional testing as requested by the OWNER beyond what is included in the Contract.
   2. Payment: The CONTRACTOR will be reimbursed by the OWNER for the actual amount invoiced to the Contractor without any applied Contractor markup.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope: Section includes:
   1. Administrative and procedural requirements for selecting materials and equipment for the Project.
   2. Procedural requirements for substitutions of materials and equipment.
   3. Procedural requirements for substitute construction methods or procedures, when construction methods or procedures are specified.

B. A proposed substitute will not be accepted for review if:
   1. Approval would require changes in design concept or a substantial revision of the Contract Documents.
   2. Approval would delay completion of the Work or the work of other contractors.
   3. Substitution request is indicated or implied on a Shop Drawing or other submittal, or on a request for interpretation or clarification, and is not accompanied by CONTRACTOR's formal and complete request for substitution.

C. If proposed substitute is not approved, CONTRACTOR shall provide the specified materials, equipment, method, or procedure, as applicable.

D. Approval of a substitute does not relieve CONTRACTOR from requirement for submitting Shop Drawings and other submittals in accordance with the Contract Documents.

E. ENGINEER and OWNER have the right to rely upon the completeness and accuracy of the information included in CONTRACTOR's request for approval of a substitute, and CONTRACTOR accepts full responsibility for the completeness and accuracy thereof.

F. When approved substitute is defective or fail to perform in accordance with the Contract Documents, responsibility for remedying the defect or failure resides solely with CONTRACTOR and Supplier.

1.2 SUBSTITUTE MATERIALS AND EQUIPMENT

A. Procedure:
   1. Submit requests for substitution in accordance with requirements for furnishing submittals, as indicated in Section 01 33 00, Submittal Procedures.
   2. Submit separate request for each proposed substitute.

3. Submit request for substitution using forms attached to this Section. Complete all information requested on each form, and enclose with the forms supplementary information as required. In addition to requirements of the General Conditions and information required on substitution request forms, include with each substitute request the following:
    a. Identification of the materials and equipment (as applicable), including manufacturer's name and address.
    b. Manufacturer's literature with description of the materials and equipment, performance and test data, and reference standards with which materials and equipment comply.
    c. Samples, when appropriate.
    d. Name and address of similar projects on which the materials and equipment were used, date of installation, and names and contact information (including telephone number) for the facility operations and maintenance manager.

1.3 SUBSTITUTE CONSTRUCTION METHODS OR PROCEDURES

A. The provisions of the General Conditions, as may be modified by the Supplementary Conditions, regarding substitute items of materials and equipment are hereby extended to apply to substitute construction methods or procedures.

B. Procedure:
    1. Submit requests for substitution in accordance with requirements for furnishing submittals, as indicated in Section 01 33 00, Submittal Procedures.
    2. Submit separate request for each proposed substitute.
    3. Submit request for substitution using forms attached to this Section. Complete all information requested on each form, and enclose with the forms supplementary information as required. In addition to requirements of the General Conditions and information required on substitution request forms, include with each substitute request the following:
        a. Detailed description of proposed method or procedure.
        b. Itemized comparison of the proposed substitution with the specified method or procedure.
        c. Drawings illustrating method or procedure.
        d. Other data required by ENGINEER to establish that proposed substitution is equivalent to specified method or procedure.

1.4 CONTRACTOR'S REPRESENTATIONS

A. In submitting request for substitution, CONTRACTOR represents that:
    1. CONTRACTOR has read and fully understands the provisions regarding substitutes as indicated in the General Conditions, as may be modified by the Supplementary Conditions.
    2. Substitution request is complete and includes all information required by the Contract Documents.

3. CONTRACTOR certifications required by the General Conditions, as may be modified by the Supplementary Conditions, are valid and made with CONTRACTOR's full knowledge, information, and belief.
4. CONTRACTOR will provide the same or better guarantees or warranties for proposed substitute as for the specified materials, equipment, methods, or procedures, as applicable.
5. CONTRACTOR waives all Claims for additional costs or extension of time related to proposed substitute that subsequently may become apparent.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 ATTACHMENTS

A. The documents listed below, and attached following this Section's "End of Section" designation, are part of this Specification Section.
   1. Substitution Request Form (two pages).
   2. Product Substitution Checklist (one page).

+ + END OF SECTION + +

SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ Engineer Project. No._____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitute: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 1 to 4 years old ☐ 5 to 10 years old ☐ More than 10 years old

Differences between proposed substitute and specified item: _____

_____

_____

☐ Point-by-point comparative data attached — REQUIRED BY THE CONTRACT DOCUMENTS

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Engineer: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitute: ($)
(attach detailed, itemized estimate)

_____ _____

Proposed substitute changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.
(clarify whether change is to Substantial Completion, Milestone, or time for readiness for final payment)

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST
(Continued)

☐ Substitute product, method, or procedure is subject to payment of licensing fee or royalty (check if "yes" and attach information)

☐ Substitute product, method, or procedure is patented or copyrighted (check if "yes" and attach information)

The undersigned certifies:

- Representations in the General Conditions and in Section 01 25 00, Substitution Procedures, regarding substitutions are valid.
- Same or better warranty and guarantee will be furnished for proposed substitution as for specified item.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitute will have no adverse effect on other trades and will not affect or delay Progress Schedule.
- Cost data as stated above is complete. Claims for additional costs or time related to accepted substitution which may subsequently become apparent are waived.
- Proposed substitute does not affect dimensions and functional clearances.
- Payment will be made for Engineer's review and changes, if any, to the design and Contract Documents, and construction costs caused by the substitute.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: ☐

ENGINEER'S REVIEW AND ACCEPTANCE (OR NON-ACCEPTANCE) WILL BE DOCUMENTED IN A FIELD ORDER OR CHANGE ORDER, AS APPROPRIATE. _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ Engineer ☐ Other:

Adapted from CSI Form No. 13.0B, 2004 edition

PRODUCT SUBSTITUTION CHECKLIST

Date: _____ Re: _____

Engineer Proj No.: _____ Manufacturer's Project No.: _____

Filing No.: _____ Contract For: _____

Item Equivalence:

☐ Is the submitted item equivalent to the specified item? _____

☐ Does it serve the same function? _____

☐ Does it have the same dimensions? _____

☐ Does it have the same appearance? _____

☐ Will it last as long? _____

☐ Does it comply with the same codes, and standards and performance requirements? _____

☐ Has the item been used locally, and where are the projects? _____

_____

☐ Has a problem occurred with the item, and what was the remedy? _____

_____

Effect on the Project:

☐ Will the substitute affect other aspects of the construction? _____

☐ Are any details affected and are changes required? _____

☐ What is the cost of the changes? _____

☐ Who pays for the required changes? _____

☐ Are Contract Times affected? _____

_____

Effect on the Warranty:

☐ How does the proposed warranty differ from the specified warranty? _____

_____

☐ Does the manufacturer have a track record of standing behind the warranty? _____

_____

Adapted from CSI Form No. 20.3, 1998 edition

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope.
   1. This Section expands upon provisions of the General Conditions, as may be modified by the Supplementary Conditions, and includes:
      a. Requests for interpretation.
      b. Written clarifications.
      c. Minor changes in the Work and Field Orders.
      d. Work Change Directives.
      e. Proposal Requests.
      f. Change Proposals.
      g. Change Orders.

B. Submit Contract modification documents to ENGINEER, addressed to the contact person and contact information indicated in Section 01 33 00, Submittal Procedures, and in accordance with Section 01 31 26, Electronic Communication Protocols.

C. Retain at CONTRACTOR's office and at the Site complete copy of each Contract modification document and related documents, and ENGINEER's response.

1.2 REQUESTS FOR INTERPRETATION

A. General.
   1. Transmit written requests for interpretation to ENGINEER. CONTRACTOR and OWNER may prepare and transmit requests for interpretation.
   2. Prepare and transmit request for interpretation to obtain clarifications or interpretations of the Contract Documents. Report conflicts, errors, ambiguities, and discrepancies in the Contract Documents by requesting an interpretation.
   3. Do not transmit request for interpretation when other form of communication is appropriate, such as CONTRACTOR's submittals, requests for approvals of substitutes, notices, ordinary correspondence, or other form of communication. Improperly prepared or inappropriate requests for interpretation will be returned without response or action by ENGINEER.
   4. Do not submit request for interpretation or clarification when:
      a. answer may be obtained by observations at the Site; or
      b. required information is clearly indicated in the Contract Documents; or
      c. required information is included in industry standards referenced in the Contract Documents or Supplier's instructions that are consistent with the Contract Documents; or

d. are reasonably inferable from any of foregoing.

5. CONTRACTOR shall have sole financial responsibility for requests for interpretations or clarifications that are submitted late, out of sequence, or that are unnecessary.

B. Procedure.

1. Transmit requests for interpretation in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Include with each request for interpretation a separate letter of transmittal.
2. ENGINEER will provide timely review of requests for interpretation. Allow sufficient time for review and response.
3. ENGINEER will maintain log of requests for interpretation. Upon request, copy of log will be transmitted to requestor.
4. ENGINEER's response to requests for interpretation will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Each response to a request for interpretation will include a separate letter of transmittal.
5. ENGINEER's written response to each request for interpretation will be distributed to:
   a. CONTRACTOR.
   b. OWNER.
   c. Resident Project Representative (RPR).
   d. ENGINEER.
6. If ENGINEER requests additional information to make an interpretation, entity requesting the interpretation shall transmit the information requested within ten days, unless ENGINEER allows additional time, via correspondence referring to request for interpretation number.
7. Interpretations that One or Both Parties Believes Entails a Change to the Contract:
   a. If CONTRACTOR or OWNER believes that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of ENGINEER's interpretation, so advise ENGINEER in writing before proceeding with the Work associated with the request for interpretation.
   b. If, after this initial communication, either OWNER or CONTRACTOR believes that change in Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.

C. Preparation of Requests for Interpretation:

1. Prepare each request for interpretation on the "Request for Interpretation" form included with this Section, or other form acceptable to ENGINEER.
2. Number each request for interpretation as follows: Numbering system shall be the Contract number and designation followed by a hyphen and three-digit sequential number. Example: First request for interpretation on the general contract for project titled, "Contract A15" would be, "RFI No. A15-GC-001".

3. In space provided on form, describe the interpretation requested. Provide additional sheets as necessary. Include text and sketches as required in sufficient detail to describe the need for an interpretation.
4. When applicable, request for interpretation shall include CONTRACTOR's recommended resolution.

1.3 WRITTEN CLARIFICATIONS

A. General:
1. Written clarifications, when required, will be initiated and issued by ENGINEER.
2. Written clarifications do not change the Contract Price or Contract Times, and do not alter the Contract Documents.
3. Written clarifications will be issued as correspondence or using clarification notice form, with additional information as required.

B. Procedure.
1. ENGINEER's written clarifications will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section.
2. Each written clarification will be distributed to:
   a. CONTRACTOR.
   b. OWNER.
   c. Resident Project Representative (RPR).
   d. ENGINEER.
3. Written Clarifications that One or Both Parties Believes Entails a Change to the Contract:
   a. If CONTRACTOR or OWNER believes that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of ENGINEER's written clarification, so advise ENGINEER in writing before proceeding with the Work associated with the written clarification.
   b. If, after this initial communication, either OWNER or CONTRACTOR believes that change in Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.
4. If ENGINEER's written clarification is unclear, prepare and transmit a request for interpretation.

1.4 MINOR CHANGES IN THE WORK AND FIELD ORDERS

A. General:
1. Field Orders, when required, will be initiated and issued by ENGINEER.
2. Field Orders authorize minor variations in the Work but do not change the Contract Price or Contract Times.
3. Field Orders will be in the form of Engineers Joint Contract Documents Committee document EJCDC® C-942, "Field Order".

4. ENGINEER will maintain a log of Field Orders issued.

B. Procedure.
   1. Field Orders will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Each Field Order will include a separate letter of transmittal.
   2. Each Field Order will be distributed to:
      a. CONTRACTOR.
      b. OWNER.
      c. Resident Project Representative (RPR).
      d. ENGINEER.
   3. Field Orders that One or Both Parties Believes Entails a Change to the Contract Price or Contract Times:
      a. If CONTRACTOR or OWNER believes that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of a Field Order, so advise ENGINEER in writing before proceeding with the Work associated with the Field Order.
      b. If, after this initial communication, CONTRACTOR believes that change in Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.
   4. If the Field Order is unclear, submit request for interpretation.

1.5 WORK CHANGE DIRECTIVES

A. General:
   1. Work Change Directives, when required, order additions, deletions, or revisions to the Work.
   2. Work Change Directives do not change the Contract Price or Contract Times but are evidence that the parties to the Contract expect that the change ordered or documented by the Work Change Directive will be incorporated in subsequently issued Change Order following agreement by the parties as to the Work Change Directive's effect, if any, on the Contract Price or Contract Times.
   3. Work Change Directives will be in the form of EJCDC® C-940, "Work Change Directive".

B. Procedure.
   1. Work Change Directives signed by OWNER and ENGINEER will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Each Work Change Directive will include a separate letter of transmittal. CONTRACTOR shall print three originals of Work Change Directive for CONTRACTOR's signature.
   2. CONTRACTOR shall promptly sign each original Work Change Directive and, within five days of receipt, return all originals to ENGINEER.
   3. Original, signed Work Change Directives will be distributed as follows:
      a. CONTRACTOR: One original.

b. OWNER: One original.
c. ENGINEER: One original.

4. One copy of each Work Change Directive will be distributed to:
   a. Resident Project Representative (RPR).
5. Documentation of Costs:
   a. When basis of payment for Work ordered under a Work Change Directive will be paid as Cost of the Work, or when otherwise required by ENGINEER, document for the Work performed under each separate Work Change Directive, for each day, the following:
      1) Number and labor classifications of workers employed and hours worked.
      2) Construction equipment used including manufacturer, model, and year of manufacture, and number of hours such equipment was onsite and used for the Work under the Work Change Directive.
      3) Consumables and similar materials used.
      4) Receipts, bills, or invoices for and descriptions of materials and equipment incorporated into the Work.
      5) Invoices and labor and equipment breakdowns for Subcontractors and Suppliers.
      6) Other information required by OWNER or ENGINEER,
   b. Submit such information in a format acceptable to ENGINEER.
   c. Transmit such documentation to ENGINEER as a Change Proposal.

1.6 PROPOSAL REQUESTS

A. General:
   1. Proposal Requests may be initiated by ENGINEER or OWNER.
   2. Proposal Requests are for requesting the effect on the Contract Price and the Contract Times and other information relative to contemplated changes in the Work. Proposal Requests do not authorize changes or variations in the Work, and do not change the Contract Price or Contract Times or terms of the Contract.
   3. Proposal Requests will be furnished using the "Proposal Request" form included with this Section.

B. Procedure.
   1. Proposal Requests will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Each Proposal Requests will include a separate letter of transmittal.
   2. Each signed Proposal Request will be transmitted to:
      a. CONTRACTOR.
      b. OWNER.
      c. Resident Project Representative (RPR).
      d. ENGINEER.
   3. Transmit request for interpretation to clarify conflicts, errors, ambiguities, and discrepancies in Proposal Request.

4. Upon receipt of Proposal Request, CONTRACTOR shall prepare and transmit to ENGINEER a Change Proposal, in accordance with the Contract Documents, for the proposed Work described in the Proposal Request.

1.7 CHANGE PROPOSALS

A. General.
   1. Prepare and transmit written Change Proposal to ENGINEER in response to each Proposal Request; or when CONTRACTOR believes a change in the Contract Price or Contract Times or other change to the terms of the Contract is required; or to appeal an initial decision by ENGINEER concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract.

B. Procedure.
   1. Prepare and transmit Change Proposals within time limits indicated in the General Conditions, as may be modified by the Supplementary Conditions.
   2. Transmit Change Proposals in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Include with each Change Proposal all required supporting documentation and a separate letter of transmittal.
   3. ENGINEER's Review and Requests for Additional Information:
      a. ENGINEER will review and act on each Change Proposal in accordance with, and within the time limits indicated in, the General Conditions, as may be modified by the Supplementary Conditions.
      b. When, ENGINEER requests additional information to render a decision, submit required information within five days of receipt of ENGINEER's request, unless ENGINEER allows more time. Submit the required information via correspondence that refers to the specific Change Proposal number.
      c. OWNER shall transmit to ENGINEER such comments, if any, that OWNER has on the Change Proposal, within 10 days of OWNER's receipt of the Change Proposal.
      d. ENGINEER will render a written decision on the Change Proposal.
      e. ENGINEER's response to Change Proposals will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section, the General Conditions, and the Supplementary Conditions.
   4. ENGINEER's response to each Change Proposal will be distributed to:
      a. CONTRACTOR.
      b. OWNER.
      c. Resident Project Representative (RPR).
      d. ENGINEER.
   5. If Change Proposal is recommended for approval by ENGINEER and is approved by OWNER, a Change Order will be issued or, when applicable, an appropriate use of contingency allowance will be authorized by OWNER.

6. If parties do not agree on terms for the change, OWNER or CONTRACTOR may file a Claim against the other, in accordance with the General Conditions, as may be modified by the Supplementary Conditions.

C. Preparation of Change Proposals:
   1. Each Change Proposal shall be submitted on the "Change Proposal" form included with this Section, or other form acceptable to ENGINEER.
   2. Number each Change Proposal as follows: Numbering system shall be the Contract number and designation followed by a hyphen and three-digit sequential number. Example: First Change Proposal for the general contract for project named "Contract A15" would be, " Change Proposal No. A15-GC-001".
   3. In space provided on Change Proposal form:
      a. Describe scope of each proposed change. Include text and sketches on additional sheets as required to provide detail sufficient for ENGINEER's review and response. If a change item is submitted in response to Proposal Request, write in as scope, "In accordance with Proposal Request No." followed by the Proposal Request number. Submit written clarifications, if any, to scope of change.
      b. Submit justification for each proposed change. If change is in response to proposal request, write in as justification, "In accordance with Proposal Request No." followed by the proposal request number.
      c. List the total change in the Contract Price and Contract Times for each separate change item included in the Change Proposal.
   4. Unless otherwise directed by ENGINEER, attach to the Change Proposal detailed breakdowns of pricing (Cost of the Work and CONTRACTOR's fee) including:
      a. List of Work tasks to accomplish the change.
      b. For each task, labor cost breakdown including labor classification, total hours per labor classification, and hourly cost rate for each labor classification.
      b. Construction equipment and machinery to be used, including manufacturer, model, and year of manufacture, and number of hours for each.
      c. Detailed breakdown of cost of materials and equipment to be incorporated into the Work, including quantities, unit costs, and total cost, with Supplier's written quotations.
      d. Breakdowns of the Cost of the Work and fee for Subcontractors, including labor, construction equipment and machinery, and materials and equipment incorporated into the Work, other costs, and Subcontractor fees (e.g., overhead and profit).
      e. Breakdown of other costs eligible, in accordance with the General Conditions and the Supplementary Conditions under "Cost of the Work" provisions.
      f. Other information required by ENGINEER.
      g. CONTRACTOR's fees applied to eligible CONTRACTOR costs and eligible Subcontractor costs.

1.8 CHANGE ORDERS

A. General:
   1. Change Orders will be recommended by ENGINEER (when required by the General Conditions), and will be signed by OWNER and CONTRACTOR, to authorize additions, deletions, or revisions to the Work, or changes to the Contract Price or Contract Times.
   2. Change Orders will be in the form of EJCDC® C-941, "Change Order".

B. Procedure.
   1. Change Orders for signature by CONTRACTOR will be transmitted in accordance with Section 01 31 26, Electronic Communication Protocols, and requirements of this Section. Each Change Order will include a separate letter of transmittal. CONTRACTOR shall print three originals of Change Order for CONTRACTOR's signature.
   2. CONTRACTOR shall promptly sign each original Change Order and, within five days of receipt, return all originals to ENGINEER.
   3. ENGINEER will sign each original Change Order and forward them to OWNER.
   4. After approval and signature by OWNER, original Change Orders will be distributed as indicated below.
   5. Original, signed Change Orders will be distributed as follows:
      a. CONTRACTOR: One original.
      b. OWNER: One original.
      c. ENGINEER: One original.
   6. One copy of each Change Order will be distributed to:
      a. Resident Project Representative (RPR).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 ATTACHMENTS

A. The forms listed below, following this Section's "End of Section" designation, are part of this Specifications Section:
   1. Request for Interpretation form (one page).
   2. Proposal Request form (one page).
   3. Change Proposal form (one page).

+ + END OF SECTION + +

REQUEST FOR INTERPRETATION

Owner: _____
Project Name:
Contractor: _____ RFI No. _____
Date Transmitted: _____ Date Received: _____
Date Response Requested: _____ Date Response Transmitted: _____

Subject:_____
Specification Section and Paragraph: _____
_____
Drawing References: _____

INTERPRETATION REQUESTED:

Signature: _____ Date: _____

ENGINEER'S RESPONSE:

Signature: _____ Date: _____

PROPOSAL REQUEST

Owner: _____
Project Name: _____

Proposal Request No.: _____ Date: _____

Contract Name and No.: _____

Contractor: _____

Other Contracts Involved in Proposed Change:
_____
_____

TO CONTRACTOR: Please submit a complete Change Proposal for the proposed modifications described below. If the associated Change Proposal is approved, a Change Order or allowance authorization will be issued to authorize adjustment so the scope of the Work. This Proposal Request is not a Change Order, Work Change Directive, Field Order, or an authorization to proceed with the proposed Work described below.

SCOPE OF PROPOSED WORK:

1. *Item*:
2. *Item*:
3. *Item*:

Proposal requested by: _____

Signature of Requestor: _____

CHANGE PROPOSAL

Owner: _____
Project Name: _____

Change Proposal No.: _____ Date: _____
Submitted in Response to Proposal Request No.: _____

Contract Name and No.: _____
Contractor: _____

Subject: _____
_____

The following changes to the Contract are proposed:

SCOPE OF WORK: *(attach and list supporting information as required)*

1. *Item*:
2. *Item*:

JUSTIFICATION:

1. *Item*:
2. *Item*:

CHANGES IN CONTRACT PRICE AND CONTRACT TIMES:

We propose that the Contract Price and Contract Times be changed as follows:

For Contract Price, attach detailed cost breakdowns for Contractor and Subcontractors, Supplier quotations, and other information required.

For the Contract Times, state increase, decrease, or no change to Contract Times for Substantial Completion, readiness for final payment, and Milestones, if any. If increase or decrease, state specific number of days for changes to the Contract Times.

Description	Amount	Contract Times (days)	
		Substantial	Final
1. Item	$0.00	0	0
2. Item	$0.00	0	0
Total This Change Proposal	**$0.00**	**0**	**0**

Changes to Milestones, if any: _____

Contractor represents that supporting data attached to this Change Proposal are accurate and complete. The requested time or price adjustment indicated in this Change Proposal is the entire adjustment to which Contractor believes it is entitled as a result of the proposed change(s) indicated herein.

Change Proposal by: _____

Signature of Proposer: _____

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall prepare and submit to ENGINEER for acceptance a Schedule of Values that allocates cost to each item of the Work. Schedule of Value list of line items shall correspond to each aspect of the Work, establishing in detail the portion of the Contract Price allocated to each major component of the Work.
   2. Upon request of ENGINEER, support values with data that substantiate their correctness.
   3. Submit preliminary Schedule of Values to ENGINEER for initial review. CONTRACTOR shall incorporate ENGINEER's comments into the Schedule of Values and resubmit to ENGINEER. ENGINEER may require corrections and re-submittals until Schedule of Values is acceptable.
   4. Schedule of Values may be used as a basis for negotiating price of changes, if any, in the Work.
   5. Schedule of Values and the Progress Schedule updates specified in Section 01 32 16, Progress Schedule, will be basis for preparing each Application for Payment.

1.2 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Submit to ENGINEER Schedule of Values in the form and quantity required in Section 01 33 00, Submittal Procedures, and in accordance with Section 01 31 26, Electronic Communication Protocols.
   2. Content of Schedule of Values submittals shall be in accordance with Article 1.3 of this Section.
   3. Timing of Submittals:
      a. Submit preliminary Schedule of Values within time limit indicated in the General Conditions.
      b. Submittal of the Schedule of Values for acceptance by ENGINEER shall be in accordance with the General Conditions. ENGINEER will not accept Applications for Payment without an acceptable Schedule of Values.
      c. When required by ENGINEER, promptly submit updated Schedule of Values to include cost breakdowns for changes in the Contract Price.

1.3 SCHEDULE OF VALUES FORMAT AND CONTENT

A. Organization and Major Elements of Schedule of Values

1. Prepare Schedule of Values on the "progress estimate" or "continuation sheets", as applicable, of the Application for Payment form indicated in Section 01 29 76, Progress Payment Procedures.
2. Include in Schedule of Values itemized list of Work for each major work area included in the Work, for each payment item specified in Section 01 22 13, Measurement and Payment.
3. Organization in Accordance with Specification Sections:
    a. Within each work area, organize the Schedule of Values by the various Specifications Section numbers and titles included in the Contract Documents.
    b. Label each row in the Schedule of Values with the appropriate Specifications Section number. Include an amount for each row in the Schedule of Values.
    c. List sub-items of major products or systems, as appropriate or when requested by ENGINEER.
4. Include in Schedule of Values unit price payment items with their associated quantity. Provide in the Schedule of Values detailed breakdown of unit prices when required by ENGINEER.

B. Requirements for preliminary Schedule of Values and Schedule of Values are:
1. Subcontracted Work:
    a. Schedule of Values shall show division of Work between CONTRACTOR and Subcontractors.
    b. Line items for Work to be done by Subcontractor shall include the word, "(SUBCONTRACTED)".
2. Apportionment between Materials and Equipment, and Installation:
    a. Schedule of Values shall include breakdown of costs for materials and equipment, installation, and other costs used in preparing the Bid by CONTRACTOR and each Subcontractor.
    b. List purchase and delivery costs for materials and equipment for which CONTRACTOR may apply for payment as stored materials.
3. Sum of individual values shown on the Schedule of Values shall equal the total of associated payment item. Sum of payment item totals in the Schedule of Values shall equal the Contract Price.
4. Overhead and Profit: Include in each line item a directly proportional amount of CONTRACTOR's overhead and profit. Do not include overhead and profit as separate item(s).
5. Include separate line item for each allowance, and for each unit price item.
6. Bonds and Insurance Costs: Include line item for bonds and insurance in payment item for Item 1 – General Construction , in amount not exceeding 2.0 percent of the Contract Price. This amount may be applied for in the first Application for Payment.
7. Include relevant items for the General Conditions, permits (when applicable), construction Progress Schedule, and other items required by ENGINEER. Include such items in Applications for Payment on payment schedule acceptable to ENGINEER

8. Line items for Site maintenance such as dust control, snow removal, compliance with storm water pollution prevention plans and permits, spill prevention control and countermeasures plans, and for construction photographic documentation; temporary utilities and temporary facilities, field offices, temporary controls, field engineering, and similar Work shall be included in the Schedule of Values and proportioned in Applications for Payment throughout duration of the Work.
9. Mobilization and Demobilization:
    a. Include separate line items under each appropriate payment item for mobilization and demobilization. Document for ENGINEER the activities included in mobilization and demobilization line items.
    b. Mobilization will be limited to 2 percent of the Contract Price, and will be paid in 4 payments, each of 0.5 percent of total amount for mobilization.
    c. Demobilization shall be not less than 1 percent of the Contract Price and shall be included with the Application for Payment following Substantial Completion, or other schedule acceptable to ENGINEER.
10. Costs for Shop Drawings, Samples, and other submittals; operations and maintenance manuals; field testing; and training of operations and maintenance personnel shall be as follows, unless otherwise accepted by ENGINEER:
    a. Up to eight percent of cost (including all associated overhead and profit) of each equipment item, exclusive of transportation and installation costs associated with that item, may be allocated to preparation of Shop Drawings, Samples ,and other submittals and may be included in the Application for Payment following ENGINEER's approval of Shop Drawings (and acceptance of other submittals, as applicable) required for fabricating or purchasing for that item for the Work.
    b. Up to three percent of total cost of each item (including all associated overhead and profit), including materials and equipment, and installation, may be apportioned to testing and included in the Application for Payment following ENGINEER's acceptance of the associated written field testing report(s).
    c. Up to a total of four percent of equipment cost (including all associated overhead and profit), exclusive of transportation and installation costs, may be apportioned to operations and maintenance manuals and training of operations and maintenance personnel, which may be included in the Application for Payment following completion of training for that item.
11. Project Record Documents:
    a. Include in the Schedule of Values a line item with appropriate value for Project record documents.
    b. If adequate record documents are maintained, up to 50 percent of the value of the record documents line item will be eligible for payment, spread evenly over those progress payments in which construction at the Site is performed.
    c. Remainder of Project record documents line item will be eligible for payment when complete record documents are submitted in accordance

with the Contract Documents. If record documents submitted are unsatisfactory to ENGINEER, amount may be reduced via set-offs in accordance with the Contract Documents.

12. Schedule of Values shall include an itemized list of Work by work area, as applicable, for Work included in Section 01 14 16, Coordination with Owner's Operations.
13. Coordinate Schedule of Values with cost-loading of the Progress Schedule, in accordance with Section 01 32 16, Progress Schedule.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 29 76

PROGRESS PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 PROGRESS PAYMENTS

A. Scope:
   1. CONTRACTOR's requests for payment shall be in accordance with the Agreement, General Conditions and Supplementary Conditions, and the Specifications.
   2. Form: Applications for Payment shall be in the form of Engineers Joint Contract Documents Committee (EJCDC) document EJCDC® C-620, "Contractor's Application for Payment", 2013 edition or later.

B. Procedure:
   1. Review with Resident Project Representative (RPR) quantities and the Work proposed for inclusion in each progress payment. Application for Payment shall cover only the Work and quantities recommended by the RPR.
   2. CONTRACTOR will be required to review with ENGINEER or RPR the status of record documents in connection with ENGINEER's review of each Application for Payment. Failure to maintain record document current will be just cause for ENGINEER to recommend a reduction in payment for record documents in accordance with Section 01 29 73, Schedule of Values, and will entitle OWNER to set-offs in accordance with the Contract Documents.
   3. Submit to ENGINEER four printed originals, each with CONTRACTOR's original, "wet" signature, of each complete Application for Payment and other documents to accompany the Application for Payment.
   4. ENGINEER will act on request for payment in accordance with the General Conditions and Supplementary Conditions.

C. Each request for progress payment shall include:
   1. Completed Application for Payment form, including summary/signature page, progress estimate sheets, and stored materials summary. Progress estimate sheets shall have the same level of detail as the Schedule of Values.
   2. Documentation for Stored Materials and Equipment:
      a. For materials and equipment not incorporated in the Work but suitably stored, submit documentation in accordance with the General Conditions and Supplementary Conditions.
      b. Legibly indicate on invoice or bill of sale the specific stored materials or equipment included in the payment request and corresponding bid/payment item number for each and the Supplier price for each item.
   3. Listing of Subcontractors and Suppliers:
      a. In accordance with the General Conditions, submit not less than monthly updated listing of all Subcontractors and Suppliers known to

CONTRACTOR, whether or not such entities have a contract directly with CONTRACTOR.

b. Submit complete information using the form attached to this Section.

4. Allowance Work:
   a. For payment requests that include payment for Work under an allowance, include with the progress payment request copy of OWNER's authorization of the associated allowance Work, in accordance with Section 01 21 00, Allowances.
5. Partial Release or Reduction of Retainage:
   a. For each Application for Payment where CONTRACTOR requests partial release or reduction of retainage in any amount (other than request for final payment), submit with associated progress payment request consent of surety to partial release or reduction of retainage, duly completed by CONTRACTOR and surety.
   b. Acceptable form includes AIA® G707A™, "Consent of Surety to Reduction in or Partial Release of Retainage", 1994 or later edition, or other form acceptable to OWNER.
   c. For payment requests that include reduction in or payment of retainage in an amount greater than that required by the Contract Documents, obtain OWNER's concurrence for partial release or reduction in retainage prior to submitting such Application for Payment.

D. Final Payment:
   1. Requirements for request for final payment are in the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 77 19, Closeout Requirements.

1.2 PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Observation of Stored Materials and Equipment Prior to Application for Payment:
   1. General:
      a. Prior to materials or equipment suitably stored but not yet incorporated into the Work can be eligible for payment, ENGINEER or Resident Project Representative (RPR) shall visit the storage location and verify the extent, condition, and storage environment of the stored items.
      b. When the same material or equipment item is stored for more than two months, such visits to storage location shall be not less than once every two months.
   2. Cost Responsibility for Observations:
      a. When storage location is less than 20 miles from the Site or less than 20 miles from ENGINEER's office, CONTRACTOR is not responsible for reimbursing OWNER for cost of ENGINEER's time and expenses for observing stored materials and equipment.
      b. When storage location is more than 20 miles from the Site and more than 20 miles from ENGINEER's office, CONTRACTOR shall reimburse OWNER, via a set-off under the Contract Documents, for

cost of ENGINEER's time and expenses, including travel time, to visit the storage location and observe the stored materials and equipment.

C. Other Requirements for Stored Items: Regardless of storage location, perform the following for stored materials and equipment for which payment is sought:
   1. Clearly mark each stored container, crate, or item. Such marking shall not blemish or deface the finish of items that will be exposed to view after installation at the Site.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 ATTACHMENTS

A. The forms listed below, following this Section's "End of Section" designation, are part of this Specification Section:
   1. List of Subcontractors and Suppliers form (two pages).

+ + END OF SECTION + +

LIST OF SUBCONTRACTORS AND SUPPLIERS

Owner: _____
Project Name: _____

Contractor: _____ Date: _____
Contract Designation: _____

Indicate below complete information for each Subcontractor and Supplier known to Contractor, regardless of whether the firm has a direct contract with Contractor. Include all lower-tier Subcontractors and associated Suppliers. Copy and paste the paragraphs below as required to indicate all Subcontractors and Suppliers.

SUBCONTRACTORS

1. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

2. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

3. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

Total of Subcontract Prices for all subcontracts equals approximately ___ percent of the Contract Price *(Contractor to fill in blank monthly)*

SUPPLIERS

1. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

2. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

3. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

SECTION 01 31 13

PROJECT COORDINATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall coordinate the Work, including testing agencies whether hired by CONTRACTOR, OWNER, or others; Subcontractors, Suppliers, and others with whom coordination is necessary, in accordance with the General Conditions, Supplementary Conditions, and this Section, to perform the Work within the Contract Times and in accordance with the Contract Documents.
   2. CONTRACTOR shall coordinate with the Owner's Contract Operations firm, Veolia, and the ENGINEER on a daily basis to discuss the current work, upcoming work, bypasses and shutdowns.
   3. CONTRATOR shall coordinate with the Rhode Island Department of Environmental Management throughout the Work.

B. Coordination:
   1. In accordance with the General Conditions as may be modified by the Supplementary Conditions, CONTRACTOR shall cooperate with and coordinate the Work with other contractors, utility owners, utility service companies, OWNER's and facility manager's employees working at the Site, and other entities working at the Site, in accordance with Section 01 11 13, Summary of Work.
   2. CONTRACTOR will not be responsible or liable for damage unless damage is through negligence of CONTRACTOR, or Subcontractors, Supplier, or other entity employed by CONTRACTOR.
   3. Attend and participate in all project coordination and progress meetings, and report on the progress of the Work and compliance with the Progress Schedule.

C. Layout and Coordination Drawings:
   1. Maintain sufficient competent personnel, drafting and computer-aided drafting/design (CADD) equipment, software, systems, and supplies at the Site for preparing layout drawings, coordination drawings, and record documents.
   2. With the Contract Documents and Shop Drawings, use such coordination drawings as tools for coordinating the Work of various trades.
   3. Where such coordination drawings are to be prepared by mechanical, electrical, plumbing, or heating-ventilating-air conditioning Subcontractors and other Subcontractors, ensure that each Subcontractor maintains required personnel and facilities at the Site.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION +

SECTION 01 31 19.13

PRE-CONSTRUCTION CONFERENCE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. A pre-construction conference will be held for the Project.
   2. CONTRACTOR shall attend the conference prepared to discuss all items on the pre-construction conference agenda.
   3. ENGINEER will distribute an agenda, preside at conference, and prepare and distribute minutes to all conference participants and others as requested.

B. Purpose of Pre-construction Conference:
   1. Purpose of conference is to designate responsible personnel, establish working relationships, discuss preliminary schedules submitted by CONTRACTOR, and review administrative and procedural requirements for the Project.
   2. Matters requiring coordination will be discussed and procedures for handling such matters will be established.
   3. Unless otherwise indicated in the Contract Documents or otherwise agreed to by the entities involved, Site mobilization meeting will be part of the pre-construction conference.

1.2 PREPARATION FOR PRE-CONSTRUCTION CONFERENCE

A. Date, Time, and Location:
   1. Conference will be held after execution of the Contract and before Work starts at the Site.
   2. ENGINEER will establish the date, time, and location of conference and notify the interested and involved entities.

B. Submittals Required Prior to Pre-construction Conference:
   1. Not less than three days prior to pre-construction conference, submit the following preliminary schedules in accordance with the General Conditions and other requirements of the Contract Documents:
      a. Preliminary Progress Schedule.
      b. Preliminary Schedule of Submittals.
      c. Preliminary Schedule of Values.
      d. Listing of identity and general scope of Work or supply (as applicable) of planned Subcontractors and Suppliers. Indicate extent of each Subcontract proposed and overall percentage of Contract Price to be subcontracted.

C. CONTRACTOR shall furnish information required and contribute appropriate items for discussion at the pre-construction conference.

D. Handouts for Pre-Construction Conference:
   1. CONTRACTOR shall bring to the conference the following, with sufficient number of copies for each attendee:
      a. Preliminary Progress Schedule, as submitted to ENGINEER.
      b. Preliminary Schedule of Submittals, as submitted to ENGINEER.
      c. Preliminary Schedule of Values, as submitted to ENGINEER.
      d. Listing of identity and general scope of Work or supply of planned Subcontractors and Suppliers.
      e. List of emergency contact information, in accordance with Article 1.5 of Section 01 35 23, Safety Requirements.

1.3 REQUIRED ATTENDEES

A. Representative of each entity attending the conference shall be authorized to act on that entity's behalf.

B. Contractor Attendance: Conference shall be attended by CONTRACTOR's:
   1. Project manager.
   2. Site superintendent
   3. Project managers for major Subcontractors, and major equipment Suppliers as CONTRACTOR deems appropriate.

C. Other attendees will be representatives of:
   1. OWNER.
   2. ENGINEER.
   3. Resident Project Representative (RPR), if available.
   4. Authorities having jurisdiction over the Work, if available.
   5. Utility owners, as applicable.
   6. Others as requested by OWNER, CONTRACTOR, or ENGINEER.

1.4 AGENDA

A. Preliminary Agenda: Be prepared to discuss in detail the topics indicated below. Revisions, if any, to the agenda below will be furnished to required attendees prior to the pre-construction conference.
   1. Procedural and Administrative:
      a. Personnel and Teams:
         1) Designation of roles and personnel.
         2) Limitations of authority of personnel, including personnel who will sign Contract modifications and make binding decisions.
         3) Subcontractors and Suppliers in attendance.
         4) Authorities having jurisdiction.
      b. Procedures for communications and correspondence, including electronic communication protocols.

c. Copies of the Contract Documents and availability.
d. Subcontractors and Suppliers.
   1) Lists of proposed Subcontractors and Suppliers.
e. The Work and Scheduling:
   1) General scope of the Work.
   2) Contract Times, including Milestones (if any).
   3) Phasing and sequencing.
   4) Preliminary Progress Schedule.
   5) Critical path activities.
f. Safety:
   1) Responsibility for safety.
   2) Contractor's safety representative.
   3) Emergency procedures and accident reporting.
   4) Emergency contact information.
   5) Confined space entry permits.
   6) Hazardous materials communication program.
   7) Impact of Project on public safety.
g. Permits.
h. Review of insurance requirements and insurance claims.
i. Coordination:
   1) Project coordination, and coordination among contractors.
   2) Construction coordinator.
   3) Coordination with Owner's operations.
   4) Progress meetings.
   1) Preliminary Schedule of Submittals.
   2) Procedures for furnishing and processing submittals.
   3) Work not eligible for payment until submittals are approved or accepted (as required).
   4) Construction photographic documentation.
j. Submittals:
   1) Preliminary Schedule of Submittals.
   2) Submittal procedures.
   3) Contractor coordination and approval stamp.
   4) Meaning of Engineer's actions/submittal disposition.
   5) Preliminary discussion of initial, critical submittals.
   6) Construction photographic documentation.
k. Substitutes and "Or-Equals":
   1) Product options.
   2) Procedures for proposing "or-equals".
   3) Procedures for proposing substitutes.
l. Contract Modification Procedures
   1) Requests for interpretation
   2) Written clarifications
   3) Field Orders
   4) Proposal Requests
   5) Change Proposals
   6) Work Change Directives.

7) Change Orders.
8) Procedure for Claims and dispute resolution

m. Payment:
1) Owner's Project financing and funding, as applicable.
2) Owner's tax-exempt status.
3) Preliminary Schedule of Values
4) Procedures for measuring for payment.
5) Retainage.
6) Progress payment procedures.
7) Prevailing wage rates and payrolls.

n. Testing and inspections, including notification requirements.
o. Disposal of demolition materials.
p. Record documents.
q. Preliminary Discussion of Contract Closeout:
1) Procedures for Substantial Completion.
2) Contract closeout requirements.
3) Correction period.
4) Duration of bonds and insurance.

2. Site Mobilization (if not covered in a separate meeting):
a. Working hours and overtime.
b. Field offices, storage trailers, and staging areas.
c. Temporary facilities.
d. Temporary utilities and limitations on utility consumption (where applicable).
e. Utility company coordination (if not done as a separate meeting).
f. Access to Site, access roads, and parking for construction vehicles.
g. Maintenance and protection of traffic.
h. Use of Site and premises.
i. Protection of property.
j. Security.
k. Temporary controls, such as sediment and erosion controls, noise controls, dust control, storm water controls, and other such measures.
l. Site barriers and temporary fencing.
m. Storage of materials and equipment.
n.. Reference points and benchmarks; surveys and layouts.
o. Site maintenance during the Project.
p. Cleaning and removal of trash and debris.
q. Restoration.

3. General discussion and questions.
4. Next meeting.
5. Site visit, if required.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 31 19.23

PROGRESS MEETINGS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Progress meetings will be held throughout the Project. CONTRACTOR shall attend each progress meeting prepared to discuss in detail all items on the agenda.
   2. ENGINEER will preside at progress meetings and will prepare and distribute minutes of progress meetings to all meeting participants and others as requested.

1.2 PREPARATION FOR PROGRESS MEETINGS

A. Date and Time:
   1. Regular Meetings: Every two weeks on a day and time agreeable to OWNER, ENGINEER, and CONTRACTOR. The OWNER and ENGINEER reserve the right to schedule progress meetings on a more frequent basis depending on critical ongoing work, commencement of new work items, completion of work items, and whenever deemed necessary.
   2. Other Meetings: As required.

B. Location:
   1. CONTRACTOR's field office at the Site or other location mutually agreed upon by OWNER, CONTRACTOR, and ENGINEER.

C. Handouts:
   1. CONTRACTOR shall bring to each progress meeting not less than ten copies of each of the following:
      a. List of Work accomplished since the previous progress meeting.
      b. Up-to-date Progress Schedule.
      c. Up-to-date Schedule of Submittals.
      d. Detailed "look-ahead" schedule of Work planned through the next progress meeting, with specific starting and ending dates for each activity, including shutdowns, deliveries of important materials and equipment, Milestones (if any), and important activities affecting the OWNER, Project, and Site.
      e. When applicable, list of upcoming, planned time off (with dates) for personnel with significant roles on the Project, and the designated contact person in their absence.

1.3 REQUIRED ATTENDANCE

A. Representatives present for each entity shall be authorized to act on that entity's behalf.

B. Required Attendees:
   1. CONTRACTOR:
      a. Project manager.
      b. Site superintendent.
      c. Safety representative.
      d. When needed for the discussion of a particular agenda item, representatives of Subcontractors and Suppliers shall attend meetings.
   2. Construction coordinator (if any).
   3. ENGINEER:
      a. Project manager or designated representative
      b. Resident Project Representative (if any).
      c. Others as required by ENGINEER.
   4. OWNER's representative(s), as required.
   5. Rhode Island Department of Environmental Management
   6. Testing and inspection entities, as required.
   7. Others, as appropriate.

1.4 AGENDA

A. Preliminary Agenda: Be prepared to discuss in detail the topics listed below. Revised agenda, if any, will be furnished to CONTRACTOR prior to first progress meeting. Progress meeting agenda may be modified by ENGINEER during the Project as required.
   1. Review, comment, and amendment (if required) of minutes of previous progress meeting.
   2. Review of progress since the previous progress meeting.
   3. Planned progress through next progress meeting.
   4. Review of Progress Schedule
      a. Contract Times, including Milestones (if any)
      b. Critical path.
      c. Schedules for fabrication and delivery of materials and equipment.
      d. Corrective measures, if required.
   5. Submittals:
      a. Review status of critical submittals.
      b. Review revisions to Schedule of Submittals.
   6. Contract Modifications
      a. Requests for interpretation
      b. Written clarifications
      c. Field Orders
      d. Proposal Requests
      e. Change Proposals

f. Work Change Directives.
g. Change Orders.
h. Claims.

7. Applications for progress payments.
8. Problems, conflicts, and observations.
9. Quality standards, testing, and inspections.
10. Coordination between parties.
11. Site management issues, including access, security, maintenance and protection of traffic, maintenance, cleaning, and other Site issues.
12. Safety.
13. Permits.
14. Construction photographic documentation.
15. Record documents status.
16. Punch list status, as applicable.
17. Other business.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 31 26

ELECTRONIC COMMUNICATION PROTOCOLS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section establishes the procedures with which the parties will comply regarding transmission or exchange of electronic data for the Project.
   2. CONTRACTOR shall provide labor, materials, tools, equipment, services, utilities, and incidentals shown, specified, and required for complying with this Section throughout the Project.
   3. This Section does not supersede the General Conditions, as may be modified by the Supplementary Conditions, regarding transmitting of the Contract Documents to CONTRACTOR after the Effective Date of the Contract.
   4. In addition to the requirements of this Section, comply with requirements for exchange of electronic data in the following:
      a. Section 01 32 16, Progress Schedule.
      b. Section 01 32 33, Photographic Documentation.
      c. Section 01 33 00, Submittal Procedures.
      d. Section 01 78 39, Project Record Documents.

B. Coordination:
   1. CONTRACTOR shall require all Subcontractors and Suppliers to comply with the electronic communication protocols established in this Section.

C. Related Sections:
   1. Section 01 32 16, Progress Schedule.
   2. Section 01 32 33, Photographic Documentation.
   3. Section 01 33 00, Submittal Procedures.
   4. Section 01 78 39, Project Record Documents.

1.2 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Electronic data” means information, communications, drawings, or designs created or stored for the Project in electronic or digital form.
   2. “Confidential information” means electronic data that the transmitting party has designated as confidential and clearly marked with an indication such as “Confidential”, “Business Proprietary”, or similar designation.
   3. “Written” or “in writing” means any and all communications, including without limitation a notice, consent, or interpretation, prepared and sent to an address provided in the Contract Documents or otherwise agreed upon by the parties and ENGINEER using a transmission method sent forth in this

Section that allows the recipient to print or store the communication. Communications transmitted electronically are presumed received when sent in conformance with this Paragraph 1.2.A.3.

1.3 TRANSMISSION OF ELECTRONIC DATA

A. Transmission of electronic data constitutes a warrant by the transmitting party to the receiving party that the transmitting party is one or more of the following:
   1. The copyright owner of the electronic data.
   2. Has permission from the copyright owner to transmit the electronic data for its use on the Project.
   3. Is authorized to transmit confidential information.

B. Receiving party agrees to keep confidential information confidential and not to disclose it to another person except to (1) its employees, (2) those who need to know the content of the confidential information to perform services or construction solely and exclusively for the Project, or (3) its consultants, contractors, Subcontractors, and Suppliers whose contracts include similar restrictions on the use of electronic data and confidential information.

C. Transmitting party does not convey any right in the electronic data or in the software used to generate or transmit such data. Receiving party may not use electronic data unless permission to do so is provided in the Contract Documents, or in a separate license.

D. Unless otherwise granted in a separate license, receiving party's use, modification, or further transmission of electronic data, as provided the Contract Documents, is specifically limited to the design and construction of the Project in accordance with this Section, and nothing contained in this Section conveys any other right to use the electronic data for any other purpose.

E. To the fullest extent permitted by Laws and Regulations, receiving party shall indemnify and defend the transmitting party from and against all claims arising from or related to receiving party's modification to, or unlicensed use of, electronic data.

F. Means of Transmitting Electronic Data: Unless otherwise indicated in Table 01 31 26-A of this Section or elsewhere in the Contract Documents, transmission of electronic data for the Project will generally be via:
   1. E-mail and files attached to e-mail. Maintain e-mail system capable of transmitting and receiving files not less than 20 megabytes (MB) file size.
   2. Project's Internet-based website.
      a. Software Platform: Microsoft SharePoint.
      b. Website hosting will be by CONTRACTOR.
      c. Website address will be furnished to CONTRACTOR within ten days after the Effective Date of the Contract.

d. To access the Project website, CONTRACTOR shall acquire and maintain throughout the Project high-speed Internet service suitable for transferring electronic data, and Internet browsing software such as Microsoft Internet Explorer 9.0 or equal.

d. Upon request of one or both parties, CONTRACTOR will provide training for requesting party for up to four hours (one time) via, at CONTRACTOR's option, web-based meeting interface such as Citrix WebEx or in person at requesting party's place of business. CONTRACTOR will provide additional training upon requesting party's request. Requesting party shall compensate CONTRACTOR for cost of such additional training.

1.4 ELECTRONIC DATA PROTOCOLS

A. Comply with the data formats, transmission methods, and permitted uses set forth in Table 01 31 26-A, Electronic Data Protocol Table, below, when transmitting or using electronic data on the Project. Where a row in the table has no indicated means of transmitting electronic data, use for such documents only printed copies transmitted to the receiving party via appropriate delivery method.

TABLE 01 31 26-A
ELECTRONIC DATA PROTOCOL TABLE (E-MAIL ATTACHMENTS)

Electronic Data	Data Format	Transmitting Party	Transmission Method	Receiving Party	Permitted Uses	Notes
1.4.A.1. Project communications						
General communications & correspondence	EM, PDF	O, E, C	EM, EMA	O, E, C	R	
Meeting notices and agendas	EM, PDF	E	EM, EMA	O, C	R	
Meeting minutes	PDF	E	EM, EMA	O, C	R	
1.4.A.2. Contractor's submittals to Engineer						
Shop Drawings	PDF	C	EMA	E	M (1)	(1)
Product data	PDF	C	EMA	E	M (1)	(1)
Informational and closeout submittals:	PDF	C	EMA	E	M (1)	(1) (6)
Documentation of delivery of maintenance materials submittals	PDF	C	EMA	E	M (1)	
1.4.A.3. Engineer's return of reviewed submittals to Contractor						
Shop Drawings	PDF	E	EMA	O., C	R	
Product data	PDF	E	EMA	O., C	R	
Informational and closeout submittals:	PDF	E	EMA	O., C	R	(6)
Documentation of delivery of maintenance materials submittals	PDF	E	EMA	O. C	R	
1.4.A.4. Contract Modifications Documents						
Requests for interpretation to Engineer	PDF	C., O	EMA	E	M (1)	(1)
Engineer's interpretations (RFI responses)	PDF	E	EMA	C, O	R	
Engineer's clarifications to Contractor	EM, PDF	E	EM, EMA	C, O	R	
Engineer's issuance of Field Orders	PDF	E	EMA	C, O	R	
Proposal Requests	PDF	E, O	EMA	C	R	
Change Proposals – submitted to Engineer	PDF	C	EMA	O, E	S	
Change Proposals – Engineer's response	PDF	E	EMA	C. O		
Work Change Directives (for Contractor signature)	PDF	E	EMA	C	R	(2)
Change Orders (for Contractor signature)	PDF	E	EMA	C	R	(2)
1.4.A.5. Applications for Payment						(3)
1.4.A.6. Claims and other notices						(4)
1.4.A.7. Closeout Documents						
Record drawings	DWG and PDF	C	EMA	E, O	M (5)	(5)
Other record documents	PDF	C	EMA	E. O	M (5)	(5)
Contract closeout documents						

B. Key to Electronic Data Protocol Table:

Data Format:

EM .msg, .htm, .txt, .rtf, e-mail text
W .docx, Microsoft® Word 2007 or later
EX .xlsx, Microsoft® Excel 2007 or later
PDF .pdf. Portable Document Format
DWG .dwg. Autodesk AutoCAD 2013 drawing.

Transmitting Party:

O OWNER

C CONTRACTOR
E ENGINEER

Transmission Method:

EM Via e-mail
EMA As an attachment to an e-mail transmission
CD Delivered via compact disc
PW Posted to Project website
FTP FTP transfer to receiving FTP server

Receiving Party:

O OWNER
C CONTRACTOR
E ENGINEER

Permitted Uses:

S Store and view only
R Reproduce and distribute
I Integrate (incorporate additional electronic data without modifying data received)
M Modify as required to fulfill obligations for the Project

Notes:

(1) Modifications by ENGINEER to CONTRACTOR's submittals and requests for interpretations are limited to printing out, marking-up, and adding comment sheets.
(2) May be distributed only to affected Subcontractors and Suppliers. Print out, sign document, and return executed printed copy originals to ENGINEER.
(3) Submit printed Applications for Payment with original ("wet") signatures.
(4) Submit notices, including Claims, in accordance with the notice provisions of the General Conditions, as may be modified by the Supplementary Conditions.
(5) Submit record drawings in native CAD format indicated when CONTRACTOR has executed ENGINEER's standard agreement for release of electronic files. In addition, always submit record drawings as a PDF file. Comply with requirements of Section 01 78 39, Project Record Documents.
(6) For operation and maintenance data, also submit printed copies as required by Section 01 78 23, Operations and Maintenance Data.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 32 16

PROGRESS SCHEDULE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall prepare and submit Progress Schedules and related documents in accordance with the General Conditions, as may be modified by the Supplementary Conditions, and this Section, unless otherwise accepted by ENGINEER.
   2. Maintain and update Progress Schedules and related documents.
   3. Progress Schedule shall be resource-loaded and cost-loaded CPM Progress Schedule.
   4. ENGINEER's acceptance of the Progress Schedule or related documents, and comments or opinions concerning activities in the Progress Schedule and related documents shall not control CONTRACTOR's independent judgment concerning means, methods, techniques, sequences and procedures of construction, unless the associated means, method, technique, sequence, or procedure is directed by the Contract Documents. CONTRACTOR is solely responsible for complying with the Contract Times.

B. Use of Float:
   1. Float belongs to the Project and may be used by OWNER or CONTRACTOR to accommodate changes in the Work, or to mitigate the effect of events that delay performance or compliance with the Contract Times.
   2. Changes or delays that influence Activities that have float and that do not extend the Critical Path are not justification for an extension of the Contract Times.

C. Factors Affecting the Progress Schedule:
   1. In preparing the Progress Schedule, take into consideration submittal requirements and submittal review times, time for fabricating and delivering materials and equipment, source quality control (including shop testing) and field quality control (including testing at the Site), Subcontractors' work, availability and abilities of workers, availability of construction equipment, weather conditions, restrictions in operations at the Site and coordination with OWNER's operations, and other factors that have the potential to affect completion of the Work within the Contract Times.
   2. Comply with sequencing requirements indicated in the following:
      a. Section 01 11 13, Summary of Work.
      b. Section 01 14 16, Coordination with Owner's Operations.
      c. Section 01 31 13, Project Coordination
      d. Section 01 41 24, Permit Requirements

1.2 DEFINITIONS

A. The following terms are defined for this Section and supplement the terms defined in the General Conditions and Supplementary Conditions:
   1. Activity: An element of the construction work that has the following specific characteristics: consumes time, consumes resources, has a definable start and finish, is assignable, and is measurable.
   2. Constraint: An imposed date on the Progress Schedule or an imposed time between Activities. The Contract Times are Constraints.
   3. CPM Progress Schedule: Computerized Progress Schedule in Critical Path Method (CPM) format which accounts for the entire Work, defines the interrelationships between elements of the Work, reflects the uncompleted Work, and indicates the sequence with which the Work has been completed, indicates the sequence in which uncompleted Work will be completed, and indicates the duration of each Activity.
   4. Critical Path: The continuous chain of Activities with the longest duration for completion within the Contract Times.
   5. Early Start: The earliest possible date an Activity can start according to the assigned relationships among Activities.
   6. Early Finish: The earliest date an Activity can finish according to the assigned relationships among the Activities.
   7. Late Finish: The latest date an Activity can finish without extending the Contract Times.
   8. Late Start: The latest date an Activity can start without extending the Contract Times.
   9. Float: The time difference between the calculated duration of the Activity chain and the Critical Path.
   10. Total Float: The total number of days that an Activity (or chain of Activities) can be delayed without affecting the Contract Times.
   11. Network Diagram: A time-scaled logic diagram depicting the durations and relationships of the Activities.
   12. Work Areas, Area, or System: A logical breakdown of the Project elements or a group of Activities which, when collectively assembled, are readily identifiable on the Project (for example: yard piping, a structure or building, a treatment process, or other logical grouping).

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Progress Schedule Preparer:
      a. CONTRACTOR shall retain services of a scheduling consultant or shall self-prepare and maintain the Progress Schedule using qualified employee with experience in scheduling, and experienced with the scheduling software required for the Project, and experience serving as Progress Schedule preparer on construction projects of similar type, size, and scope to this Project.
      b. Progress Schedule preparer shall have not less than five years

experience using the schedule software required on construction projects of similar type, size, and scope as the Project.

c. Prior to engaging a scheduling consultant or using a qualified employee, submit to ENGINEER the following:
   1) Name and address of proposed Progress Schedule preparer and the names of personnel who will be assigned to scheduling the Project.
   2) Information sufficient to demonstrate that proposed Progress Schedule preparer and scheduling personnel to be assigned to the Project possess qualifications complying with this Section. For each person assigned, submit list of similar type, size, contract value of projects, names and contact information of engineer or architect and owner.

d. Engineer's Review of Qualifications:
   1) ENGINEER will respond to CONTRACTOR whether proposed scheduling personnel are acceptable within ten days after ENGINEER's receipt of complete qualifications.
   2) If qualifications are not acceptable, submit qualifications of acceptable personnel within five days of receipt of ENGINEER's non-acceptance.
   3) ENGINEER's acceptance or non-acceptance of qualifications does not release CONTRACTOR from its obligations under the Contract Documents.

B. Scheduling Workshop Conferences:
   1. Prior to preparing the preliminary Progress Schedule, CONTRACTOR shall meet with ENGINEER for one workshop conferences, each up to four hours in duration, to review technical requirements and Progress Schedule development methods and procedures.
   2. Required Attendance:
      a. CONTRACTOR's project manager, site superintendent, and Progress Schedule preparer.
      b. ENGINEER
      c. OWNER may attend one or more scheduling workshop conferences.
   3. ENGINEER will prepare minutes of the scheduling workshop conferences and distribute minutes to each attendee.

1.4 SUBMITTALS

A. Quantity of each submittal required and timing of submittals are in this Section.

B. Informational Submittals: Submit the following:
   1. Ninety-day Bar Chart:
      a. Preliminary 90-day bar chart.
      b. Acceptable 90-day bar chart.
   2. Initial Progress Schedules:
      a. Preliminary Progress Schedule with associated Network Diagrams, narrative report, and mathematical tabulations.

b. Acceptable Progress Schedule with associated Network Diagrams, narrative report, and mathematical tabulations.
c. Preliminary resource-loaded and cost-loaded Progress Schedule and associated reports.
d. Acceptable resource-loaded and cost-loaded Progress Schedule and associated reports.
e. Submit each Progress Schedule submittal with letter of transmittal complying with requirements of Section 01 33 00, Submittal Procedures.

3. Progress Schedule Updates.
   a. Progress Schedule updates shall comply with requirements of this Section, and shall include updated Progress Schedule, narrative report, updated Network Diagram when relationships among Activities are changed, and updated mathematical tabulations.
   b. Submit updated Progress Schedule prior to each progress meeting. When a Progress Schedule remains unchanged from one progress meeting to the next, submit a written statement to that effect. In addition to monthly Progress Schedule submittals, also bring to progress meeting the number of printed copies of the updated Progress Schedule indicated in Section 01 31 19.23, Progress Meetings.
4. Look-Ahead Schedules
   a. Furnish 14-day look-ahead schedule weekly and at each progress meeting.
5. Time Impact Analyses: Submit in accordance with this Section.
6. Recovery Schedule: Submit in accordance with this Section.
7. Qualifications:
   a. Submit qualifications of Progress Schedule preparer, and other personnel that will assist Progress Schedule preparer in preparing and maintaining the Progress Schedule.

1.5 INITIAL PROGRESS SCHEDULES

A. Type and Organization of Progress Schedules:
   1. Prepare Progress Schedule using software approved by ENGINEER.
   2. Sheet Size: 22 inches by 34 inches, unless otherwise accepted by ENGINEER.
   3. Time Scale: Indicate first date of each work week.
   4. Activity Designations: Indicate title and related Specifications Section number.
   5. Progress Schedules shall be CPM Progress Schedules.
   6. Organization:
      a. Indicate on the separate Schedule of Submittals dates for submitting and reviewing Shop Drawings, Samples, and other submittals.
      b. Group deliveries of materials and equipment into a separate sub-schedule that is part of the Progress Schedule.
      c. Group construction into Work Area sub-schedules (that are part of the Progress Schedule) by Activity.

d. Clearly indicate the Critical Path on the Progress Schedule.
e. Organize each Work Area sub-schedule by Specifications Section number.

B. Ninety-day Bar Chart:
1. For the first 90 days after the Contract Times commence running, the 90-day bar chart accepted by ENGINEER will serve as an initial progress schedule for mobilization and initial Work until the preliminary Progress Schedule is submitted.
2. Prepare 90-day bar chart using same scheduling software required for Progress Schedule, with same information required for Progress Schedule, indicated for the first 90 days after the Contract Times commence running.
3. Submit 90-bar chart in accordance with Section 01 31 26, Electronic Communication Protocols and Section 01 33 00, Submittal Procedures. Also submit 90-day bar chart in its native format generated by the scheduling software, transmitted using the transmission method indicated in Section 01 31 26, Electronic Communication Protocols.
4. Within 10 days after the Effective Date of the Contract, submit preliminary 90-day bar chart.
5. Not less than 10 days before submission of the first Application for Payment a conference attended by CONTRACTOR, Progress Schedule preparer, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER, as provided below, the preliminary 90-day bar chart. Following the conference, CONTRACTOR shall have 10 days to make corrections and adjustments and to complete and resubmit the acceptable 90-day bar chart. No progress payment will be made to CONTRACTOR until acceptable 90-day bar chart is submitted to ENGINEER.
6. Ninety-day bar chart will be acceptable to ENGINEER if it provides an orderly progression of the Work in the first 90 days of the Project and indicates compliance with Milestones, if any, in the first 90 days of the Project. Such acceptance will not impose on ENGINEER responsibility for the 90-day bar chart or the Progress Schedule for sequencing, scheduling, or progress of the Work, nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.
7. After 90-day bar chart is accepted by ENGINEER and prior to acceptance of the Progress Schedule by ENGINEER, CONTRACTOR may apply for progress payments for bonds and insurance, mobilization, and approved Shop Drawings and Samples (and acceptance of other submittals, as applicable) required for fabricating or purchasing materials and equipment to be incorporated into the Work.

C. Preliminary Progress Schedule:
1. Within 30 days after the Contract Times commence running, CONTRACTOR shall submit to ENGINEER the preliminary Progress Schedule covering the entire Project, with associated Network Diagrams.
2. Submit preliminary Progress Schedule in accordance with Section 01 31 26, Electronic Communication Protocols and Section 01 33 00, Submittal

Procedures. Also submit preliminary Progress Schedule in its native format generated by the scheduling software, transmitted using the transmission method indicated in Section 01 31 26, Electronic Communication Protocols.

3. ENGINEER will conduct a timely review of the preliminary Progress Schedule.
4. Preliminary Progress Schedule shall comply with the Contract Documents relative to Progress Schedules, but need not be resource-loaded and cost-loaded.

D. Initial Acceptance of Progress Schedule:
   1. Not more than 60 days after the Contract Times commence running, a scheduling conference attended by CONTRACTOR, Progress Schedule preparer, ENGINEER, and others as appropriate will be held at the Site to review for acceptability to ENGINEER the preliminary Progress Schedule and associated Network Diagram and other reports and schedule-related documents required. Following the scheduling conference, CONTRACTOR shall have 15 days to make corrections and adjustments and to complete and resubmit the Progress Schedule and associated Network Diagram. Other than bonds and insurance, mobilization, and approved Shop Drawings (and acceptance of other submittals, as applicable) required for fabricating or purchasing materials and equipment to be incorporated into the Work, no progress payment will be made to CONTRACTOR until acceptable Progress Schedule, Network Diagram, and other reports and schedule-related documents required are submitted to ENGINEER.
   2. Submit acceptable Progress Schedule, together with Network Diagram, reports, and other schedule-related documents required to accompany the initial acceptable Progress Schedule, in accordance with the Submittals Article of this Section, Section 01 31 26, Electronic Communication Protocols, and Section 01 33 00, Submittal Procedures. Also submit acceptable form of Progress Schedule in its native format generated by the scheduling software, transmitted using the transmission method indicated in Section 01 31 26, Electronic Communication Protocols.
   3. The Progress Schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within the Contract Times, in accordance with the Contract Documents. Such acceptance will not impose on ENGINEER responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.
   4. Initially-accepted Progress Schedule shall be identified as the baseline Progress Schedule.

E. Resource-Loaded and Cost-Loaded Progress Schedule:
   1. Not more than 15 days after ENGINEER's acceptance of the Progress Schedule, submit to ENGINEER resource-loaded and cost-loaded Progress Schedule complying with resource-loaded and cost-loading requirements in this Section.

2. Submit of the preliminary and the acceptable resource-loaded and cost-loaded Progress Schedules and associated reports to accompany the initial submittals of resource-loaded and cost-loaded Progress Schedules in accordance with the Submittals Article of this Section, Section 01 31 26, Electronic Communication Protocols, and Section 01 33 00, Submittal Procedures. Also submit preliminary and acceptable form of resource-loaded and cost-loaded Progress Schedules in its native format generated by the scheduling software, transmitted using the transmission method indicated in Section 01 31 26, Electronic Communication Protocols.
3. Resource-loaded and cost-loaded Progress Schedules will be reviewed by ENGINEER within 10 days of ENGINEER's receipt, and ENGINEER's comments will be transmitted to CONTRACTOR.
4. Make revisions required in accordance with ENGINEER's comments and resubmit to ENGINEER within 10 days of CONTRACTOR's receipt of ENGINEER's comments.
5. Resource-loaded and cost-loaded Progress Schedule accepted by ENGINEER shall be the basis for determining the amount of each CONTRACTOR progress payment.

F. If the Progress Schedule reflects completion date(s) different than the Contract Times, the Contract Times are not thereby voided, nullified, or affected. The Contract Times govern. Where the Progress Schedule reflects completion date(s) that are earlier than the Contract Times, ENGINEER may accept such Progress Schedule with CONTRACTOR to specifically understand that no Change Request or Claim for additional Contract Times or additions to the Contract Price shall be brought against OWNER resulting from CONTRACTOR's failure to complete the Work by the earlier date(s) indicated on the accepted Progress Schedule.

1.6 PROGRESS SCHEDULE UPDATES

A. Updates:
1. Update the Progress Schedule not less-often than once per month. If during progress of the Work events develop that necessitate changes in the initially accepted Progress Schedule (e.g., baseline Progress Schedule), identify updated Progress Schedules sequentially as "Progress Schedule Revision 1", "2", "3", and continuing in sequence as required. Number the Progress Schedule submittals in accordance with Section 01 33 00, Submittal Procedures.
2. CONTRACTOR's Progress Schedule update shall include a narrative report in accordance with this Section. Narrative report shall include description of current progress and status of each Area of the Project, a description of progress for the period, a description of the Critical Path, a discussion of current or potential delays, Change Orders (pending and approved in since the previous Progress Schedule update), and other problems associated with maintaining the Work on schedule.
3. The update to the Progress Schedule shall be based on retained logic. Progress override logic is not allowed.

4. Required scheduling software, and schedule organization, format, and content for updated Progress Schedules are identical to that required in this Section for initial Progress Schedules.
5. Submit to ENGINEER updated Progress Schedule, together with Network Diagram (when required), reports, and other schedule-related documents required to accompany the updated Progress Schedule, in accordance with Section 01 31 26, Electronic Communication Protocols, and Section 01 33 00, Submittal Procedures. Also submit updated Progress Schedule in its native format generated by the scheduling software, transmitted using the transmission method indicated in Section 01 31 26, Electronic Communication Protocols.
6. Submit updated Network Diagrams when revisions are proposed to the logic. Indicate in the narrative report delays that have occurred since the previous updated Progress Schedule. ENGINEER will not recommend payment by OWNER of progress payments until updated Progress Schedule is received, reviewed, and accepted by ENGINEER. Payment for out-of-sequence Work is not allowed.

B. Monthly Schedule Meeting:
1. During the month, utilizing the previous month's 14-day look-ahead schedule. CONTRACTOR shall record the percent complete, start and finish dates of each scheduled Activity with the remaining duration for each Activity started but not completed, including Activities associated with procurement of materials and equipment.
2. On the same day each month, not less than one week prior to a progress meeting, CONTRACTOR, Progress Schedule preparer, ENGINEER, and others as appropriate shall meet at the Site and tour the Work to review and update the schedule and progress information gathered by CONTRACTOR during the month. After acceptance of CONTRACTOR's updated data, Progress Schedule preparer shall use this information to update the Progress Schedule.

1.7 NETWORK DIAGRAMS (PERT CHARTS)

A. Network Diagrams – General:
1. Prepare and submit Network Diagrams, as generated using the scheduling software suitable for printing on paper of the size indicated for Progress Schedules in this Section.
2. Group Network Diagrams by Area and show the order and interdependence of Activities and sequence and quantities in which the Work will be accomplished.
3. Do not use match lines on Network Diagrams. Depict interrelationships to or from Activities outside the Area shown using an Activity symbol with Activity number and description.
4. In preparing Network Diagrams, comply with the basic concept of precedence diagramming method (PDM) network scheduling to show how start of a given

Activity depends on completion of preceding Activities, and how the Activity's completion may affect the start of subsequent Activities.

5. Level of schedule detail shall define the day-to-day Activities of the Work.

B. Network Diagram Content:
   1. Clearly indicate the Critical Path and distinguish the Critical Path from other paths on the network.
   2. Organize Network Diagrams by grouping into major Work Areas, including one for procurement of materials and equipment, and by specific Activity within each Area.
   3. Logic diagrams shall include the following:
      a. Activity number.
      b. Activity description.
      c. Activity duration (in work days).
      d. Critical Path denoted.
      e. Float for each Activity.
      f. Activity or System designation.
      g. Coded Area designation.
      h. Responsibility code (e.g., CONTRACTOR, Subcontractor, trade, operation, Suppliers, or other entity responsible for accomplishing an Activity).
      i. Shift number (if more than one shift per day is to be employed).

C. Network Diagram Revisions:
   1. General:
      a. When conditions develop that require revisions to logic or durations of the Network Diagram associated with the initially accepted Progress Schedule (e.g., baseline Progress Schedule), identify updates to the Network Diagram in the same manner required in this Section for Progress Schedule updates.
      b. Revision of the logic or durations from the baseline Progress Schedule initially accepted by ENGINEER shall be submitted to ENGINEER for acceptance.
      d. Incorporate into the Progress Schedule revisions to logic or duration accepted by ENGINEER, and include in monthly narrative report both a description of revisions and listing of Activities affected by revisions.
      e. Changes resulting from Change Orders, Work Change Directives, Field Orders, allowance authorizations, and other additions or deletions, shall be fully incorporated into the Progress Schedule and Network Diagram on the first update after the associated Change Orders, Work Change Directive, or allowance authorization is approved by OWNER, or Field Order issued by ENGINEER, including adjustments to the Contract Price (if any).
   2. Submit revised Network Diagrams with updated Progress Schedule submittals.

1.8 RESOURCE AND COST LOADING REPORTS

A. Resource Loading:
   1. After ENGINEER's initial acceptance of the Progress Schedule, CONTRACTOR shall assign resources for personnel labor-hours, materials, and equipment to each construction Activity within each responsibility code. Submit resource schedule reports with each updated Progress Schedule.

B. Cost Loading:
   1. Assign to each Activity a total dollar amount commensurate with its value relative to the associated line item in the Schedule of Values accepted by the ENGINEER. Submit cost reports for the initially accepted cost-loaded Progress Schedule and each subsequent update of the Progress Schedule.
   2. After the cost-loaded Progress Schedule is accepted by ENGINEER, each Application for Payment will be on the basis of earned revenue as indicated in updates of the Progress Schedule.

1.9 NARRATIVE REPORT

A. Prepare and include with the preliminary Progress Schedule and each subsequent Progress Schedule submittal, written narrative report describing the schedule-related requirements of the Contract Documents and CONTRACTOR's plan and schedule for complying with such requirements. Narrative report shall describe the methods of sequencing and operation, resources to be employed, time frames for the construction of each of the major Systems on the Project, and time frames for complying with the Contract Times and CONTRACTOR's interim schedule milestones.

1.10 MATHEMATICAL TABULATIONS

A. Mathematical Tabulations – General:
   1. Submit a mathematical tabulation of each Network Diagram. Mathematical tabulation shall include tabulation of each Activity shown on the detailed Network Diagram.
   2. Submit each mathematical tabulation submittal in accordance with procedures of this Section and elsewhere in the Contract Documents governing Progress Schedules submittals

B. Mathematical tabulation shall include the following information for each Activity.
   1. Activity number.
   2. Activity description.
   3. Activity duration in work days.
   4. Early Start date (calendar date).
   5. Early Finish date (calendar date).
   6. Late Start date (calendar date).
   7. Late Finish date (calendar date).
   8. Float of each Activity.
   9. Quantities involved for each Activity with labor-hour requirements and associated cost value.

10. Critical Path activities indicated.
11. Calendar extending beyond the date for completion and readiness for final payment by not less than six months.

C. Mathematical tabulation shall be computer-generated reports that shall be as a single portable document format (PDF) file, indexed with functioning bookmarks. Submit computer-generated reports as follows:
   1. Contract Times and scheduling milestone(s).
   2. Critical Path Activities by Early Start.
   3. Area Schedule for each System by Area, Early Start, and Total Float.
   4. Responsibility schedule for each System by responsibility, Early Start, and Total Float.
   5. Cost Reports:
      a. Cost summary by responsibility.
      b. Monthly projected cash flow report (tabular) with cash flow graphic, formatted for printing on paper of the size specified in this Section for Progress Schedules.
      c. Cost summary by Area.
      d. Detailed cost reports by Area and by Activity.
   6. Labor-hour Resource Reports:
      a. Labor-hour summary by responsibility.
      b. Monthly projected labor-hour flow report (tabular) with labor resource graphic formatted for printing on paper of the size specified in this Section for Progress Schedules.
      c. Labor-hour summary by Area.
      d. Detailed labor-hour reports by Area and by Activity.

1.11 TIME IMPACT ANALYSIS

A. Time Impact Analyses – General:
   1. Prepare and submit a time impact analysis when one or more of the following occurs: a Change Proposal is prepared, a Work Change Directive is issued that will affect the Progress Schedule, or when delays are experienced. Time impact analysis shall illustrate the influence of each Change Order, Work Change Directive, allowance authorization, or delay, as applicable, on the Contract Times and schedule milestones.
   2. Each time impact analysis shall include a sketch (fragnet) demonstrating how CONTRACTOR proposes to incorporate the changes in the Work or, as applicable, delays into the Progress Schedule. Fragnet shall include all logic, resource and cost changes, and additions required as result of said Change Order, Work Change Directive, allowance authorization, or delay.
   3. Fragnet shall show all CPM logic revisions for the Work associated with the Change Order, Work Change Directive, allowance authorization, or delay and its relationship to other Activities in the Network Diagram.
   4. Time impact analysis shall demonstrate the time impact, based on date the Change Order, Work Change Directive, or allowance authorization was given to CONTRACTOR, or as applicable the date the delay was implemented; the

status of the Work at that point in time; and the Activity duration of affected Activities. Activity duration used in the time impact analysis shall be those included in the latest update of the Progress Schedule accepted by ENGINEER, closest to the time of the start of the delay or start of the Change Order, Work Change Directive, or allowance authorization as adjusted by mutual, written agreement of the parties and ENGINEER.

5. Timing of Time Impact Analysis:
   a. Submit each time impact analysis within 7 days after the following, as applicable:
      1) Start of the delay.
      2) After the submittal of Change Proposal.
      3) After CONTRACTOR receipt of Work Change Directive.
   b. When CONTRACTOR does not submit time impact analysis for a specific change or delay, within the specified period of time for such submittal, such non-submittal shall be construed that no extension of the Contract Times is required.

B. Evaluation by Engineer and Acceptance:
   1. ENGINEER's evaluation of each time impact analysis comprised of complete information will be completed in timely manner after ENGINEER's receipt. Changes in the Contract Times will be made only by Change Order.
   2. When mutual agreement is reached between the parties on effect of the change or delay in the Project, incorporate into the next Progress Schedule update the associated fragnets illustrating the influence of changes and delays.

1.12 RECOVERY SCHEDULES

A. Recovery Schedules – General:
   1. When updated Progress Schedule indicates that the ability to comply with the Contract Times falls 30 or more days behind schedule, and there is no excusable delay, Change Order, or Work Change Directive to support an extension of the Contract Times, CONTRACTOR shall prepare and submit a Progress Schedule demonstrating CONTRACTOR's plan to accelerate the Work to achieve compliance with the Contract Times ("recovery schedule") for ENGINEER's acceptance.
   2. Submit recovery schedule within 7 days after submittal of updated Progress Schedule where need for recovery schedule is indicated.

B. Implementation of Recovery Schedule:
   1. At no additional cost to OWNER, do one or more of the following: furnish additional labor, provide additional construction equipment, provide suitable materials, employ additional work shifts, expedite procurement of materials and equipment to be incorporated into the Work, and other measures necessary to complete the Work within the Contract Times.
   2. Upon acceptance of recovery schedule by ENGINEER, incorporate recovery schedule into the next Progress Schedule update.

C. Lack of Action:

1. CONTRACTOR's refusal, failure, or neglect to take appropriate recovery action, or to submit a recovery schedule, shall constitute reasonable evidence that CONTRACTOR is not prosecuting the Work or separable part thereof with the diligence that will ensure completion within the Contract Times. Such lack of action shall constitute sufficient basis for OWNER to exercise remedies available to OWNER under the Contract Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall retain professional photographer to perform services specified, including:
      a. Digital photography.
      b. Digital videography.
   2. Furnish photographic documentation for the following:
      a. Pre-construction.
      b. Construction progress.
      c. Final.
   3. Photographs shall be taken of the overall site, individual structures, each work area, and each bypass setup. Pre-construction, progress photos (before/after each step) and post-construction photos shall be taken.

B. Image Quality:
   1. Photographic documentation shall be in color.
   2. Photographic images shall be suitably staged and set up ("framed"), focused, and shall have adequate lighting to illuminate the Work and conditions that are the subject of the photograph.
   3. For still photographs, use camera with minimum 24.0-megapixel resolution.

1.2 QUALITY ASSURANCE

A. Qualifications:
   1. Photographer:
      a. Photographer shall be a specialist regularly engaged in professional photography and experienced in photographing construction sites.
      b. Upon request of ENGINEER, submit documentation of photographer having successfully performed photographic documentation for not less than five previous construction projects, each lasting not less than six months.

B. At the Site, ENGINEER or Resident Project Representative will indicate the views to be taken and will select time at which images will be taken. Photographic subjects, views, and angles will vary with progress of the Work.

1.3 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Pre-construction Photographic Documentation: Submit acceptable pre-construction photographic documentation (prints and digital files) prior to mobilizing to and disturbing the Site. Submit pre-construction photographic documentation not later than the first Application for Payment, unless other schedule for pre-construction photographic documentation is accepted by ENGINEER.
2. Construction Progress Photographic Documentation: Submit acceptable construction progress photographic documentation (prints and digital files) not less-often than monthly. Submit with each Application for Payment, unless otherwise agreed to by ENGINEER.
3. Qualifications Statements:
    a. When requested by ENGINEER, prior to starting photographic documentation, submit photographer qualifications and record of experience. List of construction photography experience shall include the following for each project:
        1) Project name and location
        2) Nature of construction.
        3) Photographer's client with contract information.
        4) Approximate duration of photographer's services.

B. Closeout Submittals: Submit the following:
1. Final Photographic Documentation: Submit acceptable final photographic documentation (prints and digital files) prior to requesting the final inspection by ENGINEER.

1.4 PHOTOGRAPHIC DOCUMENTATION – GENERAL

A. Photographic Prints:
1. Quantity: For each photograph taken, submit to ENGINEER upon request.
2. Print Size and Finish:
    a. Photographs: Submit five-inch by seven-inch prints on professional-grade, nine-mil-thick, photographic paper with semi-gloss or satin finish, unless otherwise specified.
3. Include the following information on back of each print:
    a. Date photograph was taken.
    b. Name of OWNER.
    c. Name of the Site.
    d. Project name.
    e. Description of view shown in photograph.
    f. Photographer name and address.

B. Digital Files of Photographs:
1. For each photograph taken, furnish high-quality digital image in "JPG" file format compatible with Microsoft Windows 7 and higher operating systems.
2. Image resolution shall be sufficient for clear, high-resolution prints. Minimum resolution shall be 600 dots per inch (dpi). Minimum size of digital images shall be eight-inch by ten-inch.

3. Do not imprint date and time in the image.
4. Electronic image filename shall describe the image; do not submit filenames automatically created by digital camera. For example, an acceptable electronic filename would be, "Dewatering Building – Looking West at Centrifuge No. 2.jpg".
5. Form of Digital Submittal – Image File Upload:
    a. Upload digital files of Project photographic documentation to the Project website, as indicated in Section 01 31 26, Electronic Communication Protocols.
    b. Upload files to new directory each time files are uploaded. Directory name shall be the date the photographs were taken (in the form of YEAR-MO-DAY), with brief general description of subject matter. Example: "2013-09-10 – Concrete Reinforcing in Slab".

C. Videography:
1. Video shall be high-definition (HD), high-quality video of the Site and Project work.
2. All video files for the entire Project shall be submitted in one container file format. Video files shall be in one of the following container file formats:
    a. AVI (Microsoft systems).
    b. Flash Video (F4V, FLV; Adobe systems).
    c. QuickTime File Format (MOV, QT; Apple, Inc.).
    d. MP4 ("MPEG-4 Part 14").
3. Video image shall have imprinted date and time that video was taken.
4. Include audio narration sufficient to explain the scenes shown.
5. Form of Digital Submittal – Video File Upload:
    a. Upload digital files of Project photographic documentation to the Project website, as indicated in Section 01 31 26, Electronic Communication Protocols.
    b. Upload files to new directory each time files are uploaded. Directory name shall be the date the video was taken (in the form of YEAR-MO-DAY), with brief general description of subject matter. Example: "2013-09-10 – Pouring Concrete Slab".

1.5 PRE-CONSTRUCTION PHOTOGRAPHIC DOCUMENTATION

A. Pre-construction Photographic Documentation:
1. Obtain and submit sufficient pre-construction photographic documentation to record Site conditions prior to construction. Photographs shall document work areas of all prime contracts under the Project.
2. Pre-construction photographs are not part of required number of construction progress photographs specified in Article 1.6 of this Section.
3. Furnish pre-construction video of all work areas included in all prime contracts on the Project, including indoor and outdoor work areas and staging areas.

B. If disagreement arises on the condition of the Site and insufficient pre-construction photographic documentation was submitted prior to the disagreement, restore the grounds or area in question to extent directed by ENGINEER and to satisfaction of ENGINEER.

1.6 CONSTRUCTION PROGRESS PHOTOGRAPHIC DOCUMENTATION

A. Progress Photographs:
   1. Take photographs not less often than once per week and more frequent as requested by the ENGINEER.
   2. Take not less than 50 photographs each time photographer is at the Site, or more upon request by the ENGINEER.
   3. Maximum number of progress photographs required will be based on the Contract Times to Substantial Completion of the entire Project and scope of the Project on date the Contract Times commence running. Proportionately modify the extent of photographic documentation if scope of the Project or the Contract Times are modified.
   4. Obtain and submit interior and exterior photographic documentation of each structure in the work area as directed by ENGINEER at the time photographic documentation is taken.

B. Video:
   1. Obtain construction progress video each time photographer is at the Site.
   2. Construction progress videography shall cover all areas of work under each prime contract on the Project since the previous video was taken.

1.7 FINAL PHOTOGRAPHIC DOCUMENTATION

A. Final Photographs:
   1. Take photographs at time and day acceptable to ENGINEER. Do not take final photographs prior to Substantial Completion of the entire Project. Work documented in final photographs shall be generally complete, including painting and finishing, furnishings, landscaping, and other visible Work.
   2. Number of final photographs will be based on scope of the Project at the time that the Contract Times commence running. Proportionately modify the number of final photographs if scope of Project is modified. Final photographs are not part of construction progress photographs required under Paragraph 1.6.A of this Section.

B. Video:
   1. Record final video at same time that final photographs are taken.
   2. Final videography shall cover all areas of the Project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall prepare and furnish submittals in accordance with the General Conditions, as may be modified by the Supplementary Conditions, and this Section.
   2. Provide submittals well in advance of need for the material or equipment, or procedure (as applicable), in the Work and with ample time required for delivery of materials and equipment and to implement procedures following ENGINEER's approval or acceptance of the associated submittal. Work covered by a submittal will not be included in progress payments until approval or acceptance of related submittals has been obtained in accordance with the Contract Documents.
   3. CONTRACTOR is responsible for dimensions to be confirmed and corrected at the Site; quantities; information pertaining solely to fabrication processes; means, methods, sequences, procedures, and techniques of construction; safety precautions and programs incident thereto; and for coordinating the work of all trades.
   4. CONTRACTOR's signature of submittal's stamp and letter of transmittal shall be CONTRACTOR's representation that CONTRACTOR has complied with his obligations under the Contract Documents relative to that submittal. ENGINEER and OWNER shall be entitled to rely on such representations by CONTRACTOR.
   5. Provisions of the General Conditions, as may be modified by the Supplementary Conditions, apply to all CONTRACTOR-furnished submittals required by the Contract Documents, regardless of whether such submittals are other than Shop Drawings or Samples.

B. Samples:
   1. Submittal of Samples shall comply with the General Conditions, as may be modified by the Supplementary Conditions, this Section, and the Specifications Section in which the Sample is specified.
   2. Furnish at the same time those Samples and submittals that are related to the same element of the Work or Specifications Section. ENGINEER will not review submittals without associated Samples, and will not review Samples without associated submittals.
   3. Samples shall clearly illustrate functional characteristics of materials, all related parts and attachments, and full range of color, texture, pattern, and materials.

C. Restrictions on Quantity of Submittals and Compensation of OWNER:

1. CONTRACTOR shall furnish required submittals with sufficient information and accuracy to obtain required approval or acceptance of submittal by ENGINEER with not more than the number of resubmittals indicated in the General Conditions (as may be modified by the Supplementary Conditions).
2. Total number of CONTRACTOR's submittals shall not exceed 25 percent above the total number of first-time submittals indicated in the Schedule of Submittals initially accepted by ENGINEER in accordance with the General Conditions. ENGINEER will record ENGINEER's time for reviewing submittals of Shop Drawings, Samples, and other submittals and items requiring approval or acceptance, beyond the quantity of first-time submittals indicated in the Schedule of Submittals initially accepted by ENGINEER, and CONTRACTOR shall reimburse OWNER for ENGINEER's charges for such time.
3. In the event that CONTRACTOR requests a substitution for a previously approved item, Contractor shall reimburse OWNER for ENGINEER's charges for such time unless the need for such substitution is beyond the control of CONTRACTOR.
4. OWNER may impose set-offs against CONTRACTOR for the costs for which CONTRACTOR is to reimburse or compensate OWNER, in accordance with the General Conditions.

1.2 TYPES OF SUBMITTALS

A. Submittal types are classified as follows: 1) Action Submittals, 2) Informational Submittals, 3) Closeout Submittals, and 4) Maintenance Material submittals. Type of each required submittal is designated in the respective Specifications Sections; when type of submittal is not designated in the associated Specification Section, submittal will be classified as follows:
   1. Action Submittals include:
      a. Shop Drawings.
      b. Product data.
      c. Delegated design submittals, which include documents prepared, sealed, and signed by a design professional retained by CONTRACTOR, Subcontractor, or Supplier for materials and equipment to be incorporated into the completed Work. Delegated design submittals do not include submittals related to temporary construction unless specified otherwise in the related Specifications Section. Delegated design submittals include: design drawings, design data including calculations, specifications, certifications, and other submittals prepared by such design professional.
      d. Samples.
      e. Testing plans, procedures, and testing limitations.
      f. Source quality control submittals (other than testing plans, procedures, and testing limitations), including results of shop testing.
      g. Field or Site quality control submittals (other than testing plans, procedures, and testing limitations), including results of operating and acceptability tests at the Site.

2. Informational Submittals include:
    a. Certificates.
    b. Design data not sealed and signed by a design professional retained by CONTRACTOR, Subcontractor, or Supplier.
    c. Pre-construction test and evaluation reports, such as reports on pilot testing, subsurface investigations, testing for a potential Hazardous Environmental Condition, and similar reports.
    d. Supplier instructions, including installation data, and instructions for handling, starting-up, and troubleshooting.
    e. Supplier reports.
    f. Sustainable design submittals (other than sustainable design closeout documentation).
    g. Special procedure submittals, including plans for shutdowns and tie-ins and other procedural submittals.
    h. Qualifications statements.
    i. Administrative submittals including:
        1) Progress Schedules.
        2) Schedules of Submittals.
        3) Schedules of Values.
        4) Photographic documentation.
        5) Coordination drawings, when submittal of such is required.
        6) Copies of permits obtained by CONTRACTOR.
        7) Field engineering reports, survey data, and similar information.
3. Closeout Submittals include:
    a. Maintenance contracts.
    b. Operations and maintenance data.
    c. Bonds, such as special maintenance bonds and bonds for a specific material, equipment item, or system.
    d. Warranty documentation.
    e. Record documentation.
    f. Sustainable design closeout documentation.
    g. Software.
    i. Keying.
4. Maintenance Material Submittals include:
    a. Spare parts.
    b. Extra stock materials.
    c. Tools.
5. When type of submittal is not specified and is not included in the list above, request an interpretation from ENGINEER and ENGINEER will determine the type of submittal.

B. Not Included in this Section: Administrative and procedural requirements for following are covered elsewhere in the Contract Documents:
    1. Requests for interpretations of the Contract Documents.
    2. Change Orders, Work Change Directives, and Field Orders.
    3. Applications for Payment

4. Reports, documentation, and permit applications required to be furnished by CONTRACTOR to authorities having jurisdiction.

1.3 REQUIREMENTS FOR SCHEDULE OF SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Schedule of Submittals:
      a. Timing:
         1) Furnish submittal within time frames indicated in the Contract Documents.
         2) Submit updated Schedule of Submittals with each submittal of the updated Progress Schedule.
      b. Content: In accordance with the General Conditions, as may be modified by the Supplementary Conditions, and this Section. Requirements for content of preliminary Schedule of Submittals and subsequent submittals of the Schedule of Submittals are identical. Identify on Schedule of Submittals all submittals required in the Contract Documents. Updates of Schedule of Submittals shall show scheduled dates and actual dates for completed tasks. Indicate submittals that are on the Project's critical path. Indicate the following for each submittal:
         1) Date by which submittal will be received by ENGINEER.
         2) Whether submittal will be for a substitution or "or-equal". Procedures for requesting approval of substitutes and "or-equals" are specified in the General Conditions, Section 01 25 00, Substitution Procedures, and Section 01 62 00, Product Options (for "or-equals").
         3) Date by which ENGINEER's response is required. Not less than 28 days shall be allowed for ENGINEER's review, starting upon ENGINEER's actual receipt of each submittal. Allow increased time for large or complex submittals.
         4) For submittals for materials or equipment, date by which material or equipment must be at the Site to avoid delaying the Work and to avoid delaying the work of other contractors, if any.
      c. Prepare Schedule of Submittals using same software, and in same format, specified for Progress Schedules in Section 01 32 16, Progress Schedule.
      d. Coordinate Schedule of Submittals with the Progress Schedule.
      e. Schedule of Submittals that is not compatible with the Progress Schedule, or that does not indicate submittals on the Project's critical path, or that that places extraordinary demands on ENGINEER for time and resources, is unacceptable. Do not include submittals not required by the Contract Documents.
      f. In preparing Schedule of Submittals:
         1) Considering the nature and complexity of each submittal, allow sufficient time for review and revision.

2) Reasonable time shall be allowed for: ENGINEER's review and processing of submittals, for submittals to be revised and resubmitted, and for returning submittals to CONTRACTOR.
3) Identify and accordingly schedule submittals that are expected to have long anticipated review times.

1.4 PROCEDURE FOR SUBMITTALS

A. Submittal Identification System: Use the following submittal identification system, consisting of submittal number and review cycle number.
   1. Submittal Number: Shall be separate and unique number correlating to each individual submittal required. Assign submittal numbers as follows:
      a. First part of submittal number shall be the applicable Specifications Section number, followed by a hyphen.
      b. Second part of submittal number shall be a three-digit number (sequentially numbered from 001 through 999) assigned to each separate and unique submittal furnished under the associated Specifications Section.
      c. Typical submittal number for the third submittal furnished for Section 40 05 19, Ductile Iron Process Pipe, would be "40 05 19-003".
   2. Review Cycle Number: Shall be a letter designation indicating the initial submittal or re-submittal associated with each submittal number:
      a. "A" = Initial (first) submittal.
      b. "B" = Second submittal (e.g., first re-submittal).
      c. "C" = Third submittal (e.g., second re-submittal).
   3. Examples:

Example Description	Submittal Identification	
	Submittal No.	Review Cycle
Initial (first) review cycle of the third submittal provided under Section 40 05 19, Ductile Iron Process Pipe	40 05 19-003-	A
Second review cycle (first re-submittal) of third submittal provided under Section 40 05 19, Ductile Iron Process Pipe	40 05 19-003-	B

B. Letter of Transmittal for Submittals:
   1. Furnish separate letter of transmittal with each submittal. Each submittal shall be for one Specifications Section.
   2. At beginning of each letter of transmittal, include a reference heading indicating: CONTRACTOR's name, OWNER's name, Project name, Contract designation, transmittal number, and submittal number.
   3. For submittals with proposed deviations from requirements of the Contract Documents, letter of transmittal shall specifically describe each proposed variation.

C. Contractor's Review and Stamp:

1. Contractor's Review: Before transmitting submittals to ENGINEER, review submittals to:
   a. ensure proper coordination of the Work;
   b. determine that each submittal is in accordance with CONTRACTOR's desires;
   c. verify that submittal contains sufficient information for ENGINEER to determine compliance with the Contract Documents.
2. Incomplete or inadequate submittals will be returned without review.
3. Contractor's Stamp and Signature:
   a. Each submittal furnished shall bear CONTRACTOR's stamp of approval and signature, as evidence that submittal has been reviewed by CONTRACTOR and verified as complete and in accordance with the Contract Documents.
   b. Submittals without CONTRACTOR's stamp and signature will be returned without review. Signatures that appear to be computer-generated will be regarded as unsigned and the associated submittal will be returned without review.
   c. CONTRACTOR's stamp shall contain the following:

"Project Name: _____

Contractor's Name: _____

Contract Designation: _____

Date: _____

---------- *Reference* ----------

Submittal Title: _____

Specifications:

Section: _____

Page No.: _____

Paragraph No.: _____

Drawing No.: _____ of _____

Location of Work: _____

Submittal No. and Review Cycle: _____

Coordinated by Contractor with Submittal Nos.: _____

_____

I hereby certify that the Contractor has satisfied Contractor's obligations under the Contract Documents relative to Contractor's review and approval of this submittal.

Approved for Contractor by: _____"

D. Submittal Marking and Organization:
   1. Mark on each page of submittal and each individual component submitted with submittal number and applicable Specifications paragraph. Mark each page of each submittal with the submittal page number.
   2. Arrange submittal information in same order as requirements are written in the associated Specifications Section.
   3. Each Shop Drawing sheet shall have title block with complete identifying information satisfactory to ENGINEER.
   4. Package together submittals for the same Specifications Section. Do not furnish required information piecemeal.

E. Format of Submittal and Recipients:
   1. Action Submittals and Informational Submittals: Furnish in accordance with Table 01 33 00-A, except that submittals of Samples shall be as specified elsewhere in this Section:

TABLE 01 33 00-A: SUBMITTAL CONTACTS AND REQUIRED FORMAT

	Address for Deliveries	Contact Person	E-mail Address	Format*	No. of Printed Copies
a.	Engineer: ARCADIS U.S., Inc.	William Casey, PE	william.casey@arcadis.com	E	Zero
b.	Resident Project Representative: At the Site.	TBD	TBD	E/P	1
c.	Owner: City of East Providence	Daniel Borges	dborges@eastprovidenceri.gov	E	Zero
d.	Owner: City of East Providence	Erik Skadberg, PE	eskadberg@eastprovidenceri.gov	E/P	1
e.	Operator: Veolia North America	Thomas Azevedo	thomas.azevedo@veolia.com	E/P	2
f.	Other Prime Contractors (TBD)	TBD	TBD	E	Zero
* **Format**: E = Electronic files; P = Printed copies. TBD = To Be Determined, None = Contact does not need Submittals					

   2. Samples:
      a. Securely label or tag Samples with submittal identification number. Label or tag shall include clear space at least four inches by four inches in size for affixing ENGINEER's review stamp. Label or tag shall not cover, conceal, or alter appearance or features of Sample. Label or tag shall not be separated from the Sample.
      b. Submit quantity of Samples required in Specifications. If quantity of Samples is not indicated in the associated Specifications Section, furnish not less than five identical Samples of each item required for ENGINEER's approval. Samples will not be returned to CONTRACTOR. If CONTRACTOR requires Sample(s) for CONTRACTOR's use, so advise ENGINEER in writing and furnish additional Sample(s). CONTRACTOR is responsible for furnishing, shipping, and transporting additional Samples.

c Deliver one Sample to ENGINEER's field office at the Site. Deliver balance of Samples to ENGINEER at address indicated in Table 01 33 00-A, unless otherwise directed by ENGINEER.

3. Closeout Submittals:
   a. Furnish the following Closeout Submittals in accordance with Table 01 33 00-A: maintenance contracts; bonds for specific materials, equipment, or systems; warranty documentation; and sustainable design closeout documentation. On documents such as maintenance contracts and bonds, include on each document furnished original ("wet") signature of entity issuing said document. When original "wet" signatures are required, furnish such submittals in printed form and electronic form to ENGINEER, and to other entities furnish as indicated in Table 01 33 00-A.
   b. Operations and Maintenance Data: Submit in accordance with Section 01 78 23, Operation and Maintenance Data.
   c. Record Documentation: Submit in accordance with Section 01 78 39, Project Record Documentation.
   d. Software: Submit number of copies required in Specifications Section where the software is specified. If number of copies is not specified, provide two copies on compact disc in addition to software loaded on OWNER's computer(s) or microprocessor(s).
4. Maintenance Material Submittals: For spare parts, extra stock materials, and tools, furnish quantity of items specified in associated Specifications Section. Furnish in accordance with Section 01 78 43, Spare Parts and Extra Materials.

F. Electronic Submittals:
   1. Format: Electronic files shall be in "portable document format" (.PDF). Files shall be electronically searchable.
   2. Organization and Content:
      a. Each electronic submittal shall be one file; do not divide individual submittals into multiple files each.
      b. When submittal is large or contains multiple parts, furnish PDF file with bookmark for each section of submittal.
      c. Content shall be identical to printed submittal. First page of electronic submittal shall be CONTRACTOR's letter of transmittal.
   3. Quality and Legibility: Electronic submittal files shall be made from the original and shall be clear and legible. Do not submit scans of faxed copies. Electronic file shall be full size of original, printed documents. Properly orient all pages for reading on a computer screen.
   4. Provide sufficient Internet service and e-mail capability for CONTRACTOR's use in transferring electronic submittals, receiving responses to electronic submittals, and associated electronic correspondence. Check not less than once per day for distribution of electronic submittals, electronic responses to submittal, and electronic correspondence related to submittals.
   5. Submitting Electronic Files:

a. Transmit electronic files in accordance with Section 01 31 26, Electronic Communication Protocols.

G. Distribution:
1. Distribution of ENGINEER's Response via Electronic Files: Upon completion of ENGINEER's review, electronic submittal response will be distributed by ENGINEER to
a. CONTRACTOR.
b. Other prime contractors.
c. OWNER.
d. Resident Project Representative (RPR).
e. ENGINEER's file.

H. Resubmittals: Refer to the General Conditions for requirements regarding resubmitting required submittals.

1.5 ENGINEER'S REVIEW

A. Timing: ENGINEER's review will conform with timing indicated in the Schedule of Submittals accepted by ENGINEER.

B. Submittals not required by the Contract Documents will not be reviewed by ENGINEER and will not be recorded in ENGINEER's submittal log. All printed copies of such submittals will be returned to CONTRACTOR. Electronic copies of such submittals, if any, will not be retained by ENGINEER.

C. Action Submittals, Results of ENGINEER's Review: Each submittal will be given one of the following dispositions by ENGINEER:
1. Approved: Upon return of submittal marked "Approved", order, ship, or fabricate materials and equipment included in the submittal (pending ENGINEER's approval or acceptance, as applicable, of source quality control submittals) or otherwise proceed with the Work in accordance with the submittal and the Contract Documents.
2. Approved as Corrected: Upon return of submittal marked "Approved as Corrected", order, ship, or fabricate materials and equipment included in the submittal (pending ENGINEER's approval or acceptance, as applicable, of source quality control submittals) or otherwise proceed with the Work in accordance with the submittal and the Contract Documents, and in accordance with the corrections indicated in the ENGINEER's submittal response.
3. Approved as Corrected – Resubmit: Upon return of submittal marked "Approved as Corrected – Resubmit", order, ship, or fabricate materials and equipment included in the submittal (pending ENGINEER's approval or acceptance, as applicable, of source quality control submittals) or otherwise proceed with the Work in accordance with the submittal and the Contract Documents, and in accordance with corrections indicated in ENGINEER's submittal response. Furnish to ENGINEER record re-submittal with all

corrections made. Receipt of corrected re-submittal is required before materials or equipment covered in the submittal will be eligible for payment.

4. Revise and Resubmit: Upon return of submittal marked "Revise and Resubmit", make the corrections indicated and re-submit to ENGINEER for approval.
5. Not Approved: This disposition indicates material or equipment that cannot be approved. "Not Approved" disposition may also be applied to submittals that are incomplete. Upon return of submittal marked "Not Approved", repeat initial submittal procedure utilizing approvable material or equipment, with a complete submittal clearly indicating all information required.

D. Informational Submittals, Results of ENGINEER's Review:
   1. Each submittal will be given one of the following dispositions:
      a. Accepted: Information included in submittal complies with the applicable requirements of the Contract Documents, and is acceptable. No further action by CONTRACTOR is required relative to this submittal, and the Work covered by the submittal may proceed, and materials and equipment with submittals with this disposition may be shipped or operated, as applicable.
      b. Not Accepted: Submittal does not indicate compliance with applicable requirements of the Contract Documents and is not acceptable. Revise submittal and re-submit to indicate acceptability and compliance with the Contract Documents.
   2. The following types of Informational Submittals, when acceptable to ENGINEER, will not receive a written response from ENGINEER. Disposition as "accepted" will be recorded in ENGINEER's submittal log. When submittals of the following are not acceptable, ENGINEER will provide written response to CONTRACTOR
      a. Material safety data sheets (MSDS).
      b. Compaction testing reports.
      c. Concrete testing reports.
      d. Manufacturer's instructions.

E. Closeout Submittals, Results of ENGINEER's Review: Dispositions and meanings are the same as specified for Informational Submittals. When acceptable, Closeout Submittals will not receive a written response from ENGINEER. Disposition as "accepted" will be recorded in ENGINEER's submittal log. When Closeout Submittal is not acceptable, ENGINEER will provide written response to CONTRACTOR.

F. Maintenance Material Submittals, Results of ENGINEER's Review: Dispositions and meanings are the same as specified for Informational Submittals. When acceptable, Maintenance Material Submittals will not receive a written response from ENGINEER. Disposition as "accepted" will be recorded in ENGINEER's submittal log. When Maintenance Material Submittal is not acceptable, ENGINEER will provide written response to CONTRACTOR, and CONTRACTOR is responsible for costs associated with transporting and handling

of maintenance materials until compliance with the Contract Documents is achieved.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 35 23

SAFETY REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section augments the requirements elsewhere in the Contract Documents regarding CONTRACTOR's responsibilities for safety and protection and includes requirements for CONTRACTOR's safety representative and other safety requirements applicable to the Project.
   2. CONTRACTOR shall provide labor, materials, tools, equipment, training, certifications, protective measures, and incidentals shown, specified, and required to comply with CONTRACTOR's obligations under the Contract for safety and protection of personnel and property.
   3. The following OWNER safety programs are applicable to the Work:
      a. Safety Plan
      b. Spill Prevention and Cleanup Pan
      c. Emergency Preparedness Plan
   4. CONTACTOR must abide by the safety programs in the list above and all personnel on site, including SUBCONTRACTORS, must complete the OWNER's Environmental Health and Safety and Contractor Orientation.

B. Coordination:
   1. When multiple contractors are working at the Site, CONTRACTOR shall communicate to each other contractor, OWNER, ENGINEER, and other entities working at the Site those elements of CONTRACTOR's safety program with which such other entities are to comply.

C. Related Sections: Provisions of this Section are coordinated with, but are not limited to, the following:
   1. Section 01 35 43.13, Environmental Procedures for Hazardous Materials.
   2. Section 01 35 44, Spill Prevention Control and Countermeasures Plan.
   3. Section 01 41 28, Confined Space Entry Permit.
   4. Section 01 51 05, Temporary Utilities
   5. Section 01 71 33, Protection of the Work and Property.

1.2 QUALITY ASSURANCE

A. Qualifications:
   1. CONTRACTOR's Safety Representative:
      a. ENGINEER's acceptance of CONTRACTOR's safety representative's qualifications does not in any way mitigate or relieve CONTRACTOR of CONTRACTOR's safety obligations under the Contract Documents.

b. CONTRACTOR's safety representative shall possess not less than five years of experience serving as the safety representative on projects similar to or larger in size than this Contract, and for type(s) of construction similar in nature to the Work. Not less than two years of said experience shall have been serving exclusively as a construction site safety representative.

c. CONTRACTOR's safety representative shall be experienced in the types of Work to be performed under the Contract and shall be experienced with safety precautions, procedures, and equipment appropriate for the safe performance of the Work.

d. Prior to the Effective Date of the Contract, CONTRACTOR's safety representative shall have successfully completed a 30-hour OSHA Construction Safety and Health training course, and a 40-hour OSHA Hazardous Materials training course, and training for confined space entry.

e. CONTRACTOR's safety representative shall be completely experienced with and knowledgeable of all OWNER's health and safety practices and regulations, applicable health and safety Laws and Regulations and with good safety practices, and shall ensure compliance with such Laws and Regulations and practices at the Site.

f. CONTRACTOR's safety representative shall possess the following, valid accreditation, unless specified differently by the ENGINEER or OWNER:

3) Certified Safety Professional (CSP) issued by the Board of Certified Safety Professionals (BCSP

g. Minimum responsibilities of CONTRACTOR's safety representative are indicated in this Section.

1.3 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Emergency contact information, in accordance with Article 1.5 of this Section.
2. Citations:
   a. Copies of safety citations from authorities having jurisdiction and insurance companies, submitted within 24 hours of CONTRACTOR's receipt of such citations.
3. Qualifications Statements:
   a. CONTRACTOR's Safety Representative: Submit name and qualifications of CONTRACTOR's safety representative, including summary of experience, and training received and valid certifications and accreditations applicable to the Project.
4. CONTRACTOR Health and Safety Plan including Confined Space Entry Procedures.
5. CONTRACTOR Lockout Tagout Plan and Procedures to OWNER and ENGINEER.

1.4 SAFETY REPRESENTATIVE RESPONSIBILITIES

A. General:
   1. CONTRACTOR's safety representative shall be at the Site full-time when Work is in progress. When CONTRACTOR employs multiple shifts, furnish more than one safety representative as necessary.
   2. CONTRACTOR's safety representative shall have no other duties on the Project except those directly related to safety. Safety representative shall not be CONTRACTOR's project manager, field engineer, superintendent, or other supervisory personnel working on the Project unless otherwise approved by the ENGINEER and OWNER.
   3. CONTRACTOR's safety representative shall have appropriate space at the Site to maintain and keep available safety records, up-to-date copies of pertinent safety Laws and Regulations, Material Data Sheets, CONTRACTOR's site-specific health and safety plan, copies of OWNER's health and safety requirements with which CONTRACTOR shall comply, and the Site safety plan including information concerning foreseeable emergency conditions, and emergency contact information as required in Article 1.5 of this Section.

B. CONTRACTOR's safety representative's responsibilities include:
   1. Duties and responsibilities in accordance with the General Conditions.
   2. CONTRACTOR's safety representative shall coordinate with CONTRACTOR's "competent person" required under Laws and Regulations.
   3. CONTRACTOR's safety representative shall attend progress meetings in accordance with Section 01 31 19.23, Progress Meetings.
   4. Schedule and conduct safety meetings and safety training programs as required by Laws and Regulations, CONTRACTOR's Site-specific health and safety plan (SSHASP), and good safety practices. Include in the SSHASP a specific schedule (dates) of such meetings and an outline of materials to be covered. Advise ENGINEER prior to the time and place of such meetings. Invite OWNER's personnel to meetings. Instruct CONTRACTOR's employees (and Subcontractors, Suppliers with personnel at the Site, and others for whom CONTRACTOR is responsible) on recognition of hazards, observance of precautions, of the contents of the SSHASP and other safety programs with which CONTRACTOR shall comply, and use of personal protective equipment (PPE) and safety equipment.
   5. Determine that operators of specific construction equipment (and permanent equipment used for construction operations) are qualified by training and experience before such personnel are allowed to operate such equipment.
   6. Develop and implement emergency response procedures, including names, locations, and contact telephone numbers for emergency services and medical assistance as indicated in requirements for the emergency contact list in Article 1.5 of this Section.
   7. Post appropriate notices regarding health and safety Laws and Regulations at

locations at the Site and CONTRACTOR's office that afford maximum exposure to personnel.

8. Post appropriate instructions and warning signs in regard to all hazardous areas and hazardous conditions that cannot be eliminated. Identification of such areas shall be based on experience, site surveillance, and severity of the associated hazard. Signage shall not be used in place of appropriate workplace controls.
9. Ascertain via personal inspection that safety Laws and Regulations and safety program requirements are enforced. Make inspections at appropriate frequencies or upon request by the OWNER or ENGINEER to ensure that machines, tools, and equipment are in a safe operating condition; and that all work areas are free of hazards to the extent practicable. Implement necessary and timely corrective actions to eliminate unsafe acts and unsafe conditions, and submit to ARCADIS daily copy of findings resulting from inspection, using inspection checklist forms established in CONTRACTROR's SSHASP.
10. Submit to ENGINEER copies of safety citations from authorities having jurisdiction and insurance companies within 24 hours of CONTRACTOR's receipt of such citations.
11. Provide appropriate orientation to employees, visitors, Subcontractors, and Supplier personnel at the Site.
12. Perform all related tasks necessary to achieve the highest degree of safety that the nature of the Work allows.

1.5 EMERGENCY CONTACT INFORMATION

A. CONTRACTOR shall submit list of emergency contact information for 24-hour use throughout the Project. Emergency contact information shall be updated and kept current throughout the Project. If personnel or contact information change, furnish updated emergency contact information list at the next progress meeting.

B. CONTRACTOR's list of emergency contact information shall include:
   1. CONTRACTOR's project manager's office, field office, cellular, and home telephone numbers.
   2. CONTRACTOR's Site superintendent's office, field office, cellular, and home telephone numbers.
   3. CONTRACTOR's foreman's field office, cellular (if available), and home telephone numbers.
   4. CONTRACTOR's safety representative's office, cellular, and home telephone numbers.
   5. Major Subcontractors' and Suppliers' office, cellular, and home telephone numbers of project manager and foreman (when applicable).

C. Additional Emergency Contact Information:
   1. OWNER's Contract Operations firm, Veolia (formerly Suez): Thomas Azevedo, Chief Operator, 401-433-6363.
   2. OWNER's Director of Public Works: Dan Borges, 401-435-7701.

3. OWNER's central 24-hour emergency telephone number.
4. ENGINEER's project manager: William Casey, 781-475-4444.
5. ENGINEER's project engineer: Evan Raffi, 781-213-4927
6. Resident Project Representative's office, field office, cellular, and home telephone numbers.
7. Utility companies' 24-hour contact telephone number(s), including gas, water, sewer, oil, telephone, cable television/telecommunications, and other companies or concerns having utilities in the vicinity of the Work.
8. Highway and street owners' 24-hour telephone number(s).
9. Emergency telephone numbers, including: "Emergency: Dial 911", and seven-digit telephone numbers for the hospital, ambulance, police, and fire department nearest to the Site. Furnish names of each of these institutions.
10. Other involved entities as applicable.
11. Include with list of emergency contact information an 8.5-inch by 11-inch map showing route from the Site to the nearest hospital.

1.6 SAFETY EQUIPMENT

A. General:
   1. CONTRACTOR shall provide proper safety and rescue equipment, adequately maintained and readily available, for any foreseeable contingency.
   2. Such equipment shall include items such as safety ropes and harnesses, fall-prevention devices, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, combustible gas detectors, fire extinguishers and first-aid equipment in accordance with the Division 01 Specifications, and similar equipment.
   3. Keep safety equipment in protected areas. Check safety equipment at scheduled intervals.

B. Safety Equipment Log:
   1. Maintain a log indicating the person who checked the equipment, when equipment was checked, and that equipment was acceptable.
   2. Update equipment log not less-often than monthly.
   3. Include in safety representative's onsite records copies of equipment calibration records.

C. Provide replacement safety equipment when primary safety equipment is unavailable due to use or when undergoing maintenance.

D. Personal Protective Equipment (PPE):
   1. All persons entering the work areas shall wear appropriate PPE required for the particular area.
   2. Remove from the Site any person failing to comply with this or any other safety requirement.
   3. Continuously provide all necessary PPE for ENGINEER's employees, Resident Project Representative, and consultants. ENGINEER will furnish for ENGINEER's employees and consultants protective helmets (hard hats),

safety eyewear, reflective vests, and hearing protection. CONTRACTOR shall furnish other equipment required.

1.7 EVACUATION DRILL

A. Included in CONTRACTOR's SSHASP shall be evacuation drills, conducted not less-often than once every six months, held in coordination with existing facility's alarm signal under the control of OWNER's facility manager.
B. Perform evacuation drill during regular working hours, scheduled to minimize disruption of the Work.
C. Upon evacuation, CONTRACTOR and all personnel for whom CONTRACTOR is responsible, immediately advise ENGINEER's onsite personnel and OWNER's facility manager that all personnel have been evacuated.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 35 26.23

CONTRACTOR REQUIREMENTS FOR CONFINED SPACE ENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

A. Portions of the Site may constitute "confined spaces" as defined in 29 CFR §1926.21(b)(2) and 1910.146. Accordingly, incorporate into CONTRACTOR's Safety Plan for the Site appropriate measures to protect the health and safety of all persons on the Site or who may be affected by the Work, including, without limitation thereby, employees and representatives of the CONTRACTOR, any Subcontractor, OWNER, or ENGINEER while they are present and engaged in the performance of their duties on the Site. This Section applies to all personnel locations of the Work where confined space entry occurs.

B. This Contract requires work in channels, tanks, splitter structures, active sewers, manholes, open pits, and other confined spaces at the wastewater facility. Follow all federal, state and local requirements for safety in confined spaces.

C. Safeguard workers from unsafe atmospheres while entering or occupying any confined space.

1.2 REFERENCE STANDARDS

A. Conform all guidelines set forth by:

1. The Occupational Safety and Health Administration (OSHA) Federal Regulations; 29 CR Ch. XVII, Section 1910.146 Confined Space Entry.

2. State of Massachusetts regulations.

1.3 SUBMITTALS

A. Prepare and submit for information only a Site-specific Confined Space Entry Plan conforming to current OSHA and state regulations.

B. Confined Space Entry Certificates for applicable personnel.

C. Copies of Confined Space Entry Permits, submitted daily.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONFINED SPACE PRACTICES

A. Comply with CONTRACTOR's Confined Space Entry Plan.

B. Recordkeeping: Using the example forms attached to this section, or other forms required by CONTRACTOR, OWNER, or other authority having jurisdiction,

issue for each instance of access to permit-required confined space, completed permit(s) and complete associated data sheet. File completed permits and data sheets in the Site-specific confined space entry plan, and submit in accordance with Article 1.3 of this section.

1. Permit for entry to permit-required confined space(s)
2. Permit for hot work in permit-required confined space(s)
3. Complete confined space data sheet

+ + END OF SECTION + +

SECTION 01 35 29

CONTRACTOR'S HEALTH AND SAFETY PLAN

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall prepare and maintain a written, Site-specific, health and safety plan (SSHASP), and conduct all construction activities in safe manner that avoids:
      a. injuries to employees, Subcontractors, and other persons with an interest at or near the Site;
      b. employee exposures to health hazards above occupational limits established by Laws or Regulations, American Conference of Governmental Industrial Hygienists (ACGIH), and Nuclear Regulatory Commission (NRC), as applicable;
      c. exposure of the public and OWNER's employees to air contaminants above levels established for public exposure by the USEPA, NRC, and by other authorities having jurisdiction at the Site;
      d. significant increases in concentrations of contaminants in soil, water, or sediment near the Site; or
      e. violations of OSHA Regulations, or other Laws or Regulations.

B. Related Sections:
   1. Section 01 11 13, Summary of Work.
   2. Section 01 35 23, Safety Requirements.
   3. Section 01 35 43.13, Environmental Procedures for Hazardous Materials.
   4. Section 01 35 44, Spill Prevention Control and Countermeasures Plan.
   5. Section 01 41 28, Confined Space Entry Permit.

1.2 QUALITY ASSURANCE

A. Qualifications:
   1. Preparer of SSHASP:
      a. Engage a Certified Safety Professional certified by the Board of Certified Safety Professionals, to prepare or supervise preparation of SSHASP, or another professional approved by the ENGINEER and OWNER.
      b. SSHASP preparer shall be thoroughly familiar with: (i) Laws and Regulations and industry standards of safety and protection relating to health and safety pertaining to the Work; (ii) the requirements of the Contract Documents relative to health, safety, and protection; (iii) health and safety hazards associated with the Work and appropriate protections therefor; and (iv) CONTRACTOR's and OWNER's safety programs.

c. SSHASP preparer shall have previously prepared site-specific health and safety plans for not less than five construction projects similar in nature, scope, and complexity to the Work.
d. Submit preparer's qualifications with SSHASP.

B. Regulatory Requirements: Laws and Regulations applying to the Work under this Section include, but are not limited to:
1. 29 CFR 1904 (OSHA), Recording and Reporting Occupational Injuries and Illnesses.
2. 29 CFR 1910 (OSHA), Occupational Safety and Health Standards.
3. 29 CFR 1926 (OSHA), Safety and Health Regulations for Construction.
4. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
5. 40 CFR 261.3, 264, and 265, Resource Conservation and Recovery Act (RCRA).

1.3 SUBMITTALS

A. Informational Submittals: Submit the following:
1. CONTRACTOR's SSHASP, in accordance with this Section. Submit within times indicated in Article 1.4 of this Section.
2. Job safety analyses (JSA) submittals for each action required for the Work that is not covered in CONTRACTOR's SSHASP.
3. Reports:
a. Health and safety reports.
b. Accident reports.
4. Qualifications Statements:
a. Qualifications for SSHASP preparer, including copy of valid, aplicable certifications.

1.4 SSHASP AND JSA SUBMITTALS

A. Timing of Submittals:
1. Submit SSHASP the sooner of: seven days prior to pre-construction conference, or 30 days prior to CONTRACTOR's scheduled mobilization at the Site.
2. Do not perform Work at the Site until written SSHASP has been accepted by ENGINEER.
3. When an element of the Work or work activity is not covered by the SSHASP, prepare and submit a JSA and obtain ENGINEER's acceptance of JSA before performing the work activity or activities covered by such JSA.
4. Delays in the Work Associated with Submittal or Review of SSHASP and JSAs:
a. Notwithstanding other provisions of the Contract Documents, changes in the Contract Price or Contract Times will not be authorized due to delay by CONTRACTOR in developing, submitting, revising, or obtaining acceptance of the SSHASP.

B. Limitations of Engineer's Review of SSHASP and JSAs:
1. ENGINEER's review and acceptance of SSHASP and JSAs (if any) will be only to determine if the topics covered in SSHASP comply with the Contract Documents and

specific requirements of safety documents referenced therein (such as OWNER's safety programs, if any).

2. ENGINEER's review and acceptance will not extend to safety measures, means, methods, techniques, procedures of construction, or whether representations made in the SSHASP and JSAs (if any) comply with Laws and Regulations, or standards of good practice.
3. CONTRACTOR's responsibility for safety and protection at the Site shall be as indicated in the Contract Documents. Nothing associated with ENGINEER's review or acceptance of SSHASP or JSAs will create or imply any obligation by ENGINEER to oversee or become, in any way, responsible for CONTRACTOR's safety obligations under the Contract Documents.

1.5 CONTRACTOR'S HEALTH AND SAFETY PROGRAM

A. General:
1. Known prior use(s) of the Site are indicated in Section 01 11 13, Summary of Work.
2. The Site is not classified as hazardous waste site. Presence of Constituents of Concern (if any), where known to OWNER and ENGINEER, are indicated in the reports and drawings (if any) of such Hazardous Environmental Conditions listed in the Supplementary Conditions.
3. Each employer working at the Site shall develop and implement a written SSHASP for their employees and other individuals for whom such employer is responsible.
4. When applicable (including when the Site includes one or more Hazardous Environmental Conditions), SSHASP shall comply with 29 CFR 1904, 29 CFR 1910, 29 CFR 1926, and other Laws and Regulations.
5. Include in the SSHASP requirements for complying with OWNER's Site-specific hazard/emergency response plans, if any. During the Project, comply with OWNER's hazard/emergency response plans.

B. Location:
1. Retain at the Site a copy of complete SSHASP, JSAs (if any), and related information. Comply with Section 01 35 23, Safety Requirements.
2. Retain copy of SSHASP, JSAs (if any), and related information at CONTRACTOR's project office.
3. Throughout the Project, update as necessary all copies of SSHASP, JSAs, and related information.
4. Copies of SSHASP, JSAs, and other related information shall be made available to CONTRACTOR's employees, Subcontractors, Suppliers, OWNER, and ENGINEER immediately upon request.

C. SSHASP Content: SSHASP shall address and include the following:
1. Address safety and health hazards of each phase of operations at the Site and shall include requirements and procedures for employee protection.
2. CONTRACTOR's organizational structure and other information required by Paragraph 1.5.D of this Section.
3. Comprehensive work plan.

4. Job safety and health risk or hazard analysis for each task and operation found in the work plan.
5. Employee training assignments including copies of OSHA 40-hour, 24-hour supervised field activities, eight-hour supervisors, and eight-hour refresher training certificates for each CONTRACTOR and Subcontractor employee assigned to the Project.
6. Personal protective equipment (PPE) to be used by employees for each task and activity performed. Include respirator fit test certificates for CONTRACTOR and Subcontractor employees assigned to the Project.
7. Medical Surveillance Requirements: Medical clearance certificates for all CONTRACTOR and Subcontractor employees assigned to the Project.
8. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.
9. Site control measures, including procedures for:
    a. preventing trespassing;
    b. preventing unqualified or unprotected workers from entering restricted areas;
    c. preventing "tracking" of contaminants out of the Site;
    d. maintaining log of employees at the Site and visitors to the Site;
    e. communicating routes of escape and gathering points.
    f. ensuring safe handling of Constituents of Concern during the Work, including excavating, handling, loading, and transporting activities. Include procedures for ensuring safety when working in or proximity to Hazardous Environmental Conditions,
    g. delineating "hot" (e.g., contaminated), "cold", and support zones;
    h. locating personnel and equipment decontamination zones; and
    i. decontamination.
10. Plan for safe and effective responses to emergencies, including necessary PPE and other equipment.
11. Confined space entry procedures (if applicable). Comply with Section 01 41 28, Confined Space Entry Permit.
12. Spill containment program. Comply with Section 01 35 44, Spill Prevention Control and Countermeasures Plan.
13. Requirements for complying with Section 01 35 43.13, Environmental Procedures for Hazardous Materials.

D. Contractor's Organizational Structure:
    1. Organizational structure portion of the SSHASP shall refer to or incorporate information on specific chain of command and specify the overall responsibilities of supervisors and employees, and shall include the following:
        a. Name and contact information for CONTRACTOR's "competent person(s)" for various work-related activities.
        b. Name and contact information for CONTRACTOR's safety representative.
        c. Designation of general supervisor who has responsibility and authority to direct operations involving handling of Constituents of Concern and work in or near Hazardous Environmental Conditions.

c. Other personnel required for operations involving Constituents of Concern and Hazardous Environmental Conditions and emergency response, and general functions and responsibilities of each.
d. Lines of authority, responsibility, and communication.

2. Review and update organizational structure as necessary to reflect current status of work activities on the Project and status of personnel.

E. Work Plan:

1. Comprehensive work plan portion of SSHASP shall refer to or incorporate information on the following:
   a. Tasks and objectives of work activities, onsite operations, and logistics and resources necessary to achieve such tasks and objectives.
   b. Anticipated activities and CONTRACTOR's normal operating procedures.
   c. Personnel and equipment requirements for implementing the work plan.

1.6 ACCIDENT REPORTING AND INVESTIGATION

A. Comply with 29 CFR 1904.29, including using OSHA Forms 300, 300A, and 301 (or equivalent) to document all accidents that result in bodily injury.

B. Accident Report Submittals:

1. Submit copies of completed accident reports to OWNER within 24 hours of the accident.
2. By the tenth day of each month, submit monthly summary of accident reports from the prior month. Monthly summary report shall indicate for each accident the root cause and descriptions of corrective actions to reduce the probability of similar accidents.
3. Submit to OWNER a copy of all accident and health or safety hazard reports received from OSHA or other authority having jurisdiction within 24 hours of CONTRACTOR's receipt.

C. Based upon results of accident investigation, modify the SSHASP as required by changing tasks or procedures to prevent reoccurrence of accident.

D. Post current copy of CONTRACTOR's OSHA 300A report, Summary of Work-related Injuries and Illnesses, at conspicuous place at the Site during period of February 1 through April 30 of each year.

1.7 DAILY HEALTH AND SAFETY FIELD REPORTS

A. CONTRACTOR must file Daily Health and Safety Field Report. Submit to OWNER and/or ENGINEER health and safety field reports upon request.

B. Content of Contractor's Daily Health and Safety Field Reports: Reports shall include, but not necessarily be limited to, the following:

1. Weather conditions.

2. Delays encountered in construction
3. Acknowledgment of deficiencies noted along with corrective actions taken on current and previous deficiencies.
4. Daily health and safety air monitoring results (when air monitoring is performed).
5. Documentation of instrument calibrations performed.
6. New hazards encountered.
7. PPE utilized.
8. Description of problems, real or anticipated, encountered during the Work that should be brought to attention of OWNER and ENGINEER and notification of deviations from planned Work shown in previously submitted daily health and safety field report(s).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 35 43.13

ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, tools, and incidentals necessary to comply with environmental procedures for Constituents of Concern.
   2. CONTRACTOR shall develop, implement, and maintain throughout the Project a hazardous materials management program (HMMP) in accordance with Laws and Regulations.
   3. Constituents of Concern Brought to Site by CONTRACTOR: Transport, handle, store, label, use, and dispose of in accordance with this Section, other applicable provisions of the Contract Documents, and Laws and Regulations.
   4. Constituents of Concern Generated by CONTRACTOR:
      a. Materials containing Constituents of Concern shall be properly handled, stored, labeled, transported and disposed of by CONTRACTOR in accordance with Laws and Regulations, and this Section.
      b. If CONTRACTOR will generate or has generated materials containing Constituents of Concern at the Site, obtain a USEPA identification number listing CONTRACTOR's name and address of the Site as generator of the Constituents of Concern. Obtain identification number from state environmental agency or similar authority having jurisdiction at the Site. Submit identification number within time frame specified in Article 1.3 of this Section.
      c. CONTRACTOR shall be responsible for identifying, analyzing, profiling, transporting, and disposing of Constituents of Concern generated by CONTRACTOR.
   5. Fines or civil penalties levied against OWNER for violations committed at the Site by CONTRACTOR, and costs to OWNER (if any) associated with cleanup of a Hazardous Environmental Condition created by CONTRACTOR shall be paid by CONTRACTOR. If CONTRACTOR has exacerbated a Hazardous Environmental Condition existing at the Site prior to the start of the Work, CONTRACTOR shall pay a share of costs associated with fines, civil penalties, and cleanup costs to in proportion equal to the extent of CONTRACTOR's responsibility for creating the Hazardous Environmental Condition and fines and civil penalties associated therewith.
   6. OWNER's environmental representative(s) are: Dan Borges, DPW Director, 401-435-7701; Thomas Azevedo, Chief Operator, 401-433-636 and William Casey, Arcadis, 781-475-4444.

B. Enforcement of Laws and Regulations:
   1. Interests of OWNER are that accidental spills and emissions, Site contamination, and injury of personnel at and near the Site are to be avoided.
   2. When OWNER is aware of suspected violations, OWNER will notify CONTRACTOR, and authorities having jurisdiction if OWNER reasonably concludes that doing so is required by Laws or Regulations.
   3. Responsibilities regarding Laws and Regulations shall be in accordance with the General Conditions, as may be modified by the Supplementary Conditions.

C. Related Sections:
   1. Section 01 35 44, Spill Prevention Control and Countermeasures Plan.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with Laws and Regulations as applicable.

1.3 SUBMITTALS

A. Informational Submittals: Submit the following to the entity(ies) specified for each:
   1. Constituents of Concern (including Chemicals) Proposed for Use at the Site:
      a. Content:
         1) Current (dated within the past two years) material safety data sheets (MSDS) in accordance with 29 CFR 1910.1200 (OSHA Hazard Communication Standard).
         2) Manufacturer of material or equipment containing such substance.
         3) Supplier (if different than manufacturer).
         4) Container size(s) and number of containers proposed to be at the Site.
         5) Minimum and maximum volume of material intended to be stored at the Site.
         6) Description of process or procedures in which Constituent of Concern will be used at the Site.
      b. Furnish the information required above in sufficient time to obtain OWNER's acceptance not later least three days before bringing Constituent of Concern to the Site.
      c. Submit to OWNER's environmental representative with copy to ENGINEER.
   2. Material Containing Constituents of Concern Generated at the Site:
      a. Submit for each Constituent of Concern generated at the Site identification number, analysis results, and number and size of storage containers at the Site.
      b. Furnish such information within not less than 48 hours after CONTRACTOR's receipt of analytical results.
      c. Submit to OWNER's environmental representative with copy to ENGINEER.
   3. Permits:

a. Submit copies of permits for storing, handling, using, transporting, and disposing of materials containing Constituents of Concern, obtained from authorities having jurisdiction.
b. Submit to OWNER's environmental representative with copy to ENGINEER.

4. Other Documents required for the HMMP: Submit to OWNER's environmental representative the requested documents within 72 hours of CONTRACTOR's receipt of such request. HMMP documents may include emergency/spill response plan, communication plan, and other documents.

1.4 HAZARDOUS MATERIALS MANAGEMENT

A. Obtain OWNER's environmental representative's acceptance before bringing to the Site each material containing a Constituent of Concern.

B. Communication Plan:
1. CONTRACTOR shall develop a communication plan relative to materials containing one or more Constituents of Concern.
2. MSDS Notebooks:
a. At minimum, maintain at the Site two notebooks containing: 1) Inventory of materials containing a Constituent of Concern (including all chemicals); and, 2) Current (dated within the past two years) material safety data sheets (MSDS) for all materials being used to accomplish the Work, whether or not defined as a Constituent of Concern.
b. Keep one notebook in CONTRACTOR's field office at the Site; keep second notebook at location acceptable by OWNER's environmental representative.
c. Keep notebooks up-to-date as materials are brought to and removed from the Site.

C. Emergency/Spill Response Plan: Develop, implement, and maintain an emergency/spill response plan, for each Constituent of Concern or each class/group of material containing a Constituent of Concern, as applicable. At minimum, response plan shall include the following:
1. Description of equipment available at the Site to contain or respond to emergency related to or spill of the material.
2. Procedures for notifying, and contact information for: authorities having jurisdiction, emergency responders, OWNER, ENGINEER, the public as applicable, and other entities as required.
3. Response coordination procedures between CONTRACTOR, OWNER, and others as appropriate.
4. Site plan showing proposed location of Constituents of Concern storage area and location of spill containment/response equipment, and location of storm water drainage inlets and drainage routes, including storm sewers, ditches and swales, and surface waters.

5. Description of Constituent of Concern handling and spill response training provided to CONTRACTOR's and Subcontractors' employees, in accordance with 29 CFR 1926.21(b) and other Laws and Regulations.
6. Comply with Section 01 35 44, Spill Prevention Control and Countermeasures Plan.

D. Storage of Materials~~.~~ Containing Constituents of Concern and Storage of Non-Hazardous Materials:
   1. Vessels containing materials with a Constituent of Concern shall bear applicable hazard diamond(s).
   2. Container Labeling:
      a. Properly label each container of consumable materials, whether or not classified as containing a Constituent of Concern.
      b. Stencil CONTRACTOR's name and, as applicable, Subcontractor's name, on each vessel containing a Constituent of Concern and, for non-hazardous materials, on each container over five-gallon capacity. Containers shall bear securely-attached label clearly identifying contents. Label containers that are filled from larger containers.
      c. If OWNER becomes aware of unlabeled containers at the Site, OWNER's environmental representative will so advise CONTRACTOR. Properly label container(s) within one hour of receipt of such notice from OWNER or remove container from the Site.
   3. To greatest extent possible, store off-Site materials containing a Constituent of Concern until required for use in the Work.

E. Area for Storing Materials Containing a Constituent of Concern:
   1. Maintain designated storage area for materials containing a Constituent of Concern. Storage area shall include secondary containment to prevent release of spilled or leaking substances. Storage area shall include barriers to prevent vehicles from colliding with storage containers, and shall include protection from environmental factors such as weather.
   2. Provide signage in accordance with Laws and Regulations, clearly identifying the storage area.

F. Not less than monthly, CONTRACTOR's safety representative shall meet with OWNER's environmental representative to review CONTRACTOR's HMMP documents, procedures, and inspect storage areas and the Site in general, to verify compliance with this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 35 44

SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section pertains to spill prevention control and countermeasures applicable to the Project under the provisions of 40 CFR 112 and other Laws and Regulations.
   2. CONTRACTOR shall provide all labor, materials, equipment, tools, professional services (when required), and incidentals as shown, specified, and required to comply with Laws and Regulations regarding spill prevention control and countermeasures (SPCC) planning and compliance, including 40 CFR 112.
   3. Single Prime Contract: CONTRACTOR shall determine whether a SPCC Plan is required. If SPCC Plan is required, CONTRACTOR shall prepare, implement, and maintain SPCC Plan as required by Laws and Regulations.

1.2 DETERMINATION OF NEED FOR SPCC PLAN FOR PROJECT

A. Determination of Need for SPCC Plan:
   1. CONTRACTOR shall determine need for SPCC Plan for the Project.
   2. CONTRACTOR's Professional Engineer:
      a. If the Site will include storage of more than 500 gallons of oil (diesel and gas) in above-ground storage, or if the Site does not comply with oil discharge history criteria specified in 40 CFR 112, CONTRACTOR shall retain a qualified professional engineer to determine need for SPCC Plan for the Project and, if SPCC Plan is required, professional engineer shall prepare or supervise preparation of SPCC Plan for the Project.
      b. If a professional engineer is not required to prepare the full SPCC Plan for the Project, but the SPCC Plan includes environmentally-equivalent SPCC measures, or impracticality determinations, CONTRACTOR shall retain a qualified professional engineer to prepare and certify those portions of the SPCC Plan dealing with environmentally equivalent measures and impracticality determinations; the balance of the SPCC Plan may be prepared by and be self-certified by CONTRACTOR.
   3. Submit to ENGINEER letter presenting results of evaluation of whether a SPCC Plan is required for the Project in accordance with Laws and Regulations.

B. SPCC Plan is required when the Project activities at the Site meet the following criteria:

1. The Site and activities thereon are not exempt from Laws and Regulations relative to SPCC planning and implementation.
2. Oil is stored, used, transferred, or otherwise handled at the Site, unless otherwise exempted by Laws and Regulations.
3. Maximum oil storage capacity at the Site equals or exceeds either of the following thresholds: 0 gallons of completely-buried capacity, or 500 gallons of above-ground capacity. Capacity includes total storage tank volume and operational storage volume at the Site for contractors and Subcontractors, including bulk storage tanks, containers with 55-gallon storage capacity and larger, mobile tanks located at the Site, and other containers covered by Laws and Regulations. Exempt are motive storage containers, such as those on construction equipment and vehicles. Oil includes petroleum products, fuel oil, hydraulic fluid, oil sludge, oil refuse, oil mixed with wastes other than dredged material, synthetic oil, vegetable oil, animal fats and oils, and other oils defined in Laws and Regulations.
4. There is reasonable expectation, based on location of the Site, that oil spill would reach navigable waters of the United States or adjoining shorelines.

C. When SPCC Plan is not required, CONTRACTOR shall ensure that conditions that preclude the need for SPCC Plan for the Project, including the activities of all contractors and Subcontractors working on the Project at the Site, are maintained throughout duration of the Project. Should changes that affect the storage, use, or handling of oil at the Site occur, reassess the need for SPCC Plan for the Project at no additional cost to OWNER and submit to ENGINEER evaluation letter regarding need for SPCC Plan.

1.3 SPCC PLAN AND IMPLEMENTATION

A. When SPCC Plan is required, develop SPCC Plan and submit for acceptance by OWNER, with copy to ENGINEER. SPCC Plan shall be specific to the Site and the Project and shall include the following:
1. Seal or stamp, original signature, and license number of CONTRACTOR'S professional engineer, when self-certification by CONTRACTOR is not allowed by Laws and Regulations.
2. Site plan identifying the name (or tag number) and location of each tank and container that will contain a substance regulated in 40 CFR 112 and other Laws and Regulations, including above-ground and buried tanks. Site plan shall indicate general directions of storm water runoff, including storm sewers and drainage inlets (including arrows indicating directions of flow), and storm sewer outfall locations shown and labeled.
3. For each tank and container shown or indicated on the Site plan, include a table that lists the tank or container's name and tag number, type of oil stored therein, and maximum storage capacity. List total storage capacity of all regulated tanks and containers at the Site covered by SPCC Laws and Regulations.
4. Predictions of direction, rate of flow, and total quantity of oil that could be discharged from the Site as result of storage tank or container failure.

5. Operating procedures that prevent oil spills, including procedures for oil handling, details of secondary containment structures at fuel and oil transfer areas, and details and descriptions of equipment to be used for oil handling, including piping.
6. Control Structures and Secondary Containment:
    a. Furnish details of and descriptions of control measures installed at the Site by CONTRACTOR to prevent spill from reaching navigable waters of the United States and associated shorelines, including secondary containment and diversionary structures.
    b. For on-shore Sites, one of the following must be used, at minimum: dikes, berms, or retaining walls; curbing; culverts, gutters, or other drainage systems; weirs, booms, or other barriers; spill diversion ponds; retention ponds; or sorbent materials.
    c. Where appropriate, the SPCC Plan shall clearly demonstrate that containment or diversionary structures or equipment are not practical.
    d. Include brittle fracture evaluation, where required, for field-constructed above-ground storage containers undergoing repair, alteration, construction, or change in service.
7. Plans for countermeasures to contain, clean up, and mitigate effects of oil spill that reaches navigable waters of the United States or their shorelines, including written commitment of manpower, equipment, and materials to quickly control and remove spilled oil. Include estimation of time required to contain spill after spill occurs.
8. Contact list and telephone numbers for facility response coordinator, National Response Center, cleanup contractors, and all appropriate federal, state, and local authorities having jurisdiction to be contacted in event of spill or discharge.
9. Program for monthly inspections of the Site by CONTRACTOR for SPCC Plan compliance. Advise OWNER in writing of each inspection not less than 72 hours in advance.
10. Measures for Site security relative to oil storage.
11. Procedures for safely handling mobile containers such as totes, drums, and fueling vehicles and construction equipment that remain at the Site.
12 Procedures and schedules for periodic testing of integrity of tanks and containers, and associated piping and valves.
13. Plans for bulk storage container compliance.
14. Plans for personnel training and oil spill prevention briefings.
15. For SPCC Plans that do not follow the format listed in Laws and Regulations, provide cross-reference to requirements of Laws and Regulations, including 40 CFR 112.7.

B. Obtain acceptance of SPCC Plan by OWNER, for coordination with OWNER's Site-specific SPCC Plan, if any.

C. SPCC Plan shall be reviewed by CONTRACTOR's professional engineer (when professional engineer is required) and OWNER every five years, as applicable. CONTRACTOR shall perform updates and revisions of the Project's SPCC Plan

as necessary and submit same in accordance with the provisions of this Section for submittal and acceptance of initial SPCC Plan.

D. Post a copy of accepted, certified SPCC Plan in conspicuous location at the Site and furnish copies to OWNER, ENGINEER, other contractors, and Subcontractors as appropriate. All contractors shall comply with SPCC Plan.

E. In event of violation of SPCC Plan or release of oils attributable to construction operations, CONTRACTOR shall:
   1. Immediately issue notifications in accordance with Laws and Regulations, including 40 CFR 110 and 40 CFR 112. When required by Laws and Regulations, report to National Response Center, US Environmental Protection Agency, and other authorities having jurisdiction, if any.
   2. Have spill clean-up performed in accordance with Laws and Regulations, the SPCC Plan, and requirements of authorities having jurisdiction.
   3. Pay fines and civil penalties (or responsible portion thereof) imposed on OWNER by authorities having jurisdiction, and pay costs associated with clean-up of spills.
   4. Should cleanup of spills attributable to CONTRACTOR be necessary, no resulting change in the Contract Price or Contract Times will be allowed. Should CONTRACTOR share responsibility for spill and cleanup with another entity, changes in Contract Price and Contract Times, if any, will be proportionate.

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. CONTRACTOR's Professional Engineer:
      a. When required by Laws and Regulations, engage a licensed, registered professional engineer legally qualified to practice in the jurisdiction where the Site is located and experienced in performing engineering services of the type required.
      b. Submit qualifications data.
      c. Responsibilities include but are not necessarily limited to:
         1) Carefully reviewing Laws and Regulations relative to SPCC.
         2) Preparing written requests for clarifications or interpretations of criteria specified in the Contract Documents for submittal to ENGINEER by CONTRACTOR, and obtaining from authorities having jurisdiction clarifications regarding Laws and Regulations as required.
         3) Preparing or supervising the preparation of letter-report evaluation of need for SPCC Plan in accordance with the Contract Documents. Evaluation shall include professional engineer's seal or stamp, registration number, and original signature.
         4) When SPCC Plan is required, preparing, supervising the preparation of, or reviewing the SPCC Plan (or designated portions thereof when oil storage at the Site will be 10,000 gallons or less) in accordance

with the Contract Documents. SPCC Plan (or designated portions thereof) shall include professional engineer's seal or stamp, registration number, and original signature.

5) Periodically re-evaluating the need for SPCC Plan and issuing findings as letter-reports with seal or stamp, license number, and signature. When SPCC Plan is required, periodically evaluating the SPCC Plan and providing recommendations for compliance with Laws and Regulations, in accordance with the Contract Documents.
6) Certifying that:
   a) it is familiar with the Laws and Regulations, including 40 CFR 112, and
   b) it has visited, examined, and is familiar with the Site, planned modifications to the Site under the Project as such modifications pertain to SPCC Laws and Regulations, and
   c) it has performed the evaluations and prepared SPCC Plan in accordance with the Contract Documents, and
   d) procedures for required testing and inspections have been established, and
   e) the said evaluations and SPCC Plan are adequate for the Project, and
   f) the said evaluations and SPECC Plan complies with Laws and Regulations, applicable industry standards, and to prevailing standards of practice.

1.5 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Certifications: With each evaluation letter and SPCC Plan submittal, include certification signed by preparer of submittal that the submittal complies with the Contract Documents and Laws and Regulations. Signature on all certifications shall be original.
   2. Evaluations:
      a. Submit letter presenting results of evaluation of whether a SPCC Plan is required for the Project. Submit evaluation not later than fourteen days after the Contract Times commence running, unless longer time is allowed by ENGINEER.
      b. Submit updated evaluations as required when conditions at the Site change. Submit updated evaluation not later than seven days after the conditions at the Site change, or within seven days of ENGINEER's request, unless longer time is allowed by ENGINEER.
   3. SPCC Plan: When SPCC Plan is required:
      a. Submit jointly to OWNER and ENGINEER. Submit within 14 days of receipt of ENGINEER's acceptance of evaluation submittal.
      b. Update and resubmit the SPCC Plan, or acceptable SPCC Plan amendments, as required when conditions at the Site change. Submit updated SPCC Plan or amendments not later than seven days after the change in conditions at the Site change giving rise to the SPCC Plan

change or amendment, or within seven days of ENGINEER's request, unless longer time is allowed by ENGINEER.

4. SPPC Plan Distribution: When SPCC Plan is required, submit copies of letters transmitting SPCC Plan and amendments (if any) to contractors and Subcontractors working at the Site.
5. Qualifications Statements: CONTRACTOR's professional engineer, when requested by ENGINEER or OWNER.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 41 24

PERMIT REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes general requirements relative to permitting requirements of which OWNER and ENGINEER are aware that apply to the Project.
   2. CONTRACTOR shall provide labor, materials, equipment, tools, and incidentals shown, specified, and required to obtain required permits and comply with required permits and licenses.
   3. Obtain, pay for, and comply with required permits and licenses whether or not indicated in this Section or elsewhere in the Contract Documents.
   4. **The OWNER, through their Contract Operations firm, maintains an Authorization to Discharge Under the Rhode Island Pollutant Discharge Elimination System for the East Providence Water Pollution Control Facility, 1 Crest Avenue, East Providence, Rhode Island 02915 to the Providence River as issued by the Rhode Island Department of Environmental Management (Permit No. 0100048). Compliance with this permit is required throughout the Work of this Contract. Should a violation occur due to the negligence of the CONTRACTOR, the CONTRATOR shall be responsible for any fines associated with the violation.**
   5. The OWNER shall receive approval for the work through RIDEM's Wastewater Planning & Design program.

B. Coordination:
   1. Coordinate compliance with permit and license requirements with Work under other Sections and with other contractors, if any, working at the Site.
   2. Coordinate with the Progress Schedule the time required to apply for and obtain required permits and licenses. Changes in Contract Times or Contract Price will not be authorized because of timing and costs associated with obtaining permits and licenses required for the Work.

C. Related Sections: In addition to permits and licenses required under this Section, obtain and comply with permits required under the following Sections:
   1. Section 01 35 43.13, Environmental Procedures for Hazardous Materials.
   2. Section 01 35 26.23, Contractor Requirements for Confined Space Entry
   3. Section 01 41 28, Confined Space Entry Permit.
   4. Section 01 41 26, Storm Water Pollution Prevention Plan and Permit.

1.2 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Copy of each of the following permits as applicable to the Contract:
      a. City of East Providence, Building Permit.
      b. Confined space entry certification
      c. All additional permits applicable to the project.

1.3 MUNICIPAL PERMITS AND LICENSES

A. Permits: CONTRACTOR is responsible for contacting the responsible municipal and/or federal official and obtaining permit and licensing requirements, fee structures, and procedures as applicable.
B. City of East Providence, Building Inspection Division, Building Permit.
C. Construction Fuel. The Contractor shall be responsible for obtaining all permits for storage of any fuels for construction on site, including those for temporary facilities. Approval shall be obtained from the City of East Providence Fire Department.

1.4 EROSION AND SEDIMENT CONTROL PERMIT

A. Erosion and Sediment Control Permit – General:
   1. Coordinate compliance with erosion and sediment control permit with requirements of Section 01 41 26, Storm Water Pollution Prevention Plan and Permit.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Comply with all applicable federal and state regulatory requirements including, the Rhode Island Department of Environmental Management, U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency.

B. Refueling and equipment maintenance shall be located 100 feet or more from wetland resource areas and located 50 feet or more from any catch basin. Spill containment equipment shall be stored on site in an easily accessible location. Used petroleum products resulting from the maintenance of construction equipment and from construction debris shall be collected and legally disposed of off-site. No on site storage or disposal of these items is allowed.

C. The Contractor shall conduct the Work so that all environmental sign-offs and approvals (e.g. Certificate(s) of Compliance) are obtained.

D. The Contractor shall have a copy of all permits at all times.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 41 28

CONFINED SPACE ENTRY PERMIT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. OWNER has determined that portions of the Site may constitute confined spaces or permit-required confined spaces, as defined in this Section.
   2. CONTRACTOR shall provide appropriate measures, including labor, supervision, equipment, protective devices, and incidentals, to protect the health and safety of personnel at the Site relative to confined spaces, and who may be affected by the Work in confined spaces including, without limitation: employees and agents of CONTRACTOR, Subcontractors, Suppliers, OWNER, ENGINEER, and ENGINEER's consultants, while engaged in performance of their respective duties at Site.
   3. Comply with requirements of OWNER's confined space entry permitting program, if any.

1.2 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Confined spaces" are areas on or about the Site as defined in 29 CFR 1910.146(b), 29 CFR 1926.21(b)(6), and other Laws and Regulations. Confined spaces include, but are not limited to: storage tanks, process vessels, bins, boilers and similar spaces; ventilation or exhaust ducts and stacks; manholes, underground utility vaults and chambers, sewers, pipelines, tunnels; and open-topped spaces greater than four feet deep, such as pits, tubs, vaults, and vessels.
   2. "Entry permit" means the written or printed document provided by the employer of personnel entering permit-required confined space, to allow and control entry into permit-required confined space and that contains the information specified in 29 CFR 1926.146(f), and other Laws and Regulations.
   3. "Permit-required confined space" means confined space as defined in 29 CFR 1926.146(b) and other Laws and Regulations, and that has one or more of the following characteristics:
      a. Contains or has potential to contain a hazardous atmosphere.
      b. Contains material that has potential for engulfing an entrant.
      c. Has internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or floors, or by floor that slopes downward and tapers to a smaller cross-section.
      d. Contains other recognized serious safety or health hazard.
   4. "Hot work permit" means the written authorization of employer of personnel entering a confined space to perform operations, such as riveting, welding, cutting, burning, and heating, capable of providing a source of ignition.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with Laws and Regulations related to protecting personnel working in or entering confined spaces, including:
   1. Code of Federal Regulations (CFR), Title 29, Part 1910, Occupational Safety and Health Standards.
   2. CFR, Title 29, Part 1926, Safety and Health Regulations for Construction.

1.4 SUBMITTALS

A. Informational Submittals: If acceptable, written response for Informational Submittals required in this Section will not be returned to CONTRACTOR. Submit the following to OWNER; if submittals under this Section are furnished to ENGINEER, ENGINEER will forward all submittals under this Section to OWNER without review.
   1. Plan: Site-specific confined space entry plan conforming to OSHA and State regulations.
   2. Permits and Reports: For each time personnel enter a confined space, copies of completed permits required for confined space entry, and completed confined space data sheets submitted daily.

1.5 CONFINED SPACE ENTRY PLAN

A. Prepare, maintain, and implement Site-specific confined space entry plan which shall be incorporated into CONTRACTOR's Site-specific health and safety plan. Maintain copy of the confined space entry plan at the Site for access by employees, OWNER, and authorities having jurisdiction. Confined space entry plan shall include:
   1. Results of CONTRACTOR's Site-specific hazard assessment to identify confined spaces that are permit-required confined spaces, including list of all such spaces that will be accessed for the Work. Update the list as required throughout the Project.
   2. Requirements for safeguarding access to, and restricting non-permitted personnel from accessing, permit-required confined spaces during the Project.
   3. Project-specific procedures to be followed when entering or accessing permit-required confined spaces.
   4. Documentation of training provided to each person that will enter, or work in conjunction with entry to, permit-required confined spaces
   5. Update the plan by adding copies of permits issued and records of entry to permit-required confined spaces, as required in Article 1.6 of this Section.

1.6 CONFINED SPACE SAFETY

A. Personnel entering confined space shall be trained in accordance with 29 CFR 1926.21 (b)(6), 29 CFR 1910.146(g), and other Laws and Regulations.

B. Comply with 29 CFR 1910.146, other Laws and Regulations, and requirements of

authorities having jurisdiction.

C. Recordkeeping: Using the example forms attached to this Section, or other forms required by CONTRACTOR, OWNER, or authority having jurisdiction, issue for each instance of access to permit-required confined space, completed permit(s) and complete associated data sheet. File completed permits and data sheets in the Site-specific confined space entry plan, and submit in accordance with Article 1.4 of this Section. Such permits and information shall include:
   1. Permit for entry to permit-required confined space(s).
   2. Permit for hot work in permit-required confined space(s).
   3. Complete confined space data sheet.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 SUPPLEMENTS

A. The example forms listed below, following this Section's "End of Section" designation, are part of this Specifications Section:
   1. "Confined Space Data Sheet" (one page).
   2. "Confined Space Entry Permit (two pages).
   3. "Confined Space Hot Work Permit" (one page).

+ + END OF SECTION + +

CONFINED SPACE DATA SHEET

Name of Confined Space Entered: _____

Location of Confined Space Entered: _____

_____

Contractor/Subcontractor Accessing Confined Space: _____

_____

PRE-ENTRY SYSTEM CONTROLS USED

		Check
Mechanical:	Isolate, lockout and de-energize to zero potential energy.	☐
Engulfment:	Blank/block/cap/bleed off lines. Lock out gates, valves, pumps.	☐
Electrical:	Lockout/Tag-out	☐
Inerting:	Flush/Purge/Vent	☐

Special Precautions: _____

_____

ATMOSPHERE RESULTS

Date of Last-measured Values: _____

	Oxygen	Explosive	H_2S/Toxic	CO	Date/Time Completed	Initials
Permissible Range	19.5%-23.5%	< 10% LFL	< 10 ppm H_2S	< 35 ppm	--	--
Last Measured						
Values This Entry						

SITE AND PERSONNEL SAFETY (check if required, list type where applicable)

Personal Protective Equipment (PPE) Used:
Safety Harness ☐. Life Lines ☐. Hard Hats ☐. Fall Protection ☐. Retrieval ☐. Eye ☐. Ear ☐. Face ☐. Hand ☐. Foot ☐. Respiratory ☐ (type) _____. Clothing ☐ (type) _____
Other: ☐ _____

_____

_____

Rescue and Emergency Equipment On-Hand/Used:
Retrieval Equipment ☐. Fire Extinguishers ☐. Radios/Telephone ☐. Ladder ☐. Other ☐ _____
Equipment on Standby for Rescue Personnel ☐ _____

_____

Site Safety Equipment/Items On-Hand/Used:
Explosion-Proof Lighting ☐. Barriers/Shield/Barricades ☐ (type) _____. Postings/Flagging ☐.
Other ☐ _____

_____

List specific equipment that was isolated, de-energized, and locked out.

_____

CONFINED SPACE ENTRY PERMIT

ENTRY TEAM

Contractor/Subcontractor Accessing Confined Space: _____

Site or Facility: _____

Specific Confined Space to be Entered: _____

Purpose of Entry (describe the work to be performed): _____

_____

_____

Date: _____ **Time:** _____ **Expected Job Duration (days/hours):** _____

Entry Supervisor: _____ **Designated Attendant:** _____

Authorized/Qualified Entrants: _____ _____

_____ _____

_____ _____

Entry Team Rotation:

Date: _____ **Time:** _____

Entry Supervisor: _____ **Designated Attendant:** _____

Authorized/Qualified Entrants: _____ _____

_____ _____

_____ _____

Entry Team Rotation:

Date: _____ **Time:** _____

Entry Supervisor: _____ **Designated Attendant:** _____

Authorized/Qualified Entrants: _____ _____

_____ _____

_____ _____

Communication Procedures:

Entry Team: _____

_____

_____

Standby/Rescue Personnel: _____

_____

_____

Sign-Offs:

Person Authorizing this Entry: _____

Entry Supervisor: _____

_____

Person Terminating Permit: _____ **Date:** _____ **Time:**

_____

Distribution to: _____ _____ _____

Attach to this permit a list of rescue and emergency services that can be summoned and the means (such as the equipment to use and the telephone numbers to call) for summoning such emergency services.

Confined Space Entry Permit (PAGE 2 of 2)

PRE-ENTRY SYSTEM CONTROL

		Check	Date/Initials
Mechanical:	Isolate, lockout and de-energize to zero potential energy.	Completed ☐	_____
Engulfment:	Blank/block/cap/bleed off lines. Lock out gates, valves, pumps.	Completed ☐	_____
Electrical:	Lockout/Tag-out	Completed ☐	_____
Inerting:	Flush/Purge/Vent	Completed ☐	_____

Special Precautions: _____

_____

_____

ATMOSPHERE - Tested by portable atmospheric monitor with audible and visual alarms.
No one will enter a space with an unsafe atmosphere without approval from the Contractor Superintendent.

	Oxygen	Explosive	H_2S/Toxic	CO	Date/Time Completed	Initials
Permissible Range	19.5%-23.5%	< 10% LFL	< 10 ppm H_2S	< 35 ppm	--	--
Pre-Entry						
Post Ventilation						
Continuous						
Continuous						
Continuous						

Ventilation Used (circle one): Mechanical Natural
Special Precautions: (See Confined Space Data Sheet) _____

_____

SITE AND PERSONNEL SAFETY (check if required, list type where applicable)

Personal Protective Equipment (PPE) Required:
Safety Harness ☐. Life Lines ☐. Hard Hats ☐. Fall Protection ☐. Retrieval ☐. Eye ☐. Ear ☐. Face ☐. Hand ☐. Foot ☐. Respiratory ☐ (type)_____. Clothing ☐ (type)_____.
Other: ☐ _____

_____

Rescue and Emergency Equipment Required:
Retrieval Equipment ☐. Fire Extinguishers ☐. Radios/Telephone ☐. Other ☐ _____
__.
Equipment on Standby for Rescue Personnel ☐ _____

_____

Site Safety Equipment/Items Required:
Explosion-Proof Lighting ☐. Barriers/Shield/Barricades ☐ (type)_____. Postings/Flagging ☐.
Other ☐ _____.

List specific equipment to be isolated, de-energized, and locked out.

_____

CONFINED SPACE HOT WORK PERMIT

Contractor/Subcontractor Accessing Confined Space for Hot Work: _____

_____

Site or Facility: _____

Specific Confined Space to be Entered: _____

_____

Date: _____ **Time:** _____

Expected Job Duration (days/hours): _____

_____

Purpose of Entry (describe the work to be done): _____

_____

_____

_____

Explain Why Work Cannot be Done Outside of the Confined Space: _____

_____

_____

_____

Safety Equipment Required:

Fire Extinguishers: **Yes** _____ **No** _____ **Number** _____

Type _____

Respirators: **Yes** _____ **No** _____ **Number** _____

Type _____

Other Equipment: _____

_____

Authorizing Supervisor:

Print Name _____

Signature _____

Date Signed _____

SECTION 01 42 00

REFERENCES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Section includes the following:
      a. Definitions and terminology in general use in the Contract Documents.
      b. Applicable codes.
      c. Owner's referenced specifications, where applicable.
      d. Abbreviations in general use throughout the Contract Documents.
      e. General requirements regarding reference standards, including a listing of standard-issuing organizations (and their acronyms) used in the Contract Documents.

1.2 DEFINITIONS AND TERMINOLOGY

A. Definitions and terminology applicable to all the Contract Documents are included in the General Conditions, as may be modified by the Supplementary Conditions.

B. Additional terminology used in the Contract Documents includes the following:
   1. "Indicated" refers to graphic representations, notes, or schedules on the Drawings, or to other paragraphs, provisions, tables, or schedules in the Specifications and similar locations in the other Contract Documents. Terminology such as "shown", "noted", "scheduled", and "specified" are used to help the user locate the reference without limitation on the location.
   2. "Installer", "applicator", or "erector" is CONTRACTOR or another person or entity engaged by CONTRACTOR, either as an employee or Subcontractor, to perform a particular construction activity, including installation, erection, application, or similar Work. Installers shall be experienced in the Work that installer is engaged to perform.
      a. The term "experienced", when used in conjunction with the term "installer", means having successfully completed not less than five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated and required; being familiar with Laws and Regulations; and having complied with requirements of authorities having jurisdiction, and complying with requirements of the Supplier of the material or equipment being installed, unless other experience requirements specific to that element of the Work are indicated elsewhere in the Contract Documents.
   3. Trades: Use of terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter", unless otherwise indicated in the Contract Documents or required by Laws or

Regulations. Such terminology also does not imply that specified requirements apply exclusively to trade personnel of the corresponding generic name.

4. "Assigned specialists" and similar terms: Certain Sections of the Specifications require that specific construction activities be performed by specialists with recognized, extensive experience in such operations. Engage said specialists for such activities, and their engagement is a requirement over which CONTRACTOR has no option. These requirements do not conflict with enforcement of building codes and other Laws and Regulations. Also, such requirements are not intended to interfere with local trade union jurisdictional settlements and similar conventions. Such assignments shall not relieve CONTRACTOR of responsibility for complying with the requirements of the Contract Documents.

1.3 APPLICABLE CODES

A. References in the Contract Documents to local code(s) shall mean the following:
   1. Rhode Island State Building Code 2021 (SBC-2021)

1.4 ABBREVIATIONS

A. Common abbreviations that may be found in the Contract Documents are indicated below, alphabetically by their written-out meaning:

alternating current	a-c
ampere	A
antemeridian	a.m.
Architectural Barriers Act	ABA
Americans with Disabilities Act	ADA
Americans with Disabilities Act Accessibility Guidelines	ADAAG
ante meridian	a.m.
average	avg
biochemical oxygen demand	BOD
five-day biochemical oxygen demand	BOD_5
brake horsepower	bhp
British thermal unit	Btu
building information model	BIM
carbonaceous biochemical oxygen demand	CBOD
five-day carbonaceous biochemical oxygen demand	$CBOD_5$
chemical oxygen demand	COD
Centigrade (or Celsius)	C
chlorinated polyvinyl chloride	CPVC

chlorofluorocarbons		CFC
Code of Federal Regulations		CFR
computer-aided drafting and design		CADD, or CAD
cubic inch		cu in
cubic foot		cu ft
cubic yard		cu yd, or CY
cubic feet per minute		cfm
cubic feet per second		cfs
decibel		db
degree Centigrade (or Celsius)	(Write)	degrees C, ^{o}C, or deg C
degrees Fahrenheit		degrees F, ^{o}F, or deg F
diameter		dia
direct current		d-c
dollars		$
each		ea
efficiency		eff
Fahrenheit		F
feet		ft
feet per hour		fph, or ft/hr
feet per minute		fpm
feet per second		fps, or ft/min
figure		fig
flange		flg
foot-pound		ft-lb
gallon		gal
gallons per hour		gph, or gal/hr
gallons per minute		gpm
gallons per second		gps
gram		g
grams per liter		g/L
Hertz		Hz
horsepower		hp or HP
hour		hr
human-machine interface		HMI
inch		in.
inches of mercury		in. Hg

inches water gage	in. w.g.
inch-pound	in.-lb
inside diameter	ID
iron pipe size	IPS
thousand pounds	kips
thousand pounds per square inch	ksi
kilovolt-ampere	kva
kilowatt	kw
kilowatt-hour	kwhr or kwh
linear foot	lin ft or LF
liter	L
Leadership in Energy and Environmental Design (USGBC)	LEED
maximum	max
mercury	Hg
milligram	mg
milligrams per liter	mg/l or mg/L
milliliter	ml
millimeter	mm
million gallons per day	mgd or MGD
million gallon	MG
minimum	min
national pipe threads	NPT
net positive suction head	NPSH
net positive suction head available	NPSHA
net positive suction head required	NPSHR
nitrogen oxide (total concentration of mono-nitrogen oxides such as nitric oxide (NO) and nitrogen dioxide (NO_2))	NOx
nominal pipe size	NPS
number	no.
operator interface terminal	OIT
ounce	oz
ounce-force	ozf
outside diameter	OD
parts per hundred	pph
parts per million	ppm
parts per billion	ppb

polyvinyl chloride	PVC
post meridian	p.m.
pound	lb
pounds per square inch	psi
pounds per square inch absolute	psia
pounds per square inch gauge	psig
pounds per square foot	psf
process control system	PCS
programmable logic controller	PLC
revolutions per minute	rpm
second	sec
specific gravity	sp gr, or SG
square	sq
square foot	sq ft, sf, or ft^2
square inch	sq in., or in^2
square yard	sq yd, or SY
standard	std
standard cubic feet per minute	scfm
total dynamic head	TDH
totally-enclosed fan-cooled	TEFC
volt	V
volts alternating current	vac
volts direct current	vdc
volatile organic compounds	VOC

1.5 REFERENCE STANDARDS

A. Refer to Article 3 of the General Conditions, as may be modified by the Supplementary Conditions, relative to reference standards and resolving discrepancies between reference standards and the Contract Documents. Provisions of reference standards are in effect in accordance with the Specifications.

B. Copies of Standards: Each entity engaged in the Work shall be familiar with reference standards applicable to its construction activity. Copies of applicable reference standards are not bound with the Contract Documents. Where reference standards are needed for a construction activity, obtain copies of standards from the publication source.

C. Abbreviations and Names: Where reference standards, specifications, codes, manuals, Laws or Regulations, or other published data of international, national, regional or local organizations are referred to in the Contract Documents, the organization issuing the standard may be referred to by their acronym or abbreviation only. The following acronyms or abbreviations that may appear in the Contract Documents shall have the meanings indicated below. Listing is alphabetical by acronym.

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACS	American Chemical Society
ADSC-IAFD	International Association of Foundation Drilling.
AEIC	Association of Edison Illuminating Companies
AF&PA	American Forest and Paper Association
ABMA	American Bearing Manufacturers Association (formerly Anti-Friction Bearing Manufacturers Association (AFBMA))
AGMA	American Gear Manufacturers Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIChE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standards Committee
AMA	Acoustical Materials Association
AMCA	Air Movement and Control Association
AMP	National Association of Architectural Metal Manufacturers, Architectural Metal Products Division
ANSI	American National Standards Institute
APA	The Engineered Wood Association
APHA	American Public Health Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers

ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Non-Destructive Testing
ASQ	American Society for Quality
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
AWCI	Association of the Wall and Ceiling Industry
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association
CBMA	Certified Ballast Manufacturers Association
CDA	Copper Development Association
CEMA	Conveyor Equipment Manufacturers Association
CGA	Compressed Gas Association
CISCA	Ceilings and Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
DIN	Deutsches Institut fur Normung eV (German Institute for Standardization)
DIPRA	Ductile Iron Pipe Research Association
EJCDC	Engineers Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association, Inc.
ETL	Intertek Testing Services, Inc. (formerly ETL Testing Laboratories, Inc.)
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FM	Factory Mutual (FM Global)
FRPI	Fiberglass Reinforced Plastics Institute
FS	Federal Specification

GA	Gypsum Association
GANA	Glass Association of North America
HEW	United States Department of Health, Education and Welfare
HI	Hydraulic Institute
HMI	Hoist Manufacturers Institute
HUD	United States Department of Housing and Urban Development
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFI	Industrial Fasteners Institute
IRI	Industrial Risk Insurers
ISA	Instrumentation, Systems, and Automation Society (formerly Instrument Society of America)
ISO	Insurance Services Office
ISO	International Organization for Standardization
LPI	Lightning Protection Institute
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MS	Military Specifications
MSS	Manufacturers' Standardization Society
MMA	Monorail Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NAPF	National Association of Pipe Fabricators, Inc.
NARUC	National Association of Regulatory Utilities Commissioners
NBHA	National Builders Hardware Association
NBS	United States Department of Commerce, National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NELMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NGA	National Glass Association

NHLA	National Hardwood Lumber Association
NHPMA	Northern Hardwood and Pine Manufacturers Association
NIST	United States Department of Commerce, National Institute of Standards and Technology
NLGA	National Lumber Grades Authority
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NSSGA	National Stone, Sand, and Gravel Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PEI	Porcelain Enamel Institute
PFI	Pipe Fabrication Institute
PPI	Plastics Pipe Institute
PGMC	Primary Glass Manufacturers Council
PS	Product Standards Section, United States Department of Commerce
RCSC	Research Council on Structural Connections (part of AISC)
RIDEM	Rhode Island Department of Environmental Management
RMA	Rubber Manufacturers Association
SAE	Society of Automotive Engineers
SCAQMD	Southern California Air Quality Management District
SCPRF	Structural Clay Products Research Foundation
SCTE	Society of Cable Telecommunications Engineers
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturing Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractor’s National Association
SPI	Society of the Plastics Industry
SPIB	Southern Pine Inspection Bureau
SSPC	Society for Protective Coatings
SWI	Steel Window Institute
TCNA	Tile Council of North America
TEMA	Tubular Exchanger Manufacturers Association
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance

UL	Underwriters Laboratories, Inc.
USAB	United States Access Board
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Council
USGS	United States Geological Survey
USPHS	United States Public Health Service
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association
WCMA	Wood Component Manufacturers Association
WDMA	Window and Door Manufacturers Association
WEF	Water Environment Federation
WWEMA	Water and Wastewater Equipment Manufacturers Association
WWPA	Western Wood Products Association

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 51 05

TEMPORARY UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all temporary utilities and temporary facilities required for the Project, including the following as needed and applicable:
      a. Electricity.
      b. Lighting.
      c. Telephone and communications.
      d. Heating, cooling, ventilating, and temporary enclosures.
      e. Water.
      f. Sanitary facilities.
      g. First-aid facilities.
      h. Fire protection.
   2. Make all arrangements with utility owners for temporary utilities and with others as appropriate for temporary facilities. Obtain required permits and approvals for temporary utilities and temporary facilities.
   3. Pay all service costs for utilities and facilities indicated in this Section as CONTRACTOR's responsibility, including cost of electricity, water, fuel, and other utility services and temporary facilities required for the Work.
   4. Continuously maintain adequate temporary utilities and temporary facilities for all purposes for the Project, until removal of temporary utilities and temporary facilities. At minimum, provide and maintain temporary utilities and temporary facilities through Substantial Completion and removal of temporary field offices and sheds unless otherwise approved in writing by ENGINEER.
   5. Should OWNER occupy part of the Work prior to Substantial Completion of the entire Work, cost of utilities consumed via temporary utilities serving the portion occupied by OWNER will be shared proportionately by OWNER and CONTRACTOR as mutually agreed to by the parties.
   6. Maintain, including cleaning, temporary utilities and temporary facilities, and continuously provide consumables as required.
   7. Temporary utilities and temporary facilities shall be adequate for personnel using the Site and the needs of the Project.
   8. Provide temporary utilities and temporary facilities in compliance with Laws and Regulations and, when applicable, requirements of utility owners.

1.2 REQUIREMENTS FOR TEMPORARY UTILITIES AND TEMPORARY FACILITIES

A. Electrical:
   1. Provide temporary electrical service required for the Work, including continuous power for temporary field offices and sheds. Provide temporary outlets with circuit breaker protection and ground fault protection.

B. Lighting.
   1. Provide lighting at the Site of not less than five foot-candles for open areas and not less than ten foot-candles for stairs and shops. Provide not less than one, 300-watt lamp every 15 feet in indoor work areas. Provide night security lighting of not less than five foot-candles within 50 feet of all parts of the Site during hours of darkness, controlled by photocell.
   2. Do not work in areas with insufficient lighting. Where lighting is insufficient for the work activities to be performed, provide additional temporary lighting.
   3. Provide temporary lighting sufficient for observation of the Work by ENGINEER and inspection by CONTRACTOR and authorities having jurisdiction. Where required by ENGINEER, provide additional temporary lighting.
   4. Provide temporary lighting for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

C. Telephone and Communications.
   1. Provide temporary telephone and communications required for CONTRACTOR's operations at the Site and for summoning emergency medical assistance.
   2. Provide temporary telephone and communications for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

D. Heating, Ventilating, and Enclosures.
   1. Provide sufficient temporary heating, cooling, ventilating, and enclosures to ensure safe working conditions and prevent damage to existing facilities and the Work.
   2. Except where otherwise specified, temporary heating shall maintain temperature of the space served between 50 degrees F and maximum design temperature of building or facility and its contents.
   3. Maintain temperature of areas occupied by OWNER's personnel or electronic equipment, including offices, lunch rooms, locker rooms, toilet rooms, and rooms containing computers, microprocessors, and control equipment, between 65 degrees F and 80 degrees F with relative humidity less than 75 percent.
   4. Required temperature range for storage areas and certain elements of the Work, including preparation of materials and surfaces, installation or application, and curing as applicable, shall be in accordance with the Contract Documents for the associated Work and the Supplier's recommended

temperature range for storage, application, or installation, as appropriate.

5. Provide temporary ventilation sufficient to prevent accumulation in construction areas and areas occupied by OWNER of hazardous and nuisance levels or concentrations of dust and particulates, mist, fumes or vapors, odors, and gases, associated with construction.
6. Provide temporary enclosures and partitions required to maintain required temperature and humidity.
7. Provide temporary heating, ventilating, and cooling for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

E. Water:
   1. General:
      a. Provide temporary water facilities including piping, valves, meters if not provided by owner of existing waterline, backflow preventers, pressure regulators, and other appurtenances. Provide freeze-protection as required.
      b. Continuously maintain adequate water flow and pressure for all purposes during the Project, until removal of temporary water systems.
   2. Water for Construction Purposes:
      a. Provide water for Site maintenance and cleaning and, water necessary for construction activities, and water for disinfecting and testing of systems.
      b. CONTRACTOR may use existing hose bibbs for short-term wash-downs and intermittent use of water for work areas in the existing building. Obtain consent of ENGINEER and OWNER for connections to existing hose bibbs and similar existing connections.
   3. Water for Human Consumption and Sanitation:
      a. Provide potable water in accordance with Laws and Regulations for consumption by personnel at the Site, for field offices, and for sanitary facilities.
      b. When necessary, provide bottled, potable water for use and consumption by personnel at the Site, including CONTRACTOR, ENGINEER, and visitors to the Site.
      c. Provide temporary water for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

F. Sanitary Facilities.
   1. Provide suitably-enclosed chemical or self-contained toilets for CONTRACTOR's employees, Subcontractors, Suppliers, ENGINEER, and visitors to the Site. Location of temporary toilets shall be acceptable to OWNER and ENGINEER.
   2. Refer to Paragraph 1.2.E of this Section for requirements for water intended for human consumption during construction.
   3. Provide suitable temporary washing facilities for employees and visitors.
   4. Provide temporary sanitary facilities for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

G. First-aid Facilities.
   1. Provide temporary first-aid stations at or immediately adjacent to the Site's work areas, and inside CONTRACTOR's temporary field office. Locations of first-aid stations shall be determined by CONTRACTOR's safety representative. Replenish supplies in first-aid stations as items are used, prior to expiration of items, and as necessary. Monitor and log inventory of supplies in first-aid stations in accordance with requirements for monitoring and logging safety equipment as indicated in Section 01 35 23, Safety Requirements.
   2. Provide list of emergency telephone numbers at each hardwired telephone at the Site. List shall be in accordance with the list of emergency contact information required in Section 01 35 23, Safety Requirements.
   3. Provide temporary first-aid facilities for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

H. Fire Protection.
   1. Provide temporary fire protection, including portable fire extinguishers rated not less than 2A or 5B in accordance with NFPA 10, Portable Fire Extinguishers, for each temporary building and for every 3,000 square feet of floor area under construction.
   2. Provide Class A (ordinary combustibles), Class B (combustible liquids and gases), and Class C (electrical equipment) fire extinguishers as necessary.
   3. Comply with NFPA 241, Standard for Safeguarding Construction, Alternation, and Demolition Operations, and requirements of fire marshals and authorities having jurisdiction at the Site.
   4. Provide temporary fire protection for ENGINEER's field office in accordance with Section 01 52 11, Engineer's Field Office.

1.3 USE OF OWNER'S SYSTEM

A. Existing Utility Systems: Do not use systems in existing buildings or structures for temporary utilities without OWNER's written permission and mutually acceptable basis agreed upon by the parties for proportionate sharing of costs between OWNER and CONTRACTOR.

B. Use of Permanent Utility Systems Provided Under the Project:
   1. Permanent electrical, lighting, water, heating, ventilating, and fire protection systems and first-aid facilities may be used to provide temporary utilities and temporary facilities if the following are met:
      a. Obtain OWNER's written permission to use permanent systems.
      b. Permanent systems to be used for temporary utilities or temporary facilities shall be substantial complete, including complete functionality of all controls.
      c. CONTRACTOR shall pay all costs while using permanent system, including operation, maintenance, replacement of consumables, and provide replacement parts.
   2. Do not use the following permanent facilities:

a. Telephone and communication facilities.
b. Sanitary facilities.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for temporary utilities and temporary facilities may be new or used, but shall be adequate for purposes intended and shall not create unsafe conditions, and shall comply with Laws and Regulations.

B. Provide required materials, equipment, and facilities, including piping, cabling, controls, and appurtenances.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install temporary utilities and temporary facilities in neat, orderly, manner, and make structurally, mechanically, and electrically sound throughout.

B. Location of Temporary Utilities and Temporary Facilities:
   1. Locate temporary systems for proper function and service.
   2. Temporary systems shall not interfere with or provide hazards or nuisances to: the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, and work of utility owners and others.
   3. Do not install temporary utilities on the ground, with the exception of temporary extension cords, hoses, and similar systems in place for short durations.

C. Modify and extend temporary systems as required by progress of the Work.

3.2 USE

A. Maintain temporary systems to provide safe, continuous service as required.

B. Properly supervise operation of temporary systems:
   1. Enforce compliance with Laws and Regulations.
   2. Enforce safe practices.
   3. Prevent abuse of services.
   4. Prevent nuisances and hazards caused by temporary systems and their use.
   5. Prevent damage to finishes.
   6. Ensure that temporary systems and equipment do not interrupt continuous progress of construction.

C. At end of each work day, check temporary systems and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient.

3.3 REMOVAL

A. Completely remove temporary utilities, temporary facilities, equipment, and materials when no longer required. Repair damage caused by temporary systems and their removal and restore the Site to condition required by the Contract Documents; if restoration of damaged areas is not specified, restore to preconstruction condition.

B. Where temporary utilities are disconnected from existing utility, provide suitable, watertight or gastight (as applicable) cap or blind flange, as applicable, on service line, in accordance with requirements of utility owner.

C. Where permanent utilities and systems were used for temporary utilities, upon Substantial Completion replace all consumables such as filters and light bulbs and parts used during the Work.

+ + END OF SECTION + +

SECTION 01 51 41

TEMPORARY PUMPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Furnish and install materials and equipment and provide labor required to temporarily bypass pump wastewater at the Water Pollution Control Facility. The Contractor is solely responsible for the design, operation, maintenance and removal of the temporary bypass pumping system.

2. Furnish and install backup systems to bypass pump flows as indicated and specified in the event of disruption of primary systems.

3. Remove equipment utilized to bypass pump flows, once bypass pumping is completed.

4. Bypass design shall include the following metering, monitoring/reporting and recording capabilities. The OWNER and ENGINEER shall have real-time, web-based access to all data at all times during bypass operations via a web-based application:

    a. Water elevations at the suction locations and, by wireless connection, the water elevation at the discharge locations, shall be continuously measured, monitored and recorded.

    b. Monitor and record which pumps are in operation, and which are not in operation, at all times.

    c. Continuously meter, monitor and record flows from each pump, and continuously meter, monitor and record flows for the total bypass system discharge.

5. The bypass system shall operate in accordance with the requirements of Section 01 11 13, Summary of Work and Section 01 14 16, Coordination with Owner Operations. Once started, continue operation of the bypass system until all work specified in Section 01 11 13, Summary of Work and Section 01 14 16 to be performed during bypass operations has been successfully performed, installed and tested, and required training has been performed, and has been accepted for operation by the ENGINEER.

6. Install all wastewater flow handling pumping equipment and piping above existing grade, except where indicated in the Contract Drawings, and except for piping at

the suction and discharge points indicated.

7. All structures containing wastewater, including sewers, channels, chambers, tanks and similar structures, shall be dewatered as required to perform the bypass work.

8. Location of the temporary pumping system shall not affect OWNER's or facility manager's operations and access at the Site, and public access to streets and drives, unless approved by ENGINEER and authorities having jurisdiction.

B. Related Sections:

1. Section 01 11 13, Summary of Work
2. Section 01 14 16, Coordination with Owner Operations
3. Section 01 35 44, Spill Prevention Control and Countermeasures Plan

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. Bypass pumping system shall have sufficient capacity to pump system flows as follows. The peak flow conveyance capacity shall be maintained by the bypass pumping system at all times. The wastewater level at the suction locations indicated on the Drawings shall be maintained, at all times, at a level that ensures adequate submergence and meets NPSHR requirements as defined by the pump manufacturer, but shall not exceed 50% capacity of the pipe segment immediately upstream.

    - Monthly Average Flow: 14.2 MGD, permitted
    - Annual Average Flow: 8.9 MGD
    - Maximum Day 19.9 MGD
    - Peak Hour 26.4 MGD
    - Suction lift: Refer to Section 01 14 16 as several setups are required. (add height of temporary pump on skid to numbers presented).

2. Provide all equipment, including all pipeline plugs, and including all temporary discharge piping and pumps of size to convey the Peak Wet Weather Flow. Pumps shall be sized to convey the range of flows specified within its manufacturer-defined allowable operating range. The total flow shall be diverted around the work area as indicated on the Drawings. Bypass pumping systems shall be operated and monitored by the Contractor's personnel 24 hours per day/7 days per week and inspected hourly during construction activities.

3. Standby equipment, including one standby pump of each size utilized, shall be provided at each suction location and shall be connected and ready for immediate operation and use in the event of an emergency or breakdown. Standby power shall be provided by the CONTRACTOR and connected and ready for immediate operation and use to operate the bypass system's web-based monitoring, metering and recording system. If electric

pumps are used, standby power shall be provided and connected and ready for immediate operation and use to concurrently operate two pumps of each size utilized and the bypass system's web-based monitoring, metering and recording system.

4. Structures for Suction/Discharge: Structures can be found on the Contract Drawings and in Part 3.2 DETAILED SHUTDOWN REQUIREMENTS of Section 01 14 16, Coordination with Owner's Operations.

5. Suction: Suction lines shall be installed at the locations indicated on the Drawings. The Contractor is responsible for supporting and restraining the suction lines. For the purposes of pump selection, it shall be assumed each suction point may need to pump up to 60% of the peak flow indicated. In that scenario, the other suction location would be pumping no more than 40% of the peak flow.

6. Discharge: Discharge lines shall be installed at the locations indicated on the Drawings. The Contractor is responsible for supporting and restraining the discharge lines. The pumps shall be sized to provide the specified flows reflective of the discharge arrangement, and all of the specified, indicated and required system characteristics including all isolation and check valves. The size of the discharge pipes and the location of the discharging piping manifold may be modified by the Contractor, provided that doing so does not interfere with ingress/egress from the site, and does not reduce the reliability or performance of the pumping system.

B. Performance Requirements:

1 Bypass pumping system pumps and generators shall be housed in sound attenuated enclosures with critically silenced mufflers. Limit noise to Chapter 10 Article III - Noise of East Providence, Rhode Island – Code of Ordinances.

2. Maintain flow around the work area to prevent surcharging of and damage to wastewater pipes and structures. Protect public and private property (including infrastructure, and wetlands and other natural resources) from damage and flooding.

C. Existing Facility Pumping Equipment

1. The existing pumps at the facility shall not be used as part of the Contractor's wastewater flow handling plan, or for any other construction-related purposes.

2. The Contractor's bypass pumps shall not be powered by the station's existing standby generator.

1.3 SUBMITTALS

A. Furnish to ENGINEER submittals for temporary pumping system not less than 30 days prior to delivery of temporary pumping system to the Site. **Additionally, all submittals are subject to the review, comment and approval of the Rhode Island Department of**

Environmental Management. Submit the following in accordance with Section 01 33 00, Submittal Procedures:

1. Evidence of the qualifications of the entity performing bypass operations specified in Paragraph 1.04.

2. Proof of licensure specified in Paragraph 1.04 for all Rhode Island Wastewater Treatment Plant Operators.

3. Registration and licensure of Professional Engineer as specified in Paragraph 1.04.

4. Completed "Certificate of Design" and "Wastewater Operations – Bypass Pumping Notification" included herein as Attachments 01 51 41-A.

5. BYPASS PUMPING PLAN: Prior to starting any construction on site, the Contractor shall submit detailed plans and descriptions outlining all provisions and precautions regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to protect the facilities, including protection of piping and structures at discharge points due to the discharge flows, and compliance with the requirements and permit conditions specified and indicated in these Contract Documents.

   The plans and descriptions shall include but not be limited to:

   a. A written description of the proposed construction sequence and how it relates to handling of existing flows.

   b. Staging areas for pumps.

   c. Safety enclosures for suction structures and discharge vault.

   d. Screening methods at suction locations.

   e. Number, size, geometry (e.g. suction bells), material, location and method of installation of suction piping.

   f. Number, size, geometry, material, method of installation, location of installation, and protection of discharge piping.

   g. Bypass pump sizes, capacity, number of each size to be on site and power requirements.

   h. Calculations of static lift, friction losses, and flow velocity. Pump curves showing pump operating range. Calculations shall reflect the common discharge piping, isolation and check valves, and all system characteristics as

specified, indicated and required.

i. Standby power generator size, type (e.g. diesel or natural gas) and location (for the monitoring system, and for electric bypass pumps if used) including location and method of fuel storage and secondary containment. Include temporary fuel tanks in spill prevention control and countermeasures evaluation and plan required in Section 01 35 44, Spill Prevention Control and Countermeasures Plan.

j. Downstream discharge plan.

k. Method of protecting piping and structures at discharge points from erosion, damage and overflow.

l. Pipe anchoring, thrust and restraint block sizes and locations.

m. Sections showing suction pipe elevations, sizes, types, geometry, supports, and arrangements in suction structures. Sections showing discharge pipe elevations, sizes, types, geometry, supports and arrangements in discharge structure. Sections showing discharge piping and, if buried, the discharge pipe depth, embedment, select fill and special backfill for buried pipe.

n. Method of noise control for each pump and generator and noise level expected. Include details of any sound attenuated enclosures provided, including size, materials of construction, etc.

o. Emergency response plan for cleaning up leakage from bypass piping.

p. Methods for and locations of odor control.

q. Details of driveway and street crossings.

r. Calculations for selection of bypass pumping size.

s. Schedule for installation of and maintenance of bypass system, including maintenance schedule for pumps, lines and valves.

t. Plans indicating locations of bypass pumping equipment.

u. Certification from a Rhode Island-Licensed Registered Professional Engineer that the pumping system has been designed to meet the requirements of the Contract Documents and will perform as intended.

v. Safety measures regarding fuel storage for pumps and generators.

w. Locations and details of dams, plugs and other means to prevent flows from

reaching areas to be bypassed.

x. Locations of pumps, power service connections, backup generators (including size and power requirements), and other support equipment.

y. Where electric pumps are specified, show the location of power feeds and all electrical equipment. Notwithstanding other specified requirements for providing and paying for temporary electrical power, the Contractor shall provide and pay for all electrical power associated with temporary electric bypass pumps.

z. Standard Operating Procedures (SOP) for the temporary bypass pumping system including alarms and notifications.

6. BYPASS PUMPING CAPABILITIES: Submit documentation from the entity performing bypass operations evidencing the following:

a. Bypass pumping equipment is automated and is capable of functioning without the assistance of an operator.

b. Bypass pumping equipment can operate for up to two (2) hours running dry. After this period of time, the pumps shall have the capability of pulling a 25-inch Hg vacuum without adjustment or repair.

c. Inventory to perform normal rentals, including this project and maintain at least 100% reserve equipment for this project for immediate delivery.

d. Service and repair parts in stock to fulfill any service or repair of all equipment within three hours of any service call.

e. Service staff and trucks to mobilize to repair or service equipment within one hour of a service call, 24 hours per day/7 days per week.

f. Telephone and pager numbers to call for 24-hour service.

7. EMERGENCY PLAN

a. Emergency Plan: Develop plan prior to installation of bypass system. Plan to include but not be limited to:

i. Names and telephone numbers of employees who can immediately respond to an emergency situation, 24-hours a day, seven days a week; emergency notification plan; proposed course of action to be taken in the event of a spill or break in the bypass system; methods to be used to clean up the spill area; materials to be stored on-site for emergency repairs and a narrative description of how repairs would be made.

ii. Tracking of weather forecasts to identify potential rain events that could substantially increase flows.

iii. Ongoing plan identifying actions to be taken if the bypass system must be taken offline.

iv. Additional spare parts for pumps and backup equipment not on site available on short notice.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. The entity performing bypass operations shall have completed successful bypass operations on at least five (5) wastewater projects of similar size and complexity within the past three years within New England.

2. At all times when the bypass system is operational, a Rhode Island licensed Wastewater Treatment Plant Operator, Grade 2 or higher, shall be onsite 24 hours per day, 7 days a week to operate, monitor and maintain flow diversion and bypass pumping equipment and operations.

3. A Licensed Professional Engineer (Civil, Environmental, Mechanical or Sanitary) registered in the State of Rhode Island shall:

a. Design and certify that the pumping system is designed in accordance with the Contract Documents to meet specified flows and will perform as intended.

b. Prepare, stamp and sign all hydraulic calculations and drawings.

B. Regulatory Requirements:

1. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

C. System Requirements:

1. The bypass system including all pumps, pipe, hose, valves and fittings shall be provided by one bypass entity.

2. All hydraulic calculations and drawings required by the submittals shall be provided by the bypass entity and stamped by a Rhode Island-Licensed Registered Professional Engineer, as specified.

1.5 SEQUENCING AND SCHEDULING

A. The temporary bypass pumping, piping and diversion system shall be successfully tested and accepted for use prior to being placed into service in accordance with the requirements of Section 01 14 16, Coordination with Owner Operations.

1. Prior to the diversion of any flow via plug/stop-log/pumping, the Contractor shall notify the OWNER 72 hours in advance.

1.6 MAINTENANCE

A. Maintenance Service

1. The temporary pumping system shall be inspected and properly serviced in accordance with the manufacturer's maintenance schedules.

2. All leaks shall be repaired immediately upon detection.

B. Extra Materials (in addition to the primary and stand-by equipment specified elsewhere in this Section)

1. Spare parts for pumps and piping shall be kept on site.

2. Spare parts shall include a minimum of one portable pump, one isolation valve and associated set of couplings in each size utilized, one check valve and associated set of couplings in each size utilized, tees, replacement pipeline sections and couplings, and flexible hose sufficient to isolate a leak or break in the bypass pump system and minimize damage to the environment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All discharge piping shall be high-density polyethylene (HDPE) pipe with fused joints.

B. All discharge piping shall be suitable for the maximum calculated discharge pressures including a factor of safety of 1.5 times the calculated discharge maximum pipe pressure and surge pressure, whichever is greater.

C. All force main connections shall be made by using flanged composite hose with a working pressure of 150 psi or 1.5 times the calculated discharge maximum pressure including surge pressure.

2.2 EQUIPMENT

A. Noise Control

1. Equipment shall comply with the requirements of Paragraphs 1.02.B and 1.04.B.

2. Pumps and generators shall be housed in sound attenuated enclosures with critically silenced mufflers.

B. Hoisting equipment for each pump and accessories shall be maintained on the site.

C. All pumps used shall be centrifugal, end suction, fully automatic, self-priming pumps that do not require the use of foot-valves, vacuum pumps, diaphragm pumps, or isolation valves in the priming system. The pumps shall employ level control devices to regulate on/off or variable speed to the pump.

1. Seals shall be high pressure, mechanical self-adjusting type with silicon carbide faces capable of withstanding suction pressures running and including a factor of safety of 1.5 and surge pressures. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. All metal parts shall be stainless steel.

D. The pumps may be electric or diesel powered.

E. Provide the necessary start/stop controls for each pump.

F. Stand-by pumps shall be provided as specified and indicated and shall be on-line at all times during bypass operations, isolated from the primary system by isolation valves.

G. Each primary pump and each stand-by pump shall have an isolation valve on its suction piping and shall have an isolation valve on its discharge piping to provide complete individual hydraulic isolation of each pump from the bypass system as needed.

H. Each primary pump and each stand-by pump shall have a check valve on its discharge piping to prevent backflow of wastewater individually through each pump.

I. Pumps shall not be connected by a common suction manifold. Each pump shall have its own suction line. The use of PVC or steel pipe with couplings will not be accepted. All pipe or hose will be rated for 25-inch Hg vacuum.

J. Provide lighting for pedestrian and vehicular safety.

PART 3 - EXECUTION

3.1 GENERAL

A. The temporary bypass system shall be maintained and kept operational at all times. The handling of wastewater flows shall be conducted in a manner that no disruption of sewer service occurs.

B. The bypass system shall convey wastewater flows without overflows or spillage to the surrounding environment.

C. Bypass pumping shall not interfere with facility operations.

D. There shall be no interruption in the flow of wastewater.

3.2 INSTALLATION

A. Remove existing covers and protect all openings..

B. Plugging or blocking of sewer flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed, it is to be removed in a manner that permits wastewater flow to slowly return to normal without surge, to prevent surcharging downstream.

C. Air vents on the bypass piping shall be configured to prevent any wastewater discharge.

D. When working inside structures, the Contractor shall comply with OSHA requirements, with the exception that a depth of 4-ft defines a confined space, in lieu of 5-ft, when working in the presence of sewer gases, combustible or oxygen-deficient atmosphere, and confined spaces.

E. Absorbent mats and booms shall be installed around the flow bypass pumping locations extending above surface grade.

F. Odor control mitigation measures shall be implemented to prevent release of odors from the suction locations and bypass vault system. A minimum 2-inch thick plywood collar of sufficient length and width, and with foam rubber seal, shall be placed around the suction pipes(s) and discharge pipe(s) to prevent odors from escaping from the structures. This is applicable to splitter structures, manholes and vautls.

G. Safety enclosures or barriers shall be provided at suction and discharge structures.

3.3 FIELD QUALITY CONTROL

A. Inspection

1. Inspect bypass pumping systems on at least an hourly basis on a 24 hour 7 day per week basis to determine that the systems are working correctly.

2. All leakage from flow bypass piping shall be immediately reported, eliminated and cleaned up at no additional cost to the OWNER.

B. Tests

1. Perform leakage and pressure testing of the bypass pumping discharge piping before it is used for bypass sewerage pumping.

    a. Pressure Test

        (1) Test pressure shall be 1.5 times the system design pressure or 150 psi, whichever is greater.

        (2) Test pressure shall be held on the piping for a period of at least 2 hours.

        (3) No drop in pressure during the test period is allowed.

    b. Leakage Test

        (1) The leakage test shall be conducted concurrently with the pressure test.

        (2) All exposed piping shall be examined during the test. If any leaks, defective material or joints are detected, they shall be repaired or replaced and the test shall be repeated at no additional cost to the OWNER prior to use for bypass pumping.

        (3) The allowable leakage shall be zero gallons per 24 hours per inch diameter per mile of pipe.

        (4) At the completion of the test, the pressure shall be released at the furthermost point from the point of application.

3.4 CLEANING

A. Flush out pumps and all piping prior to disassembling system. Sewage and related debris shall not be released onto surface features.

3.5 COMPLETION

A. Upon completion of the bypass operations
    1. Remove plugs, bulkheads, and line stops in manner that allows flow to slowly return to normal, without surging, surcharging, and adverse effects on existing system.
    2. Flush out temporary pumping system with clean water discharged to an appropriate location.
    3. When CONTRACTOR has obtained permit(s) for temporary pumping from authorities having jurisdiction, furnish written notice to such authorities that temporary pumping has been completed.
    4. Restore all property to pre-construction conditions, unless otherwise specified or indicated.

PART 4 - ATTACHMENTS

ATTACHMENT 01 51 41-A – CERTIFICATE OF DESIGN

ATTACHMENT 01 51 41-A

CERTIFICATE OF DESIGN

The undersigned hereby certifies that he/she is a Rhode Island-Licensed Registered Professional Engineer, registered in the State of Rhode Island and that he/she has been employed

by (Name of the Contractor) _____ to design

_____ in accordance with the Contract Documents for the project titled "City of East Providence, RI Department of Public Works Water Pollution Control Facility Improvements and Concrete Lining." The undersigned further certifies that he/she has performed similar designs previously and has performed the design of the _____; that said design is in conformance with all applicable local, state, and federal codes, rules, and regulations and professional practice standards; that his/her signature and Rhode Island-Licensed Registered Professional Engineer (P.E.) Stamp have been affixed to all calculations and drawings used in, and resulting from, the design; and that the use of that stamp signifies the responsibility of the undersigned for that design.

The undersigned hereby agrees to provide five (5) copies of the design drawings and calculations to the OWNER and ENGINEER prior to ordering any materials and/or performing any work covered by this Certificate of Design.

_____	_____
P.E. Name	Contractor's Name
_____	_____
Signature	Signature
_____	_____
Title	Title
_____	_____
Address	Address
_____	
P.E. License No.	

END OF SECTION

SECTION 01 52 11

ENGINEER'S FIELD OFFICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes requirements for CONTRACTOR-provided field office, with furnishings, equipment, and consumables, for use by ENGINEER.
   2. CONTRACTOR shall provide and maintain field office for ENGINEER's sole use. Provide field office at location approved by ENGINEER, near CONTRACTOR's field office.
   3. Field office shall be complete and fully functional within 14 days after date on which the Contract Times commence running.
   4. Obtain required permits for field offices.

1.2 SUBMITTALS

A. Action Submittals: Obtain ENGINEER's approval of the following prior to staging field office to the Site:
   1. Field Office Submittal: Submit all of the following as one submittal which shall include:
      a. Site plan indicating proposed location of field office, parking for field office, facilities related to the field office, and material of both field office parking and sidewalk or walkway to field office.
      b. Information on proposed field office size, construction, exterior appearance, interior finishes, and field office security measures.
      c. Proposed layout of field office interior, showing location of offices, common areas, restroom, closet, other areas specified (if any), with dimensions indicated for each.
      d. Proposed layout of field office exterior identifying sign, showing all text, font, colors, and graphics (if any).
      e. Proposed type of Internet service; name of proposed Internet service provider; and product data and technical information on equipment (if any) required for Internet service.
      f. Office Equipment: Product data and technical information for copier, telephones, and other office equipment.
      g. Computer System: Product data and technical information on the complete computer system.
      h. Digital Camera: Product data and technical information on camera and accessories.

PART 2 – PRODUCTS

2.1 FIELD OFFICE CONSTRUCTION AND SITE REQUIREMENTS

A. Site at Field Office:
   1. Allocate total of three reserved parking spaces for use by ENGINEER and OWNER in close proximity to ENGINEER's field office. Parking area shall be paved with bituminous paving, concrete, crushed stone, or other material approved by ENGINEER. Parking area shall be suitably drained and free of standing water during wet weather.
   2. Provide sidewalk or walkway, not less than four feet wide, of bituminous pavement, concrete, crushed stone, or other material approved by ENGINEER, for the full distance between parking area and field office.

B. Field Office, Minimum Construction: Field office shall comply with the following:
   1. Structurally sound foundation and superstructure.
   2. Size: Floor area of not less than 430 square feet, and not less than 10 feet wide or as requested by the ENGINEER.
   3. Completely weather-tight and insulated, with minimum R-19 insulation.
   4. Exterior finish approved by ENGINEER.
   5. New interior finishes approved by ENGINEER, including resilient floor covering in first-class condition.
   6. Field Office Ingress and Egress:
      a. Two doors for ingress and egress for each field office unit, each with landing, stairs, and railing complying with building codes and other Laws and Regulations in effect at the Site.
      b. Landing and stairs shall have slip-resistant walking surfaces, and be metal, pressure-treated wood, fiberglass, or concrete.
      c. Railing shall be metal, wood, or fiberglass.
      d. Door Security:
         1) Doors shall be secure and lockable.
         2) Furnish each door with suitable, lockable security bar. Security bar shall be Master Lock 265DCCSEN Dual-Function Security Bar, or equal.
   7. Windows:
      a. Window area equal to not less than ten percent of floor area.
      b. Windows shall each have insect screen and operable sash.
      c. Provide each window with lock and exterior security bars approved by ENGINEER.
   8. One lockable closet for storage.
   9. Keys:
      a. Furnish to ENGINEER two identical sets of keys suitable for operating all keyed locks, including ingress/egress door locks, security bars for doors, window locks, closets, and office furnishings.
      b. Permanently label each key to indicate its associated lock.
   10. Restroom:

a. Provide in field office one private restroom including one lavatory, one toilet, medicine cabinet with mirror, soap dispenser, and paper towel holder.
b. Provide each restroom with appropriate electric ventilation fan with positive discharge to location outside the field office.

11. Exterior Sign:
a. Field office identifying exterior sign, approved by ENGINEER. Sign shall be durable, weatherproof, suitable for long-term exposure to sunlight.
b. Exterior sign shall be not less than 1.5 feet high by four feet wide, installed at location determined in field and acceptable to ENGINEER.
c. Sign shall be in color, as presented in the layout below.
d. Sign layout and general proportions shall be as presented below. Text of first line and last line shall be Arial. Text size and size of graphic shall be proportionate to the graphic below. ENGINEER will furnish graphic as JPG file for use by CONTRACTOR in preparing the sign.

C. Field Office Optional Construction:
1. Provide mobile office trailer in first-class condition approved by ENGINEER, specifically designed for use as construction field office and complying with requirements of this Section.
2. Provide skirting around perimeter of each mobile field office trailer.
3. Supplier: Provide field office by one of the following:
a. Pac-Van, Inc.
b. Modular Space Corporation (ModSpace).
c. Williams Scotsman, Inc.
d. Or equal.

2.2 FIELD OFFICE UTILITIES

A. Comply with Section 01 51 05, Temporary Utilities.

B. Provide the following for the ENGINEER's field office:
1. Electrical System and Lighting:
a. Electric service as required, including paying all costs. Provide electrical submeter if electrical service is obtained from OWNER's system.

b. Interior lighting of not less than 50 foot-candles at desktop height.
c. Minimum of eight 120-volt, wall-mounted, duplex convenience electrical receptacles.
d. Exterior, wall-mounted lighting at each entrance to field office, not less than 250 watts each.

2. Heating, Ventilating, and Air Conditioning System:
   a. Provide automatic heating to maintain indoor temperature in field office of not less than 65 degrees F in cold weather. Furnish all fuel and pay all utility costs.
   b. Automatic cooling to maintain indoor temperature in field office of not warmer than 75 degrees F in warm weather.
3. Water and Sewerage:
   a. Provide potable water service for each plumbing fixture associated with field office.
   b. Provide sanitary sewerage for each lavatory/sink and toilet.
   c. Utility Connections – General:
      1) Comply with Laws and Regulations, including plumbing and sewer codes, and requirements of authorities having jurisdiction.
      2) Protect plumbing from freezing.
   c. Potable Water Service: Provide the following:
      1) Type K copper waterline from potable water main to each plumbing fixture.
      2) Reduced pressure zone (RPZ)-type backflow preventer in accordance with Laws and Regulations and requirements of authorities having jurisdiction.
      3) Provide 15-gallon electric hot water tank or tankless hot water heater, and hot water piping to serve each lavatory/sink in field office.
      4) Not less than one exterior hose bibb, with not less than 50 feet of hose, located adjacent to field office sidewalk or walkway, near field office ingress/egress doors. Provide wall-mounted hose reel or hose caddy.
      5) Before placing potable water system into service, disinfect piping and appurtenances in accordance with Laws and Regulations.
   d. Sanitary Sewerage:
      1) Provide PVC or other appropriate piping, arranged in accordance with Laws and Regulations, to convey wastewater from field office to sanitary sewer that discharges to a permitted wastewater treatment facility, or to holding tank provided by CONTRACTOR.
      2) When holding tank is provided, also provide pumping and disposal of holding tank contents at appropriate, regular intervals.
4. Telephone Service:
   a. Land Lines: provide upon request of ENGINEER.
      1) Private telephone service for ENGINEER's sole use, including payment of installation, monthly, and service costs.
      2) Pay for unlimited local and domestic long distance service for duration of the Project.

b. Cellular Telephones and Service: ENGINEER will provide cellular telephones and service for ENGINEER's employees assigned to the field office.

5. Internet Access:
   a. Obtain and pay for Internet service until removal of the field office, with unlimited (untimed) Internet access, for ENGINEER's sole use.
   b. Set up system and appurtenances required and verify functionality in the field office.
   c. Internet service shall be one of the following, listed in order of preference; provide a lower type of access only when the next-higher level is unavailable:
      1) Fiber-optic or Cable Provider Service:
         a) Provide service via communication service provider via either cable or fiber-optic service at download speed of not less than 15 megabytes per second (Mbps) and upload speed of not less than 1 Mbps.
         b) Provide appropriate modem, cabling, and appurtenances. Provide a wireless router, to be configured and set up by the ENGINEER, for field office laptops and for use by visitors.
      2) DSL:
         a) Provide service via symmetrical digital subscriber line with download speed of not less than 1.5 Mbps and upload speed of not less than 384 kilobits per second (Kbps).
         b) Provide dedicated telephone line for Internet access.
         c) Provide DSL filters on each non-DSL outlet in the field office telephone system.
      3) Mobile Broadband Wireless:
         a) Provide mobile broadband wireless 4G network by AT&T, Verizon, Sprint, T-Mobile, or equal, with download speed of not less than 37 Mbps and upload speed of not less than 17 Mbps.
         a) Provide mobile broadband wireless router. Product and Manufacturer: Linksys Wireless-G Router for Mobile Broadband, or equal.
         b) Mobile broadband air-card for field office. Product and Manufacturer: Sierra Wireless 597E, Novatel Merlin EX720, or equal.
         c) Router and air-card will remain CONTRACTOR's property upon removal of field office from the Site.
      4) Satellite:
         a) Provide 4G network service with download speed of not less than 12 Mbps.
         b) Provide required equipment, including outdoor unit (dish) and indoor satellite modem equipment, together with required cabling.
         c) Provide telephone modem in computer, together with telephone line and service, for file uploading.

C. Should actions of utility companies delay the complete set up of field office, CONTRACTOR shall provide temporary electricity, heat, water supply, sanitary facilities, and telephone service as required at no additional cost to OWNER.

2.3 FURNISHINGS AND EQUIPMENT

A. Provide the following furnishings and equipment:
   1. Desks: Two 5-drawer desks, each with desktop surface five feet long by 2.5 feet wide with not less than one file drawer per desk, suitable for storing 8.5-inch by 11-inch documents.
   2. Desk Chairs: Two new or used (in good condition) five-point, high backed, cushioned swivel chairs with seat-height adjustment.
   3. Other Chairs: Four side chairs with arm rests and padded seats and backs, and eight metal folding chairs without arm rests.
   4. Two new or used (in good condition) folding tables each eight feet long by 2.5 feet wide.
   5. Two new or used (in good condition) folding tables each four feet long by 2.5 feet wide.
   6. Plan rack(s) to hold not less than eight sets of the Drawings.
   7. Two 4-drawer file cabinets.
   8. One 2-door storage cabinet.
   9. Shelving or bookcase with a total of 12 feet of shelf length and not less than 12 inches deep.
   10. Four polyethylene waste baskets, each with capacity of not less than seven gallons.
   11. Suitable doormat at each exterior ingress/egress door.
   12. Two cork tack-boards, each 2.5 feet by three feet, with thumbtacks.
   13. One white board for use with dry markers, approximately six feet by four feet, with marker holding tray, installed by CONTRACTOR at location directed by ENGINEER in the field office. Furnish supply of colored markers and eraser for the white board.
   14. Safety Equipment: Provide the following:
      a. Fire extinguishers with associated signage.
      b. Smoke detector with supply of batteries.
      c. Carbon monoxide detector with power supply.
      d. Provide in accordance with Laws and Regulations. For each field office structure, provide not less than two wall-mounted fire extinguishers, one battery-operated ceiling-mounted smoke detector, and one carbon monoxide detector suitably installed.
   15. First-Aid Station:
      a. In addition to first-aid stations otherwise required by the Contract Documents, provide for ENGINEER's sole use a first-aid station in ENGINEER's field office.
      b. Product and Manufacturer: Zee Medical USA, Item 0152, "Medium Four-Shelf Plastic Cabinet", www.zeemedical.com; or equal.
   16. Temperature and Humidity Monitor:
      a. Sensor installed outdoors in shade, display installed inside field office.

b. Unit shall display daily minimum and maximum temperature and current temperature, and be capable of displaying daily minimum and maximum relative humidity and current relative humidity, and have audible alarm and adjustable alarm setpoints.
c. Manufacturer and Product: Provide Fisher Scientific "Traceable Remote Alarm RH/Temperature Monitor" Catalog No. 14-649-84; or equal.
d. Provide batteries for unit as required.

17. Personal Protective Equipment for Visitors: Furnish the following:
    a. Protective Helmets (Hard Hats): Four, each with full brim, of fiberglass or thermoplastic; each with ratchet suspension; white in color.
    b. Safety Glasses: Four, each with clear lenses, polycarbonate, anti-fog and anti-scratch coating, suitable to fit over personal eyewear.
    c. Reflective Safety Vest: Four, each of polyester mesh or other material acceptable to ENGINEER, color to be high-visibility orange, with one-inch-wide reflective tape, one-size-fits-all design.
    d. Earplugs: Supply of foam, disposable earplugs. Promptly resupply when stock is depleted.
18. Two electric clocks.
19. One electric coffee maker, with ten-cup capacity or larger.
20. Bottled water with electric cooler dispenser for five-gallon bottles, with cup dispenser.
21. Telephone System:
    a. Telephone System Features:
        1) Provide one cordless telephone with hands-free speaker.
        2) Telephone shall have speed dialing with minimum of 20 programmable numbers, volume control, mute, redial, and hold button.
    b. Provide one digital telephone answering machine
22. Computer System:
    a. Computer: ENGINEER will furnish computers and software required for ENGINEER's personnel assigned to the field office.
    b. Printer/Copier/Scanner:
        1) System Description: Provide one inkjet printer/copier/scanner with color printing capability.
        2) Manufacturer and Model: Provide one of the following:
            a) Brother Printer MFC J5720DW Wireless Color Inkjet All-in-One Printer.
            b) Canon PIXMA iX6820 Inkjet Business Printer.
            c) Or equal.
        3) Sheet Size: Capable of printing 8.5-inch by 11-inch, 8.5-inch by 14-inch, and 11-inch by 17-inch sheets.
        4) Printing Speed: 20 pages per minute (black and white), 18 pages per minute (color).
        5) Scanning: Capable of scanning to PDF and JPG files, selectable by the user.

6) Ink Cartridges: Provide all cartridges required for full-color printing, and promptly replace cartridges as needed throughout the Project.

c. Computer system shall have not less than one USB port beyond those required for specified equipment, including printer, mouse, and digital camera. Provide additional external USB bus when necessary.

d. Wireless Router:
   1) Provide wireless router to be configured by ENGINEER.
   2) Router capacity shall be not less than 54 Bbps.
   3) Manufacturer: Router shall be Linksys, or equal.

23. Copier: Furnished under the "Computer System" paragraph, above.
24. Digital Camera: ENGINEER will furnish digital camera for ENGINEER's field office.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install field office and related facilities in accordance with Laws and Regulations.

B. Install materials and equipment, including prefabricated structures, in accordance with manufacturer's instructions, and to provide optimal performance and accuracy.

3.2 CLEANING, MAINTENANCE, AND SUPPLIES

A. Furnish the following maintenance services:
   1. Immediately repair malfunctioning, damaged, leaking, or defective field office structure, site improvements, systems, and equipment.
   2. Provide computer supplies and pay for maintenance on CONTRACTOR-furnished computer system and copier.
   3. Promptly provide snow and ice removal for ENGINEER's field office, including parking area, walkways, and stairs and landings.
   4. Provide continuous maintenance and janitorial service of field office and sanitary facilities. Clean field office not less than once per week Sweep or vacuum field office not less than daily, or more-frequently when site conditions are such that dirt or mud is frequently tracked into field office. Clean and wax (as appropriate) flooring every six months.
   5. Waste Disposal:
      a. Properly dispose of trash and waste as needed, not less than twice per week.
      b. Properly handle and dispose of recyclables. Do not dispose of recyclables as trash.
      c. Dispose of other waste, if any, as required, to avoid creation of nuisances and adverse environmental effects. Properly dispose of electronic waste, when necessary, at proper waste receiving facility.

B. Consumables: Provide the following consumables as needed:

1. Toner and ink cartridges for printers and copier, as required.
2. Paper supplies for printer and copier. Always maintain in field office not less than one ream of each size of paper for which printer and copier are capable.
3. Dry markers in six colors and white board eraser set. Replace markers when exhausted or lost.
4. Bottled water suitable for water dispenser and disposable cups.
5. Coffee supplies, including coffee, filters, cups, sugar, creamer, and stir-sticks.
6. Hand-soap, paper towels, toilet paper, cleansers, and janitorial implements, including broom.
7. Batteries for smoke detector and other battery-powered items furnished by CONTRACTOR.
8. Replace fire extinguishers upon expiration.
9. Not less-often than monthly, inspect first-aid kit and inventory items consumed or used and remove items that are at or near their expiration date. Promptly replace and restock consumed and expired items.

3.3 REMOVAL

A. Remove field office and furnishings when directed by ENGINEER, prior to inspection for final completion. Deliver specified equipment to OWNER.

+ + END OF SECTION + +

SECTION 01 52 13

CONTRACTOR'S FIELD OFFICE AND SHEDS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide a temporary field office for CONTRACTOR's use with not less than the minimum facilities specified.
   2. Provide required temporary storage and work sheds.
   3. Obtain and pay for required permits and utilities. Field offices and sheds shall comply with Laws and Regulations.

B. Coordination:
   1. Coordinate with OWNER, facility manager, other contractors, and others using the Site the location of field offices and sheds, including contracts indicated in Section 01 11 13, Summary of Work.

C. Location:
   1. Locate field offices and sheds in accordance with the Contract Documents and in accordance with the Site mobilization discussions at the preconstruction conference.

D. Furnish in CONTRACTOR's field office one complete set of the Contract Documents for ready reference by interested persons. In addition to the reference set, comply with Section 01 78 39, Project Record Documents and related provisions of the General Conditions, as may be modified by the Supplementary Conditions.

PART 2 – PRODUCTS

2.1 FIELD OFFICE AND SHEDS – FURNISHINGS, AND EQUIPMENT

A. Contractor's Field Office and Furnishings:
   1. Construction: As required by CONTRACTOR and sufficient for Project meetings.
   2. Utilities and Services: Provide the following:
      a. Telephone service.
      b. Computer network and related facilities as required for CONTRACTOR's needs.
      c. Utilities and related facilities for lighting and maintaining temperature, in accordance with Section 01 52 11, Engineer's Field Office.

3. Furnishings:
    a. Conference Facilities: CONTRACTOR shall provide conference area with conference table and chairs sufficient for 20 people. Conference facilities and furnishings shall be provided with suitable utilities, lighting, ventilation, and temperature controls prior to the first progress meeting, unless otherwise approved by ENGINEER.
    b. Other furnishings required by CONTRACTOR.
4. Provide on field office's exterior an identification sign displaying CONTRACTOR's company name. Maximum size of sign shall be four feet by eight feet. Sign shall be suitable for outdoor use for the duration of the Project.
5. Furnish and maintain at CONTRACTOR's field office 12 protective helmets ('hard hats") for use by visitors to the Site.

B. Contractor's Storage and Work Sheds:
1. Provide storage and work sheds sized, furnished, and equipped to accommodate personnel, materials, and equipment involved in the Work, including temporary utility services and facilities required for environmental controls sufficient for personnel, materials, and equipment.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation:
1. Install CONTRACTOR's temporary field offices, sheds, and related facilities in accordance with Laws and Regulations.
2. Install materials and equipment, including prefabricated structures, in accordance with manufacturer's instructions.

3.2 MAINTENANCE AND REMOVAL

A. Maintenance:
1. Clean and maintain field offices and sheds as required.
2. Provide consumables as required.

B. Removal:
1. Do not remove temporary field offices and sheds until after Substantial Completion of the entire Work, unless otherwise approved by ENGINEER.
2. Remove field offices and sheds and restore areas prior to final inspection.

+ + END OF SECTION + +

SECTION 01 57 05

TEMPORARY CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide and maintain methods, materials, equipment, and temporary construction as required for controlling environmental conditions at the Site and adjacent areas during construction.
   2. Maintain controls until no longer required. Provide temporary controls at all times when CONTRACTOR is working at the Site.
   3. Temporary controls include, but are not limited to, the following:
      a. Erosion and sediment controls.
      b. Noise controls.
      c. Dust controls.
      d. Pest and rodent controls.
      e. Control of water, including storm water runoff.
      f. Pollution controls.

B. Related Sections:
   1. Section 01 35 43.13, Environmental Procedures for Hazardous Materials.
   2. Section 01 35 44, Spill Prevention Control and Countermeasures Plan.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions and recommendations of the following:
   1. Rhode Island Department of Environmental Management RIPDES Program

1.3 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Plan for construction staging and maintenance of the Site relative to erosion and sediment controls. Indicate on a site plan approximate areas of planned work during the Project. For areas not indicated in the Contract Documents as being disturbed and that CONTRACTOR proposes to disturb, Shop Drawing shall include proposed erosion and sediment control measures for the additional area.
   2. Product Data:
      a. Silt fencing materials.

B. Informational Submittals: Submit the following:

1. Procedural Submittals:
    a. Proposed dust control measures, when submittal is requested by ENGINEER.

PART 2 – PRODUCTS

2.1 MATERIALS FOR TEMPORARY EROSION AND SEDIMENT CONTROLS

A. General:
1. Materials utilized for temporary erosion and sediment controls shall be in accordance with the applicable regulatory requirements indicated in Article 1.2 of this Section, unless otherwise shown or indicated in the Contract Documents.

B. Silt Fencing:
1. Filter Cloth:
    a. Products and Manufacturers: Provide one of the following:
        1) Contech “Silt Fence”.
        2) Hanes Geo Components “Silt Fence”.
        3) Atlantic Construction Fabrics (ACF) Environmental “Silt Fence”.
        4) Or equal.
    b. Height: Two feet, minimum.
    c. Securely fasten filter cloth to wire mesh using ties spaced at maximum intervals of two feet on centers at top and mid-height of wire mesh.
2. Wire Mesh: Support filter cloth with wire mesh complying with the following:
    a. Woven wire mesh, 14-gauge steel wire, maximum mesh size six-inch by six-inch.
    b. Height: To match filter cloth height.
    c. Fasten wire mesh to fence supports with wire ties or staples.
3. Fence Support Posts:
    a. Length: Not less than three feet.
    a. Material: Metal or other acceptable material with "U", “T”, or "I" cross section, or hardwood measuring not less than 1.25-inch by 1.25-inch in cross-section.

C. Straw Bale Dike.
1. Bales shall be firmly-packed, unrotted straw bound firmly with baling wire. Cross-sectional area on the small end of each bale shall be approximately 12 inches by 12 inches or larger.
2. Posts shall comply with requirements for silt fencing support posts, or may be suitable reinforcing steel rods.

D. Mulch Materials and Soil Stabilization.
1. Mulch shall be unrotted straw or salt hay.

2. Soil stabilization emulsions, when used, shall be an inert, eco-friendly chemical manufactured for the specific purpose of erosion control and soil stabilization, applied with mulch or stabilization fibers.
3. Wood-fiber or paper-fiber, when used, shall be 100 percent natural and biodegradable.
4. Erosion control mat or netting shall be biodegradable. Acceptable materials include jute, excelsior, straw or coconut fiber, and cotton.

E. Protection of Storm Water Drainage Inlets and Catch Basins:
   1. Inlet Filter Bag:
      a. Product and Manufacturer: Provide one of the following for each drainage inlet or catch basin to be protected:
         1) Atlantic Construction Fabrics (ACF) Environmental, “Silt Sack”.
         2) Mutual Industries, Inc. “Silt Sack”.
         3) Or equal.
      b. Inlet filter bag permeability shall be not less than 40 gallons per square foot of bag area exposed to the flow. Fabric shall be woven polypropylene with double stitching to prevent bursting.
      c. Inlet filter bags shall:
         1) Fit inside the drainage inlet or catch basin and shall be secured by the structure's grate or by other acceptable means.
         2) Have means of removing inlet filter bag and the silt and sediment collected therein without dumping filter bag's contents into the drainage inlet or catch basin.

PART 3 – EXECUTION

3.1 NOISE CONTROL

A. Noise Control – General:
   1. CONTRACTOR’s vehicles and equipment shall minimize noise emissions to greatest degree practicable. When necessary, provide mufflers and silencers on construction equipment, and provide temporary sound barriers onsite when necessary.
   2. Noise levels shall comply with Laws and Regulations, including OSHA requirements and local ordinances.
   3. Noise emissions shall not interfere with the work of OWNER, facility manager, or others.

3.2 DUST CONTROL

A. Dust Control – General:
   1. Control objectionable dust caused by CONTRACTOR's operation of vehicles and equipment, clearing, demolition, cleaning, and other actions. To minimize airborne dust, apply water or use other methods subject to acceptance of ENGINEER and approval of authorities having jurisdiction.

2. CONTRACTOR shall prevent blowing and movement of dust from exposed soil surfaces and access roads to reduce onsite and off-Site damage, nuisances, and health hazards associated with dust emissions.

B. Dust Control Methods:
   1. Dust control may be achieved by irrigation in which the dust-prone area of the Site shall be sprinkled with water until the surface is moist.
   2. Apply dust controls as frequently as required without creating nuisances such as excessive mud and ponding of water at the Site. Do not use water for dust control when water will cause hazardous or objectionable conditions such as ice, mud, ponds, and pollution.
   3. Provide dust control that is non-polluting and does not contribute to tracking-out of dirt and dust onto pavement.

C. Removal of Dust and Dirt from Travelled Surfaces:
   1. Remove dust and dirt from roadways, drives, parking areas, and other travelled surfaces not less than the frequency indicated in Section 01 74 05, Cleaning.
   2. Perform dust and dirt removals from travelled surfaces by mechanical sweeping or other method acceptable to ENGINEER.

3.3 PEST AND RODENT CONTROL

A. Pest and Rodent Control – General:
   1. Provide pest and rodent controls as required to prevent infestation of the Site and storage areas.
   2. Employ methods and use materials that do not adversely affect conditions at the Site or on adjoining properties.
   3. In accordance with Laws and Regulations, promptly and properly dispose of pests and rodents trapped or otherwise controlled.

3.4 WATER CONTROL

A. Water Control – General:
   1. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the Site, and adjoining properties.
   2. Control fill, grading, and ditching to direct water away from excavations, pits, tunnels and other construction areas and to direct drainage to proper runoff courses to prevent erosion, damage, or nuisance. Avoid directing to adjoining properties runoff from the Site and construction operations.

B. Equipment and Facilities for Water Control:
   1. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

C. Discharge and Disposal:

1. Dispose of storm water and ground water in manner to prevent flooding, erosion, and other damage to any and all parts of the Site and adjoining areas, and that complies with Laws and Regulations.

3.5 POLLUTION CONTROL

A. Pollution Control – General:
   1. Provide means, methods, and facilities required to prevent contamination of soil, water, and atmosphere caused by discharge of noxious substances from or caused by construction operations.
   2. Equipment used during construction shall comply with Laws and Regulations.
   3. Comply with Section 01 35 43.13, Environmental Procedures for Hazardous Materials.

B. Spills and Contamination:
   1. Provide equipment and personnel to perform emergency measures required to contain spills and to remove contaminated soils and liquids.
   2. Excavate contaminated material and properly dispose of off-Site, and replace with suitable compacted fill and topsoil.
   3. Comply with Section 01 35 44, Spill Prevention Control and Countermeasures Plan, and OWNER's and facility manager's hazard control procedures as indicated in Section 01 35 23, Safety Requirements.

C. Protection of Surface Waters and Ground Water:
   1. Provide and maintain special measures to prevent harmful substances from entering surface waters and ground water. Prevent disposal of wastes, effluents, chemicals, and other such substances in or adjacent to surface waters and open drainage routes, in sanitary sewers, or in storm sewers, and in ground water.

D. Atmospheric Pollutants:
   1. Provide and maintain systems for controlling atmospheric pollutants related to the Work.
   2. Prevent toxic concentrations of chemicals and vapors.
   3. Prevent harmful dispersal of pollutants into atmosphere.

E. Solid Waste:
   1. Provide and maintain systems for controlling and managing solid waste related to the Work.
   2. Prevent solid waste from becoming airborne, and from discharging to surface waters and drainage routes.
   3. Properly handle and dispose of solid waste.
   4. Comply with requirements for cleaning and disposal of debris in the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 74 05, Cleaning.

3.6 EROSION AND SEDIMENT CONTROLS

A. Installation and Maintenance of Erosion and Sediment Controls – General:
   1. General:
      a. Provide temporary erosion and sediment controls as shown and indicated on the Drawings and as indicated elsewhere in the Contract Documents. Provide erosion and sediment controls as the Work progresses into previously-undisturbed areas.
      b. Installation of erosion and sediment controls shall be in accordance with the applicable regulatory requirements indicated in Article 1.2 of this Section, unless more-stringent methods are otherwise shown or indicated in the Contract Documents.
      c. Use necessary methods to successfully control erosion and sedimentation, including ecology-oriented construction practices, vegetative measures, and mechanical controls. Use best management practices (BMP) in accordance with Laws and Regulations, and regulatory requirements indicated in Article 1.2 of this Section, to control erosion and sedimentation during the Project.
      d. Plan and execute construction, disturbances of soils and soil cover, and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation. Provide temporary measures for controlling erosion and sedimentation, as indicated in the Contract Documents and as required for the Project.
      e. Where areas must be cleared for storage of materials or equipment, or for temporary facilities, provide measures for regulating drainage and controlling erosion and sedimentation, subject to the ENGINEER'S approval.
      f. Provide erosion and sediment controls, including stabilization of soils, at the end of each workday.
   2. Coordination:
      a. Coordinate erosion and sediment controls with this Section's requirements on water control, and with Section 01 41 26, Storm Water Pollution Prevention Plan and Permit.
      b. Coordinate temporary erosion and sediment controls with construction of permanent drainage facilities and other Work to the extent necessary for economical, effective, and continuous erosion and sediment controls.
   3. Before commencing activities that will disturb soil or soil cover at the Site, provide all erosion and sediment control measures required by the Contract Documents for the areas where soil or soil cover will be disturbed.
   4. In general, implement construction procedures associated with, or that may affect, erosion and sediment control to ensure minimum damage to the environment during construction. CONTRACTOR shall implement any and all additional measures required to comply with Laws and Regulations, and Section 01 41 26, Storm Water Pollution Prevention Plan and Permit.

5. Vegetation Removal: Remove only those shrubs, grasses, and other vegetation that must be removed for construction. Protect remaining vegetation.
6. Access Roads and Parking Areas: When possible, access roads and temporary roads and parking shall be located and constructed to avoid adverse effects on the environment. Provide measures to regulate drainage, avoid erosion and sedimentation, and minimize damage to vegetation.
7. Earthwork and Temporary Controls:
    a. Control erosion to minimize transport of silt from the Site into existing waterways and surface waters. Such measures shall include, but are not limited to, using berms, silt fencing, baled straw silt barriers, gravel or crushed stone, mulching and soil stabilization, slope drains, and other methods. Apply such temporary measures to erodible materials exposed by activities associated with the construction of the Project.
    b. Hold to a minimum the areas of bare soil exposed at one time.
    c. Construct fills and waste areas by selectively placing fill and waste materials to eliminate surface silts and clays that will erode.
    d. In performing earthwork, eliminate depressions that could serve as mosquito breeding pools.
    e. CONTRACTOR shall provide special care in areas with steep slopes, where disturbance of vegetation shall be minimized to maintain soil stability.
8. Inspection and Maintenance:
    a. Periodically inspect areas of earthwork and areas where soil or soil cover are disturbed to detect evidence of the start of erosion and sedimentation; promptly implement corrective measures as required to control erosion and sedimentation. Continue inspections and corrective measures until soils are permanently stabilized and permanent vegetation has been established
    b. Inspect not less often than the frequency indicated in Section 01 41 26, Storm Water Pollution Prevention Plan and Permit.
    c. Repair or replace damaged erosion and sediment controls within 24 hours of CONTRACTOR becoming aware of such damage.
    d. Periodically remove silt and sediment that has accumulated in or behind sediment and erosion controls. Properly dispose of silt and sediment.
9. Duration of Erosion and Sediment Controls:
    a. Maintain erosion and sediment controls in effective working condition until the associated drainage area has been permanently stabilized.
    b. Maintain erosion and sediment controls until the Site is restored and site improvements including landscaping, if any, are complete with underlying soils permanently stabilized.
10. Work Stoppage:
    a. If the Work is temporarily stopped or suspended for any reason, CONTRACTOR shall provide additional temporary controls necessary to prevent environmental damage to the Site and adjacent areas while the Work is stopped or suspended.
11. Failure to Provide Adequate Controls:

a. In the event CONTRACTOR repeatedly fails to satisfactorily control erosion and sedimentation, OWNER reserves the right to employ outside assistance or to use OWNER's own forces for erosion and sediment control.
b. Cost of such work by OWNER, plus engineering and inspection costs, will be deducted from amounts due CONTRACTOR, as set-offs in accordance with the Contract Documents.

B. Erosion and Sediment Control Permit:
1. Obtain erosion and sediment control permits as required by local and federal authorities.

C. Silt Fencing:
1. Install and maintain silt fencing in a vertical plane, at the location(s) shown or indicated in the Contract Documents and where required.
2. Locations of Silt Fencing:
a. Where possible, install silt fencing along contour lines so that each given run of silt fencing is at the same elevation.
b. On slopes, install silt fencing at intervals that do not exceed the maximum intervals indicated in the following table:

Slope (percent)	Maximum Length of Slope Above Each Silt Fence (feet)
2 and less	150
2.1 to 5	100
5.1 to 10	50
10.1 to 20	25
20.1 to 25	20
25.1 to 40	15
40.1 to 50	10

c. Provide silt fencing around perimeter of each stockpile of topsoil, general fill material, and excavated material. Install silt fencing before expected precipitation and maintain until stockpile is removed.
d. Do not install silt fencing at the following types of locations:
1) Area of concentrated storm water flows such as ditches, swales, or channels.
2) Where rock or rocky soils prevent full and uniform anchoring of silt fencing.
3) Across upstream or discharge ends of storm water piping or culverts.
3. Installation:
a. Securely fasten wire mesh to posts, and securely fasten filter cloth to wire mesh.
b. When two sections of filter cloth abut each other, fold over edges and overlap by not less than six inches and securely fasten to wire mesh.
c. Embed posts in the ground to the depth necessary for proper controls; embed posts to not less than 16 inches below ground.

d. Filter cloth and wire mesh shall extend not less than eight inches below ground and not less than 16 inches above ground.
e. Remove sediment accumulated at silt fencing as required. Repair and reinstall silt fencing as required.

4. Maintenance:
a. Do not allow formation of concentrated storm water flows on slopes above silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated storm water flows occur, stabilize the slope via earthmoving and other stabilization measures as required to prevent flow of concentrated storm water flows toward silt fencing.

D. Straw Bale Dike.
1. Install straw bale dikes where shown or indicated, including in swales, along contours, and along toe of slopes.
2. Install straw bales in shallow excavation as wide as the bale and approximately four to six inches below surrounding grade.
3. Ends of straw bales shall tightly abut ends of adjacent straw bales.
4. Securely install straw bales using two support posts per straw bale, driven into the ground not less than 1.5 to two feet below bottom of straw bale. Top of post shall be flush with top of straw bale. Angle first post for each straw bale toward the previously-installed straw bale.
5. Frequently inspect straw bales and repair or replace as required. Remove accumulated silt and debris from behind straw bales.

E. Mulching and Soil Stabilization:
1. Use mulching to temporarily stabilize exposed soil and fill material.
a. Immediately following final grading, provide mulch and stabilize with mats or netting, or sprayed soil stabilization emulsion with fiber additive.
b. Application of mulching for soil stabilization shall be as follows.
1) Unrotted Straw or Salt Hay: 1.5 to two tons per acre.
2) Soil stabilization emulsions, when used, shall be applied in accordance with manufacturer's instructions, and shall be applied with mulch or stabilization fibers.
3) Wood-fiber or Paper-fiber Application: 1,500 lbs. per acre, installed by hydroseeding.
c. Where mats or netting are used:
1) Cover entire area to be stabilized with mats or netting.
2) Provide anchoring trenches at the top and bottom of slopes to receive mats or netting. Bury at least the top and bottom ends of mat or netting, four inches or more wide, at top and bottom of slope. Tamp trench full of soil. Four inches from trench, secure mat or netting with appropriate staples spaced at intervals of 10 inches.
3) Overlap adjacent strips of mat or netting by not less than four inches.

F. Protection of Storm Water Drainage Inlets and Catch Basins:

1. Protect each drainage inlet and catch basin that has the potential to receive storm water runoff from exposed soils, and does not discharge into a storm water settlement basin.
2. Install inlet filter bags inside of drainage inlet or catch basin in accordance with manufacturer's instructions. Secure inlet filter bag with the structure's grate or by other acceptable means.
3. Inlet filter bags shall not pose any obstruction above the pre-construction elevation of the drainage inlet or catch basin grate requiring barricades or flashers.
4. When removing silt and sediment from inlet filter bag, do not dump filter bag's contents into the drainage inlet or catch basin.
5. Remove silt and sediment from inlet filter bag, or replace inlet filter bag, when inlet filter bag is not more than half full.

G. Filter Bag on Dewatering Pump Discharge:
1. Provide dewatering of excavations in compliance with Division 31 Sections on earthmoving, excavation, and fill.
2. Locate filter bags and temporary pump discharge lines to avoid interfering with the public, use of private property, and OWNER's and facility manager’s operations. Relocate filter bags and appurtenances when required.
3. Filter bag discharge shall be directed to appropriate storm water drainage route. Do not discharge into roadways, driveways, access roads, parking areas, or overland. When temporary settlement basin is used, locate filter bags to discharge to temporary settlement basin when practicable.
4. Provide filter bag on discharge of each dewatering pump drawing from an excavation.
5. Securely attach filter bag to pump discharge pipe or hose.
6. Maintain, clean out, and replace filter bags as required.

3.7 REMOVAL OF TEMPORARY CONTROLS

A. Removals – General:
1. Upon completion of the Work, remove temporary controls and restore Site to specified condition; if condition is not specified, restore Site to pre-construction condition.
2. After soils are permanently stabilized, remove from the Site temporary erosion and sediment controls.

+ + END OF SECTION + +

SECTION 01 57 33

SECURITY

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes general requirements for security at the Site, including accessing the Site, securing the Work, temporary fencing, and other requirements.
   2. CONTRACTOR shall safely guard all the Work, the Project, materials, equipment, and property from loss, theft, damage, and vandalism until Substantial Completion, unless otherwise agreed upon by the parties.
   3. CONTRACTOR's duty includes safely guarding OWNER's property in vicinity of the Work and Project, and other private property in the vicinity of the Project from injury and loss in connection with performance of the Project.
   4. Costs for security required under this Section shall be paid by CONTRACTOR.
   5. Make no claim against OWNER for damage resulting from trespass.
   6. Remedy damage to property of OWNER and others arising from failure to furnish adequate security.
   7. Provide temporary fencing in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Temporary Fencing: Submit site plan drawings showing proposed locations and extent of temporary site security fencing and each breach therein.
   2. Product Data:
      a. Temporary Fencing: Manufacturer's literature, specifications, and installation instructions for temporary site security fencing proposed.

B. Informational Submittals: Submit the following:
   1. Employee Information: Submit to OWNER the following; do not submit to ENGINEER:
      a. Updated listing of personnel to whom identification badges have been issued. Submit updated listing within 24 hours of a change in the list or change in an employee's Site access status.

1.3 CONTRACTOR'S SITE ACCESS AND SECURITY PROCEDURES

A. Comply with Section 01 11 13, Summary of Work and Section 01 14 19, Use of Site for site access and site use restrictions.

B. Comply with OWNER's security procedures and access restrictions at the Site throughout the Project. Comply with the following:
   1. Personnel Identification:
      a. All CONTRACTOR personnel, including Subcontractors, Suppliers, and others associated with the Project shall wear, in a visible location, at all times at the Site a durable, waterproof badge with wearer's photograph, name, signature, and, as applicable employee number; CONTRACTOR's name; employer (if other than CONTRACTOR), and Project name.
   2. General Provisions Regarding Personnel Identification:
      a. Prerequisites to Issuance of Personnel Identification Badges:
         1) Do not issue personnel identification badge until the person receiving the badge is documented by CONTRACTOR as:
            a) Being eligible to perform work in the jurisdiction where the Project is located.
            b) Has received all required safety instructions, training, and equipment.
            c) Is known to CONTRACTOR as being qualified to perform the Work to which the person will be assigned.
      b. Listing of Personnel to Whom Badges are Issued:
         1) Maintain and continuously update a listing or log of all personnel to whom personnel identification badges have been issued.
         2) Listing or log shall indicate each person's full name, home address, personal telephone number, employer name, and employer address and telephone number.
         3) Submit copy of listing or to OWNER in accordance with Article 1.2 of this Section.
   3. Vehicle Identification:
      a. While on-Site, all CONTRACTOR vehicles, including employee vehicles, shall display vehicle identification tag in clearly visible location on dashboard.
      b. Vehicle tag shall be issued by the CONTRACTOR.
      c. Vehicle tag shall include the following information: Site name, CONTRACTOR name, contract designation, vehicle license plate number and state of registration, name and employer of vehicle owner, and vehicle owner contact telephone number.
   4. Parking:
      a. Do not park outside of designated CONTRACTOR parking area, which will be designated by the OWNER and ENGINEER. Prepare and maintain parking area as required.
      b. Personal vehicles are not allowed outside the contractor parking area.

PART 2 – PRODUCTS

2.1 TEMPORARY FENCING

A. When security fencing or barriers are breached or temporarily removed for the Project, provide and maintain temporary security fencing equal to existing, unless otherwise specified, in manner satisfactory to ENGINEER and OWNER.

PART 3 – EXECUTION

3.1 TEMPORARY FENCING

A. Installation:
   1. Provide temporary fencing for site security so that integrity of site security is maintained throughout the Project.
   2. Install temporary fencing used for site security in accordance with the Contract Documents and fence manufacturer's instructions.

B. Maintenance:
   1. Maintain temporary fencing throughout the Project.
   2. Repair damage to temporary fencing and replace fencing when required to preserve Site security.

C. Removal:
   1. Remove temporary fencing when permanent site security fencing is in place and fully functional, or when otherwise directed or ENGINEER.

+ + END OF SECTION + +

SECTION 01 58 00

PROJECT IDENTIFICATION AND SIGNS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall furnish, install, and maintain temporary signage for Project identification and construction site information.
   2. Temporary signs required are indicated in Part 2 of this Section.
   3. Do not display any other temporary signs, other than those specified, without prior approved of OWNER.

1.2 QUALITY ASSURANCE

A. Qualifications:
   1. Sign Painter:
      a. Shall be a professional in the type of Work required, regularly engaged in work similar to that required.

1.3 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Layout of each temporary sign, indicating layout, text, font, character size, graphics (if any), type and grade of materials, including sign board, trim, supports, and bracing.
   2. Product Data:
      a. Specifications and product data for finishes proposed for use, when requested by ENGINEER.
   3. Samples: Submit color Samples when requested by ENGINEER.

PART 2 – PRODUCTS

2.1 MATERIALS AND CONSTRUCTION

A. Performance Criteria:
   1. Temporary signs, including supports and bracing, shall withstand sustained winds of 75 miles per hour.

B. Temporary Signage Required: Provide the following temporary signs:
   1. Project Sign at Site Entrance:
      a. Sign shall be placed at the site entrance identifying the proper entrance to site.

2. Site Informational Signage:
    a. Provide temporary signage as required for construction site operations and controlling traffic at the construction site.

C. Materials:
1. Sign Board:
    a. Signs shall be 3/4-inch thick, exterior-grade plywood, unless otherwise shown or indicated.
    b. Provide signs with trim, mitered on edges.
2. Supports and Bracing:
    a. Provide supports and bracing as required to adequately support and brace temporary signs to comply with the performance criteria indicated in this Section.

D. Finishing:
1. Paint sign with exterior gloss-finish enamel, suitable for long-term exposure to sunlight without fading for the duration of the Project.

PART 3 – EXECUTION

3.1 INSTALLATION, MAINTENANCE, AND REMOVAL

A. Installation:
1. Location of signs shall be as shown or indicated on the Contract Documents, or as directed by ENGINEER. Temporary signs shall be plainly visible to vehicular traffic.
2. Install signs in a neat, professional, workmanlike manner to withstand the performance criteria indicated in this Section.

B. Maintenance:
1. Maintain temporary signage so that signs are clean, legible, and upright.
2. Cut grass, weeds, and other plants so that temporary signs are not covered or obscured.
3. Repair and repaint damaged temporary signs.
4. Relocate signs as required by progress of the Project.

C. Remove temporary signage prior to final inspection of the Work, or when directed by OWNER and/or ENGINEER.

+ + END OF SECTION + +

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes general requirements for storing and protecting materials and equipment.
   2. CONTRACTOR shall provide all labor, materials, tools, equipment, and incidentals to store and handle materials and equipment to be incorporated into the Work, and other materials and equipment at the Site.

1.2 STORAGE

A. Store and protect materials and equipment in accordance with manufacturer's recommendations and the Contract Documents.

B. General:
   1. CONTRACTOR shall make all arrangements and provisions necessary for, and pay all costs for, storing materials and equipment.
   2. Excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed to avoid injuring the Work and existing facilities and property, and so that free access is maintained at all times to all parts of the Work and to public utility installations in vicinity of the Work.
   3. Store materials and equipment neatly and compactly in locations that cause minimum inconvenience to OWNER, facility manager, other contractors, public travel, and owners, tenants, and occupants of adjoining property.
   4. Arrange storage in manner to allow easy access for inspection by ENGINEER and Resident Project Representative (RPR).

C. Storage Location:
   1. Areas available at the Site for storing materials and equipment are shown or indicated in the Contract Documents, or as acceptable to ENGINEER and Facility Manager.
   2. Restrictions:
      a. Do not store materials or equipment in structures being constructed unless approved by ENGINEER in writing.
      b. Do not use lawns or other private property for storage without written permission of the owner or other person in possession or control of such premises.

D. Protection of Stored Materials:

1. Store materials and equipment to become OWNER's property to ensure preservation of quality and fitness of the Work, including proper protection against damage by freezing, moisture, and with outdoor ambient air high temperatures as indicated on manufacturer specifications for each product; temperature and humidity inside crates, containers, storage sheds, and packaging may be significantly higher than the outdoor ambient air temperature.
2. Store in indoor, climate-controlled storage areas all materials and equipment subject to damage by moisture, humidity, heat, cold, and other elements, unless otherwise acceptable to OWNER.
3. When placing orders to Suppliers for equipment and controls containing computer chips, electronics, and solid-state devices, CONTRACTOR shall obtain, coordinate, and comply with specific temperature and humidity limitations on materials and equipment, because temperature inside cabinets and components stored in warm temperatures can approach 200 degrees F.
4. CONTRACTOR shall be fully responsible for loss or damage (including theft) to stored materials and equipment.
5. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer or otherwise specified in the Contract Documents.
6. Comply with requirements of Article 1.3 of this Section.

1.3 PROTECTION – GENERAL

A. Equipment to be incorporated into the Work shall be boxed, crated, or otherwise completely enclosed and protected during shipping, handling, and storage.

B. Store all materials and equipment off the ground (or floor) on raised supports such as skids or pallets.

C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged or marred shall be repainted in their entirety in accordance with equipment manufacturer and paint manufacturer requirements, to the satisfaction of ENGINEER.

D. Protect electrical equipment, controls, and instrumentation against moisture, water damage, humidity, heat, cold, and dust. Space heaters provided in equipment shall be connected and operating at all times until equipment is placed in operation and permanently connected.

1.4 UNCOVERED STORAGE

A. The following types of materials may be stored outdoors without cover on supports so there is no contact with the ground:
1. Reinforcing steel.
2. Precast concrete materials.
3. Structural steel.

1.5 COVERED STORAGE

A. The following materials and equipment may be stored outdoors on supports and completely covered with covering impervious to water:
   1. Grout and mortar materials.
   2. Masonry units.

B. Tie down covers with rope, and install covering properly sloped to prevent accumulation of water.

C. Store loose granular materials, with covering impervious to water, in well-drained area or on solid surfaces to prevent mixing with foreign matter.

1.6 FULLY PROTECTED STORAGE

A. Store all material and equipment not indicated in Articles 1.4 and 1.5 of this Section on supports in buildings or trailers that have concrete or wooden flooring, roof, and fully-closed walls on all sides. Covering with visquine plastic sheeting or similar material in space without floor, roof, and walls is unacceptable. Comply with the following:
   1. Provide heated storage for materials and equipment that could be damaged by low temperatures or freezing.
   2. Provide air-conditioned storage for materials and equipment that could be damaged by high temperatures or humidity.
   3. Protect mechanical and electrical equipment from being contaminated by dust, dirt, and moisture.
   4. Maintain humidity at levels recommended by manufacturers for electrical and electronic equipment.

1.7 HAZARDOUS MATERIALS AND EQUIPMENT

A. Prevent contamination of personnel, storage areas, and the Site. Comply with Laws and Regulations, manufacturer's instructions, Section 01 35 43.13, Environmental Procedures for Hazardous Materials, and other provisions of the Contract Documents.

1.8 MAINTENANCE OF STORAGE

A. On a scheduled basis, periodically inspect stored materials and equipment to ensure that:
   1. Condition and status of storage facilities is adequate to provide required storage conditions.
   2. Required environmental conditions are maintained on continuing basis.
   3. Materials and equipment exposed to elements are not adversely affected.

1.9 RECORDS

A. Keep up-to-date account of materials and equipment in storage to facilitate preparation of Applications for Payment, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 71 23

FIELD ENGINEERING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes field engineering, surveying, and layouts by CONTRACTOR, and associated requirements. This Section supplements the General Conditions' provisions on reference points and other matters.
   2. CONTRACTOR shall provide field engineering services, surveying and layout services, and professional services of the types indicated for the Project, including:
      a. Furnishing civil, structural, and other professional engineering services specified or required to execute CONTRACTOR's construction methods.
      b. Developing and making all detail surveys and measurements required for construction; including slope stakes, batter boards, and all other working lines, elevations, cut sheets, and rehabilitation quantities.
      c. Providing materials required for benchmarks, control points, batter boards, grade stakes, structure and pipeline elevation stakes, and other items.
      g. Providing such facilities and assistance necessary for ENGINEER and Resident Project Representative (if any) or Owner's Site Representative (if any) to check quantities and rehabilitation performed by CONTRACTOR.

B. Coordination:
   1. Review requirements of this and other Sections and coordinate installation of items to be installed with or before field engineering, surveying, and layout Work.

1.2 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Certificates:
      a. When requested by ENGINEER, submit certificate signed by professional engineer or professional surveyor, as applicable, certifying that elevations and locations of the Work comply with the Contract Documents. Explain each deviation, if any.
   2. Field Engineering:
      a. Submit daily reports as indicated in this Section.
      b. When requested by ENGINEER, submit documentation verifying accuracy of field engineering.
   3. Qualifications Statements:

a. Field Engineer: Name, employer, and professional address. When requested by ENGINEER, submit qualifications, including resume.

1.3 CONTRACTOR'S ENGINEERS

A. Qualifications of Field Engineer:
   1. Employ and retain at the Site a field engineer with experience and capability of performing all field engineering tasks required of CONTRACTOR, as indicated in this Article and elsewhere in the Contract Documents.
   2. CONTRACTOR's field engineer shall possess not less than five years of experience performing duties similar in scope and extent to those required of CONTRACTOR's field engineer on this Project.

B. Responsibilities of Contractor's Field Engineer:
   1. Daily Reports:
      a. Prepare and maintaining daily reports of activity on the Contract. Submit reports to ENGINEER including the following information:
         1) Number of employees at the Site.
         2) Number employees at the Site for each Subcontractor.
         3) Breakdown of employees by trades.
         4) Major equipment and materials installed as part of the Work.
         5) Major construction equipment utilized.
         6) Location of areas in which construction was performed.
         7) Materials and equipment delivered to the Site or suitable, offsite storage location.
         8) Work performed, including field quality control and testing.
         9) Weather conditions.
         10) Safety concerns, events, and precautions taken.
         11) Delays encountered, extent of delay incurred, reasons for the delay, and measures that will be taken to rectify delays encountered.
         12) Acknowledgement of specific instructions received from ENGINEER or OWNER.
      b. Daily reports shall be signed and dated by responsible member of CONTRACTOR's staff, such as CONTRACTOR's project manager, field engineer, or superintendent, or foreman designated by CONTRACTOR as having authority to sign daily reports.
      c. Submit CONTRACTOR's daily reports in accordance with Section 01 31 26, Electronic Communication Protocols, by 9:00 a.m. the next working day after the day covered in the associated report.
   2. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment for compliance with the Contract Documents.
   3. Continually inspect the Work to ensure that the quality and quantities required by the Contract Documents are provided.
   4. Cooperate as required with ENGINEER and Resident Project Representative (if any) in observing the Work and performing field inspections.

5. Check and coordinate the Work for conflicts and interferences, and immediately advise ENGINEER and Resident Project Representative, if any, of all discrepancies of which CONTRACTOR is aware.
6. Maintain field office files and drawings, record documents, and coordinate field engineering services with Subcontractors and Suppliers as appropriate, and other prime contractors (if any).
7. Prepare layout and coordination drawings for construction operations.
8. Review and coordinate the Work with Shop Drawings and CONTRACTOR's other submittals approved or accepted, as applicable, by ENGINEER.

C. Professionals Retained by Contractor (whether or not stationed at the Site):
   1. Delegated Professional Design Services:
      a. Where the Contract Documents require CONTRACTOR to furnish professional engineering or architecture services as delegated professional design, the provisions of the General Conditions regarding delegated professional design services, and the Contract Documents' requirements applicable to the specific delegated professional design, shall apply.

1.4 NOT USED

1.5 RECORDS

A. Records – General:
   1. Maintain at the Site a complete and accurate log of control and survey Work as such Work progresses.

B. Field Books and Records:
   1. Organized and consistent daily field records of work progress including photographs and redlines.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 71 33

PROTECTION OF THE WORK AND PROPERTY

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes general requirements for safety and protection that augment the requirements of the General Conditions, as may be modified by the Supplementary Conditions. This Section also includes requirements for barricades and warning signals, and protection of trees and plants, existing structures, floors, roofs, installed items, and landscaping.
   2. CONTRACTOR shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect personnel health and safety, and to protect the Work and all public and private property and facilities from damage, as specified in the General Conditions, Supplementary Conditions, and the Specifications.
   3. To prevent damage, injury, or loss, CONTRACTOR's actions shall include the following:
      a. Provide measures for safety of personnel at the Site, including workers engaged in the Work, delivery personnel, testing and inspection personnel, personnel of authorities having jurisdiction, other visitors to the Site, the public, OWNER's personnel, facility manager's personnel (if different from OWNER), ENGINEER, and Resident Project Representative (if any).
      b. Storing apparatus, materials, supplies, and equipment in an orderly, safe manner that does not unduly interfere with progress of the Work or work of other contractors, utility owners, and owners of transportation rights-of-way.
      c. Providing suitable storage facilities for materials and equipment subject to damage or degradation by exposure to climate, temperature, theft, breakage, or other cause.
      d. Placing upon the Work or any part thereof only loads consistent with the safety and integrity of that portion of the Work and existing construction.
      e. Frequently removing and disposing of refuse, rubbish, scrap materials, and debris caused by CONTRACTOR's operations so that, at all times, the Site is safe, orderly, and workmanlike in appearance.
      f. Providing temporary barricades, fencing, and guard rails around the following: openings, scaffolding, temporary stairs and ramps, around excavations, for elevated walkways, and other areas that may present a fall-hazard or hazard to vehicles.
   4. Do not, except after written consent from proper parties, enter or occupy privately-owned property or premises with personnel, tools, materials or equipment, except on lands and easements provided by OWNER.

5. CONTRACTOR has full responsibility for preserving public and private property and facilities on and adjacent to the Site. Direct or indirect damage done by, or on account of, any act, omission, neglect, or misconduct by CONTRACTOR in executing the Work, shall be remedied by CONTRACTOR, at his expense, to condition equal to that existing before damage was done.
6. Owner May Remedy:
    a. Should CONTRACTOR fail to protect and safeguard property and the Work after requests from ENGINEER or OWNER, OWNER may implement measures to protect property and the Work.
    b. Cost of such OWNER-implemented measures shall be paid by CONTRACTOR. OWNER may deduct from payments due CONTRACTOR such amounts as set-offs in accordance with the Contract Documents.
    c. Such right, however, shall not result in any obligation by OWNER or ENGINEER to continuously monitor or have responsibility for protection of property and the Work, which responsibility is exclusively CONTRACTOR's.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 BARRICADES AND WARNING SIGNALS

A. Barricades and Warning Signals – General:
    1. Where the Work is performed on or adjacent to roadway, access road or driveway, right-of-way, or public place:
        a. Provide temporary barricades, fences, lights, warning signs, danger signals, watchmen, and take other precautionary measures for protecting persons, property, and the Work.
        b. Use appropriately colored and reflective barricades, or paint barricades accordingly, to be visible at night.
        c. From sunset to sunrise, provide and maintain not less than one temporary light at each barricade.
        d. Erect sufficient barricades to keep vehicles from being driven on or into Work under construction.
        e. Furnish watchmen in sufficient numbers to protect the Work.
    2. Provide temporary barricades to protect personnel and property for Work not in or adjacent to transportation routes and vehicular travel areas, including indoor work, in accordance with Laws and Regulations.
    3. CONTRACTOR's responsibility for maintaining temporary barricades, signs, lights, and for providing watchmen shall continue until the Work is substantially complete in accordance with the Contract Documents, unless other provision for security and protection is agreed to by the parties. After

Substantial Completion, protect Work and property during periods when final Work or corrective Work is underway.

B. Temporary Fencing: Refer to Section 01 57 33, Security.

3.2 TREE AND PLANT PROTECTION

A. Tree and Plant Protection – General:
   1. Protect existing trees, shrubs, and plants on or adjacent to the Site, shown or designated to remain in place, against unnecessary cutting, breaking, damage, or skinning of trunk, branches, bark, and roots.
   2. Do not store materials or equipment or park construction equipment and vehicles within foliage drip lines.
   3. In areas subject to traffic, provide temporary fencing or temporary barricades to protect trees and plants.
   4. Open fires are not allowed onsite.
   5. Within the limits of the Work, water trees and plants that are to remain to maintain their health during construction operations.
   6. Cover exposed roots with burlap, and keep such burlap continuously wet. Cover exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, runoff, and noxious materials in solution.
   7. If branches or trunks are damaged, prune branches immediately and protect cut or damaged areas with emulsified asphalt compounded specifically for horticultural use, in manner acceptable to ENGINEER.
   8. When directed by ENGINEER, remove and dispose of at location away from the Site damaged trees and plants that die or suffer permanent injury, and replace each damaged tree or plant with specimen of equal or better species and quality.

3.3 PROTECTION OF EXISTING STRUCTURES

A. Underground Facilities:
   1. Underground Facilities known to OWNER and ENGINEER, except water, gas, sewer, electric, and communications services to individual buildings and properties, are shown. Information shown for Underground Facilities is the best available to OWNER and ENGINEER but, in accordance with the General Conditions, as may be modified by the Supplementary Conditions, is not guaranteed to be correct or complete.
   2. CONTRACTOR shall explore ahead of trenching and excavating Work and shall sufficiently uncover Underground Facilities that will or may interfere with the Work to determine their location, to prevent damage to Underground Facilities, and to prevent service interruption to structures and properties served by Underground Facilities. If CONTRACTOR damages an Underground Facility, CONTRACTOR shall restore it to its pre-construction condition, in accordance with requirements of the owner of the damaged facility and the Contract Documents.

3. Necessary changes in the location of the Work may be directed by ENGINEER to avoid Underground Facilities not shown or indicated on the Contract Documents.
4. If permanent relocation of an existing Underground Facilities is required and is not otherwise shown or indicated in the Contract Documents, CONTRACTOR may be directed in writing to perform the required work. When such relocation Work results in a change in the Contract Price, Contract Times, the associated Contract modification procedures and payment for such Work shall be in accordance with the Contract Documents.

B. Surface Structures:
1. Surface structures are existing buildings, structures, and other facilities at or above ground surface, including their foundations and any extension below ground surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage routes, exposed piping and utilities, poles, exposed wires, posts, signs, markers, curbs, walks, fencing, and other facilities visible at or above ground surface.
2. Existing surface facilities, including but not limited to guard rails, posts, guard cables, signs, poles, markers, curbs, and fencing, that are temporarily removed to facilitate the Work shall be replaced and restored to their pre-construction condition at CONTRACTOR's expense.

C. Protection of Underground Facilities and Surface Structures:
1. CONTRACTOR shall sustain in their places and protect from direct or indirect injury all Underground Facilities and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure or facility.
2. Before proceeding with the Work of sustaining and supporting such structure or facility, CONTRACTOR shall satisfy ENGINEER that methods and procedures to be used have been approved by party owning same.
3. CONTRACTOR shall bear all risks attending the presence or proximity of all Underground Facilities and surface structures within or adjacent to limits of the Work, in accordance with the Contract Documents.
4. CONTRACTOR shall be responsible for damage and expense for direct or indirect injury, caused by CONTRACTOR's activities, to structures and facilities. CONTRACTOR shall promptly repair damage caused by CONTRACTOR's activities, to the satisfaction of owner of damaged structure or facility.
5. Protection of Underground Facilities Under Roads and Parking Areas: Provide temporary, heavy-duty steel roadway plates to protect existing manholes, handholes, valve boxes, vaults, and other Underground Facilities near to or visible at the ground surface.

3.4 PROTECTION OF FLOORS AND ROOFS

A. Protection of Floors and Roofs – General:

1. Use proper protective covering when moving equipment, handling materials or other loads, when painting, handling mortar or grout, and when cleaning walls, ceilings, or structure contents.
2. Use metal pans to collect oil and cuttings from piping, conduits, and rod threading machines, and under metal cutting machines.
3. Do not load concrete floors less than 28 days old without written permission of ENGINEER. Do not load floors, roofs, or slabs in excess of design loading.
4. Do not load roofs without written permission of ENGINEER.
5. Restrict access to roofs, and keep CONTRACTOR personnel off existing roofs, except as required for the Work.
6. If access to roofs is required, roofing, parapets, openings, and all other construction on or adjacent to roof shall be protected with suitable plywood or other acceptable means.

3.5 PROTECTION OF INSTALLED MATERIALS, EQUIPMENT, AND LANDSCAPING

A. Protect installed Work to prevent damage from subsequent operations. Remove protective items when no longer needed, prior to Substantial Completion of the Work.

B. Control traffic to prevent damage to equipment, materials, and surfaces.

C. Coverings:
   1. Provide temporary coverings to protect materials and equipment from damage.
   2. Cover projections, wall corners and jambs, sills, and soffits of openings, in areas used for traffic and for passage of materials and equipment in subsequent work.

+ + END OF SECTION + +

SECTION 01 74 05

CLEANING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes requirements for keeping the Site free of accumulations of waste materials during construction ("progress cleaning") and cleaning for Substantial Completion and prior to final inspection (collectively, "closeout cleaning").
   2. CONTRACTOR shall perform cleaning during the Project, including progress cleaning (weekly), upon completion of the Work, and as required by the General Conditions, as may be modified by the Supplementary Conditions, and this Section.
   3. Maintain in a clean manner the Site, the Work, and areas adjacent to or affected by the Work.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PROGRESS CLEANING

A. General:
   1. Clean the Site, work areas, and other areas occupied by CONTRACTOR not less than twice per week. Dispose of materials in accordance with the General Conditions, as may be modified by the Supplementary Conditions, and the following:
      a. Comply with NFPA 241 for removing combustible waste materials and debris.
      b. Do not hold non-combustible materials at the Site more than three days if the temperature is expected to rise above 80 degrees F. When temperature is less than 80 degrees F, dispose of non-combustible materials within seven days of their generation.
      c. Provide suitable containers for storage of waste materials and debris.

d. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately.

B. Site:
   1. Keep outdoor, dust-generating areas wetted down or otherwise control dust emissions.
   2. Not less than twice per week, brush-sweep roadways and paved areas at the Site that are used by construction vehicles or otherwise affected by construction activities.
   3. Comply with dust control requirements of Section 01 57 05, Temporary Controls.

C. Work Areas:
   1. Clean areas where the Work is in progress to maintain the extent of cleanliness necessary for proper execution of the Work.
   2. Remove liquid spills promptly. Immediately report spills to OWNER, ENGINEER, and authorities having jurisdiction, in accordance with the Contract Documents and Laws and Regulations.
   3. Where dust would impair proper execution of the Work, broom-clean or vacuum entire work area, as appropriate.
   4. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

D. Installed Work:
   1. Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of material or equipment installed, using only cleaning agents and methods specifically recommended by material or equipment manufacturer. If manufacturer does not recommend specific cleaning agents or methods, use cleaning agents and methods that are not hazardous to health and property and that will not damage exposed surfaces.

E. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

F. Cutting and Patching:
   1. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, trailings and cuttings, and similar materials.
   2. Thoroughly clean piping, conduits, and similar features before applying patching material, paint, or other finishing materials. Restore damaged coverings on piping, ducting, and similar items to its pre-construction condition.

G. Cleaning of Hydraulic Structures: Clean hydraulic structures that will contain fluid, such as tanks and channels, in accordance with this Section and Section 09 85 00, Concrete Resurfacing and Lining.

H. Waste Disposal:
   1. Properly dispose of waste materials, surplus materials, debris, and rubbish off the Site.
   2. Do not burn or bury rubbish and waste materials at the Site.
   3. Do not discharge volatile or hazardous substances, such as mineral spirits, oil, or paint thinner, into storm sewers or sanitary sewers.
   4. Do not discharge wastes into surface waters or drainage routes.
   5. CONTRACTOR is solely responsible for complying with Laws and Regulations regarding storing, transporting, and disposing of waste generated by CONTRACTOR's operations or brought to the Site by CONTRACTOR.

I. During handling and installation of materials and equipment, clean and protect construction in progress and adjoining materials and equipment already in place. Apply protective covering where required for protection from damage or deterioration, until Substantial Completion.

J. Clean completed construction as frequently as necessary throughout the construction period.

3.2 CLOSEOUT CLEANING

A. Complete the following prior to requesting inspection for Substantial Completion:
   1. Clean and remove from the Site rubbish, waste material, debris, and other foreign substances.
   2. Sweep paved areas broom-clean. Remove petrochemical spills, stains, and other foreign deposits.
   3. Hose-clean sidewalks and loading areas.
   4. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   5. Leave surface waterways, drainage routes, storm sewers, and gutters open and clean.
   6. Repair pavement, roads, sod, and other areas affected by construction operations and restore to specified condition; if condition is not specified, restore to pre-construction condition.
   7. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of spatter, grease, stains, fingerprints, films, and similar foreign substances.
   8. Clean, wax, and polish wood, vinyl, and painted floors.
   9. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
   10. In unoccupied spaces, sweep concrete floors broom-clean.
   11. Clean transparent materials, including mirrors and glazing in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
   12. Remove non-permanent tags and labels.

13. Surface Finishes:
    a. Touch-up and otherwise repair and restore chipped, scratched, dented or otherwise marred surfaces to specified finish and match adjacent surfaces.
    b. Do not paint over “UL” or similar labels, including mechanical and electrical nameplates.
14. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint, and mortar droppings, and other foreign substances.
15. Clean plumbing fixtures to sanitary condition, free of stains, including stains resulting from water exposure.
16. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
17. Clean lighting fixtures, lamps, globes, and reflectors to function with full efficiency. Replace temporary lamps provided in permanent fixtures. Replace existing lighting fixture components that are burned out or noticeably dimmed from use during construction. Replace defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
18. Leave the Site clean, and in neat, orderly condition, satisfactory to OWNER and ENGINEER.

B. Complete the following prior to requesting final inspection:
    1. Following completion of the Work on the “punch list” of Work uncompleted at Substantial Completion, clean in accordance with Paragraph 3.2.A of this Section.

+ + END OF SECTION + +

SECTION 01 77 19

CLOSEOUT REQUIREMENTS

PART 1 – GENERAL

1.1 GENERAL

A. Scope:
   1. Section Includes.
      a. Substantial Completion.
      b. Final inspection.
      c. Request for final payment and acceptance of the Work.

1.2 SUBSTANTIAL COMPLETION

A. Substantial Completion – General:
   1. Prior to requesting Substantial Completion, perform the following for the substantially completed Work:
      a. Materials and equipment for which Substantial Completion is requested shall be fully ready for their intended use, including full operating and monitoring capability in automatic and manual modes.
      b. Complete field quality control Work, including testing at the Site, indicated in Specifications Sections for individual materials and equipment items. Submit results of, and obtain ENGINEER's acceptance of, field quality control tests required by the Contract Documents.
      b. Startup and checkout shall be completed in accordance with requirements of the Specifications for the various materials and equipment in the substantially completed Work.
      c. Cleaning for Substantial Completion shall be completed in accordance with Section 01 74 05, Cleaning.
      d. Spare parts, extra stock materials, and tools shall be delivered and accepted in accordance with the Specifications for the various materials and equipment.
      e. Training shall be completed in accordance with OWNER specifications.
      f. Submit and obtain ENGINEER's acceptance of final operations and maintenance manuals.
      g. Obtain and submit to ENGINEER all required permits, inspections, and approvals of authorities having jurisdiction for the substantially completed Work to be occupied and used by Owner.
      h. Complete other tasks that the Contract require be completed prior to Substantial Completion.
   2. Procedures for requesting and documenting Substantial Completion are in the General Conditions, as may be modified by the Supplementary Conditions.

3. Sample letter for CONTRACTOR to request inspection for Substantial Completion is attached to this Specifications Section. Use the model language of the sample letter, modified to suit the Project.
4. Unless decided otherwise by OWNER and ENGINEER, form of certificate of Substantial Completion will be EJCDC® C-625, "Certificate of Substantial Completion" (2013 edition), prepared by ENGINEER.
5. Refer to the Agreement and Section 01 29 76, Progress Payment Procedures, for requirements regarding consent of surety to partial release of or reduction in retainage.

1.3 FINAL INSPECTION

A. Final Inspection – General:
   1. Prior to requesting final inspection, verify that all the Work is fully complete and ready for final payment. Partial checklist for this purpose is attached to this Specifications Section.
   2. Sample letter for CONTRACTOR to request final inspection is attached to this Specifications Section. Use the model language of the sample letter, modified to suit the Project.
   3. Procedures for requesting and documenting the final inspection are in the General Conditions, as may be modified by the Supplementary Conditions, and as augmented in this Section.

1.4 REQUEST FOR FINAL PAYMENT AND ACCEPTANCE OF THE WORK

A. Procedure:
   1. Submit request for final payment in accordance with the Agreement and General Conditions, as may be modified by the Supplementary Conditions, and using procedure specified in Section 01 29 76, Progress Payment Procedures, and this Section.
   2. Acceptance of the Work:
      a. Upon ENGINEER's receipt of the final Application for Payment, accompanied by other required Contract closeout documentation in accordance with the Contract Documents, ENGINEER will issue to OWNER and CONTRACTOR a notice of acceptability of the Work, in accordance with the General Conditions, as may be modified by the Supplementary Conditions.
      b. Nothing other than receipt of such notice of acceptability from ENGINEER constitutes acceptance of the Work.
      c. Unless decided otherwise by OWNER and ENGINEER, form of acceptance will be EJCDC® C-626, "Notice of Acceptability of Work", (2014 edition).

B. Request for final payment shall include:
   1. Documents required for progress payments in Section 01 29 76, Progress Payment Procedures.

2. Documents required in the General Conditions, as may be modified by the Supplementary Conditions.
3. List of all disputes that Contractor believes are unsettled, presented on CONTRACTOR's letterhead. If there are no such disputes or Claims, so indicate in writing.
4. Consent of Surety to Final Payment:
    a. Acceptable form includes AIA® G707™, "Consent of Surety to Final Payment" (1994 or later edition), or other form acceptable to OWNER.
5. Releases of Liens:
    a. Submit "complete and legally effective releases (satisfactory to OWNER) of all Liens filed in connection with the Work, regardless of whether such Lien was filed by CONTRACTOR or any Subcontractor or Supplier.
    b. Each release of Lien shall be signed by an authorized representative of the entity submitting the release of Lien, and shall include CONTRACTOR's, Subcontractor's, or Supplier's (as applicable) corporate seal, when applicable.
6. Waivers of Lien Rights:
    a. If required by the OWNER, separate releases of lien or lien waivers from CONTRACTOR and each subcontractor, lower tier subcontractor, laborer, supplier or other person or entity who has, or might have a claim against the OWNER or the OWNER'S property.

    b. Furnish final list of Subcontractors and Suppliers, using the form included in Section 01 29 76, Progress Payment Procedures, indicating final amount of the associated subcontract or purchase order for each. Include on the list all lower-tier Subcontractors and Suppliers retained by higher-tier Subcontractors and Suppliers.
    c. Each waiver of Lien rights shall be signed by an authorized representative of the entity submitting waiver of Lien rights, and shall include CONTRACTOR's, Subcontractor's, or Supplier's (as applicable) corporate seal, when applicable.
    d. Waiver of Lien rights may be conditional upon receipt of final payment.
    e. Required Affidavits: Submit the following:
        1) Affidavit of payment of debts and claims, submitted by CONTRACTOR. Acceptable form includes AIA® G706™, "Contractor's Affidavit of Payment of Debts and Claims" (1994 or later edition), or other form acceptable to OWNER, and;
        2) Affidavit of release of Liens, submitted by CONTRACTOR. Acceptable form includes AIA® G706A™, "Affidavit of Release of Liens" (1994 or later edition).
    f. Waivers of Lien rights and affidavits and supporting documents furnished under this Paragraph 1.4.B.6 shall comply with the requirements of the General Conditions, as may be modified by the Supplementary Conditions.
    g. Each affidavit furnished shall be signed by an authorized representative of the entity furnishing the affidavit, and shall include issuing entity's corporate seal, when applicable.

h. Where all required waivers of Lien rights and affidavits are not submitted:
   1) Submit letter on CONTRACTOR's letterhead indicating the Subcontractor(s) and Suppliers for whom such waivers or releases were not obtained, amount owed to such entity, reason(s) why such amount was not previously paid, and indicate how CONTRACTOR intends to fulfill its obligations and assure OWNER that associated debts and claims are paid.
   2) In lieu of the releases or waivers of Liens specified in Paragraphs 1.4.B.5 and 1.4.B.6 of this section, and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTACTOR 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.
   3) 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.

7. Evidence satisfactory to OWNER that all title issues (not otherwise addressed by releases of Liens, waivers of Lien rights, and related documentation required in Paragraphs 1.4.B.5 and 1.4.B.6 of this section) have been resolved and that title will pass to OWNER free and clear of other title defects, or will so pass upon final payment.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 ATTACHMENTS

A. The documents listed below, following this Section's "End of Section" designation, are part of this Specifications Section:
   1. Sample letter for Contractor's use in requesting inspection for Substantial Completion (two pages).
   2. Sample partial checklist to identify readiness for final inspection (four pages).
   3. Sample letter for Contractor's use in requesting final inspection (one page).

B. In the model language of the attached sample letters for the CONTRACTOR to request inspection for Substantial Completion and the final inspection, italicized language in brackets, e.g., "[*insert date*]" indicates instructions to the drafter of the letter and often indicates specific information to be inserted by CONTRACTOR; do not include bracketed, italicized text in the final version of the letter(s) prepared for the Project. Non-italicized language in brackets is optional language; use the appropriate language to complete the actual letter for the Project and edit where required to suit the specific circumstances.

+ + END OF SECTION + +

SAMPLE LETTER FOR CONTRACTOR'S USE IN REQUESTING INSPECTION FOR SUBSTANTIAL COMPLETION

SENT VIA E-MAIL AND U.S. CERTIFIED MAIL/RETURN RECEIPT REQUESTED

[*Date*]

[*Name of Engineer's contact person*]
ARCADIS U.S., Inc.
[*Street address*]
[*City, state, postal code*]

Subject:
[*Project name, Contract designation*]
Request for Inspection for Substantial Completion

Dear [*addressee*]:

In our opinion, [all of] [*or*] [a portion of] the Work under the above-referenced Contract is substantially complete as of [*insert month, day, year on which Substantial Completion was achieved*]. [The specific portion of the Work that we believe is substantially complete is [*insert identification of that portion of the Work that is substantially complete*].]

Enclosed is our listing of uncompleted Work items ("punch list"). In accordance with Paragraph 15.03.A of the General Conditions, we hereby request: 1) That the Engineer schedule and perform the inspection for Substantial Completion as soon as possible, and 2) Issuance of the certificate of Substantial Completion.

In accordance with Paragraph 15.03.D of the General Conditions, upon Substantial Completion, we propose the following relative to apportionment of responsibilities between the Owner and the Contractor:

1. Security, Protection, Insurance:
    a. Site Security: [*insert proposal; address whether Owner or Contractor will be responsible for security of the Site*].
    b. Protection of the Substantially Completed Work: [*insert proposal; address whether Owner or Contractor will be responsible for protection*].
    c. Property Insurance: [*insert proposal; typically Owner assumes responsibility for property insurance upon Substantial Completion*]
2. Operation and Maintenance:
    a. Operation: [*insert proposal; address whether Owner or Contractor will be responsible for operating the substantially completed Work*].

b. Maintenance: [*insert proposal; address whether Owner or Contractor will be responsible for maintaining the substantially completed Work*].

3. Utilities: [*for each of the following, indicate whether Owner or Contractor will be responsible for utilities and services, or whether responsibility will be shared; if shared, indicate proposed cost-sharing*]

   a. Electricity: [*insert proposal*].

   b. Natural Gas/Fuel/Heating: [*insert proposal*].

   c. Water Supply: [*insert proposal*].

   d. Wastewater: [*insert proposal*].

   e. Communications (Telephone, Internet, Video): [*insert proposal*].

In accordance with Paragraph 15.08.A of the General Conditions, we understand that the Contract's correction period for the Work covered by the certificate of Substantial Completion commences on the Substantial Completion date documented in said certificate. [*Drafter: Also see Paragraph 15.08.C of the General Conditions and, where necessary, edit this paragraph of the letter accordingly.*]

Should you have questions or comments regarding this notice, please contact [the undersigned] [*or*] [*insert other contact person's name*], at [*insert telephone number and e-mail address*].

Sincerely,

[*Contractor's company name*]

[*Signatory name*]
[*Signatory's title*]

Attachments:
Preliminary list of uncompleted Work items ("punch list"; [##] pages)

Copies:
[*Owner's project manager*]

SAMPLE PARTIAL CHECKLIST TO IDENTIFY READINESS FOR FINAL INSPECTION

Project: _____
Contract: _____
Contractor: _____

Item No./Description	Completed/Date		In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
1. All Shop Drawings, Samples, and Submittals approved by Engineer	☐		☐	☐	☐		
Remarks:							
2. Final services completed by Suppliers, including submittal of "Supplier Installation Certification	☐		☐	☐	☐		
Remarks:							
3. Final Work completed by Subcontractors	☐		☐	☐	☐		
Remarks:							
4. Permits closed out and regulatory compliance transitioned from construction to operations	☐		☐	☐	☐		
Remarks:							
5. All outstanding change issues are addressed and all Change Proposals submitted	☐		☐	☐	☐		

Item No./Description	Completed/Date		In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
Remarks:							
6. All Claims are resolved	☐		☐	☐	☐		
Remarks:							
7. All defective Work of which Contractor is aware has been corrected in accordance with the Contract Documents	☐		☐	☐	☐		
Remarks:							
8. Issues related to Constituents of Concern and potential Hazardous Environmental Condition have been fully addressed	☐		☐	☐	☐		
Remarks:							
9. All spare parts, tools, and extra stock materials have been furnished in accordance with the Contract Documents, and documentation thereof submitted to Engineer	☐		☐	☐	☐		
Remarks:							
10. All final Operations & Maintenance manuals have been submitted and accepted by Engineer	☐		☐	☐	☐		
Remarks:							

Item No./Description	Completed/Date		In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
11. Manufacturer warranties and software license(s) furnished	☐		☐	☐	☐		
Remarks:							
12. Instruction and training of operations and maintenance personnel is complete and records of training submitted	☐		☐	☐	☐		
Remarks:							
13. MBE/WBE/DBE compliance report(s) submitted (when applicable)	☐		☐	☐	☐		
Remarks:							
14. All field engineering submittals, including survey data, furnished	☐		☐	☐	☐		
Remarks:							
15. All Work on "punch list" is complete in accordance with the Contract Documents	☐		☐	☐	☐		
Remarks:							
16. All record documents submitted to and accepted by Engineer	☐		☐	☐	☐		
Remarks:							
17. Contractor is fully demobilized from Site	☐		☐	☐	☐		

Item No./Description	Completed/Date		In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
Remarks:							
18. All Site restoration is complete	☐		☐	☐	☐		
Remarks:							
19. Final cleaning of all work areas is complete	☐		☐	☐	☐		
Remarks:							
20. Lien waivers or affidavits of payment obtained from Subcontractors and Suppliers	☐		☐	☐	☐		
Remarks:							
21. Evidence of Contractor liability insurance furnished for correction period	☐		☐	☐	☐		
Remarks:							
22. All other required Contract closeout documents obtained	☐		☐	☐	☐		
Remarks:							

SAMPLE LETTER FOR CONTRACTOR'S USE IN REQUESTING FINAL INSPECTION

SENT VIA E-MAIL AND U.S. CERTIFIED MAIL/RETURN RECEIPT REQUESTED

[*Date*]

[*Name of Engineer's contact person*]
ARCADIS U.S., Inc.
[*Street address*]
[*City, state, postal code*]

Subject:
[*Project name, Contract designation*]
Request for Final Inspection

Dear [*addressee*]:

In our opinion, all of the Work under the above-referenced Contract is complete and ready for final payment as of [*insert month, day, year on which final completion was achieved*]. In accordance with Paragraph 15.05.A of the General Conditions, we hereby request that the Engineer schedule and perform the final inspection as soon as possible. Upon successful completion of the final inspection, we will submit our final Application for Payment accompanied by the required Contract closeout documentation in accordance with the Contract Documents.

Should you have questions or comments regarding this notice, please contact [the undersigned] [*or*] [*insert other contact person's name*], at [*insert telephone number and e-mail address*].

Sincerely,

[*Contractor's company name*]

[*Signatory name*]
[*Signatory's title*]

Attachments:
None

Copies:
[*Owner's project manager*]

SECTION 01 78 36

WARRANTIES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This section describes general requirements for warranties required in the various Specifications.
   2. Provisions on the Contract's correction period, CONTRACTOR'S general warranty and guarantee, and CONTRACTOR's warranty of title are in the General Conditions, as may be modified by the Supplementary Conditions.
   2. This section includes general requirements for:
      a. Suppliers' standard warranties.
      b. Suppliers' special warranties.
      c. Implied warranties.
      d. Commencement and duration of warranties.

1.2 SUBMITTALS

A. General:
   1. For each item of equipment furnished under the Contract, submit Supplier's standard warranty, regardless of whether such warranty or submittal thereof is required by the associated Specifications for that item. Submit such warranties for materials where such submittal is required in the Specifications for the material.
   2. For each item of material or equipment where Supplier's special (or extended) warranty is required by the Contract Documents, submit appropriate special warranty that complies with the Contract Documents.
   3. Supplier's warranties shall be specifically endorsed solely to OWNER by the entity issuing such warranty.
   4. Submit Suppliers' standard warranties and special warranties as submittals in accordance with Schedule of Submittals accepted by ENGINEER.

1.3 SUPPLIERS' WARRANTIES FOR MATERIALS AND EQUIPMENT

A. Warranty Types:
   1. Required by the General Conditions:
      a. Warranties specified for materials and equipment shall be in addition to, and run concurrent with, CONTRACTOR's general warranty and guarantee and requirements for the Contract's correction period.
      b. Disclaimers and limitations in specific materials and equipment warranties do not limit CONTRACTOR's general warranty and guarantee, nor does such affect or limit CONTRACTOR's performance obligations under the correction period.

2. Material or equipment manufacturer's standard warranty is pre-printed, written warranty published by item's manufacturer and specifically endorsed by manufacturer to OWNER.
3. Special warranty is written warranty that either extends the duration of material or equipment manufacturer's standard warranty or provides other, increased rights to OWNER. Where the Contract Documents indicate specific requirements for warranties that differ from the manufacturer's standard warranty for that item, special warranty is implied.

B. Requirements for Special Warranties:
1. Submit written special warranty document that contains appropriate provisions and identification, ready for execution by material or equipment manufacturer and OWNER. Submit draft warranty with submittals required prior to fabrication and shipment of the item from the Supplier's facility.
2. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed by product manufacturer and other entities as appropriate.
3. Specified Form: When specified forms for special warranties are included in the Contract Documents, prepare written document, properly executed by item manufacturer and OWNER, using the required form.
4. Refer to the Specifications for content and requirements for submitting special warranties.

1.4 IMPLIED WARRANTIES

A. Warranty of Title and Intellectual Property Rights:
1. Except as may be otherwise indicated in the Contract Documents, implied warranty of title required by Laws and Regulations is applicable to the Work and to materials and equipment incorporated therein.
2. Provisions on intellectual property rights, including patent fees and royalties, are in the General Conditions, as may be modified by the Supplementary Conditions.

B. Warranty of Merchantability:
1. Notwithstanding any other provision of the Contract to the contrary, implied warranties of merchantability required by Laws and Regulations apply to the materials and equipment incorporated into the Work.

C. Warranty of Fitness-for-Purpose:
1. Implied warranty of fitness-for-purpose for materials and equipment to be incorporated into the Work is hereby disclaimed by OWNER and CONTRACTOR.
1. When Supplier is aware of, or has reason to be aware of, specified materials or features of the Work that are contrary to the intended use, purpose, service, application, or environment in which the material or equipment item will be used, submit request for interpretation in accordance with Section 01 26 00, Contract Modification Procedures. Where appropriate, such request for

interpretation shall indicate the apparent discrepancy and propose appropriate, alternative materials or equipment.

1.5 COMMENCEMENT AND DURATION OF WARRANTIES

A. Commencement of Warranties:
   1. Contract correction period and CONTRACTOR's general warranty commence as indicated in the General Conditions, as may be modified by the Supplementary Conditions.
   2. Suppliers' general warranties and special warranties commence running on the date that the associated item is certified by ENGINEER as substantially complete. In no event shall special warranties commence running prior to ENGINEER's review and acceptance of special warranty submittal for the item.
   3. Implied warranties commence in accordance with Laws and Regulations.

C. Duration of Warranties:
   1. Duration of correction period is in accordance with the General Conditions, as may be modified by the Supplementary Conditions.
   2. Duration of CONTRACTOR's general warranty and guarantee is in accordance with Laws and Regulations.
   3. Duration of Suppliers' general warranties is in accordance with the applicable general warranty document accepted by ENGINEER.
   4. Duration of required Suppliers' special warranties shall be in accordance with the requirements of the Contract Documents for the subject item.
   5. Duration of implied warranties shall be in accordance with Laws and Regulations.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. This Section includes requirements for Project record documents, to supplement the requirements of the General Conditions, as may be modified by the Supplementary Conditions.
   2. CONTRACTOR shall provide all labor, materials, equipment, and services to maintain and submit to ENGINEER Project record documents in accordance with the Contract Documents.

B. Maintenance of Record Documents:
   1. Maintain in CONTRACTOR's field office, in clean, dry, legible condition, complete sets of the following record documents: Drawings, Specifications, and Addenda; Shop Drawings, Samples, and other CONTRACTOR submittals, including records of test results, approved or accepted as applicable, by ENGINEER; Change Orders, Work Change Directives, Field Orders, copies of all interpretations and clarifications issued, photographic documentation, survey data, and all other documents pertinent to the Work.
   2. Provide files and racks for proper storage and easy access to record documents. File record documents in accordance with the edition of the Construction Specification Institute's *MasterFormat*™ used for organizing the Project Manual, unless otherwise accepted by ENGINEER.
   3. Promptly make record documents available for observation and review upon request of ENGINEER or OWNER. Requirements for review of record documents status as a condition precedent to progress payments is in Section 01 29 73, Schedule of Values, and Section 01 29 76, Progress Payment Procedures.
   4. Do not use record documents for any purpose other than serving as Project record. Do not remove record documents from CONTRACTOR's field office without ENGINEER's approval.

1.2 SUBMITTALS

A. Closeout Submittals: Submit the following:
   1. Record Documents:
      a. Submit the following Project record documents:
         1) Drawings.
         2) Project Manual including Specifications and Addenda (bound).
      b. Prior to readiness for final payment, submit to ENGINEER one copy of Project's final record documents and obtain ENGINEER's acceptance

of same. Submit complete record documents; do not make partial submittals.

c. Submit both printed record documents and electronic record documents, in accordance with Section 01 31 26, Electronic Communication Protocols.

d. Submit record documents with transmittal letter on CONTRACTOR letterhead in accordance with requirements in Section 01 33 00, Submittal Procedures.

2. Certifications:

a. Record documents submittal shall include certification, with original signature of official authorized to execute legal agreements on behalf of CONTRACTOR, reading as follows:

"[*Insert Contractor's corporate name*] has maintained and submitted Project record documentation in accordance with the General Conditions and Supplementary Conditions, Section 01 78 39, Project Record Documents, and other elements of Contract Documents, for the "*City of East Providence Water Pollution Control Facility Concrete Rehabilitation and Concrete Lining Project*". We certify that each record document submitted is complete, accurate, and legible relative to the Work performed under our Contract, and that the record documents comply with the requirements of the Contract Documents.

[*Provide signature, print name, print signing party's corporate title, and date*]"

1.3 RECORDING CHANGES

A. Recording Changes – General:

1. At the start of the Project, label each record document to be submitted as, "PROJECT RECORD" using legible, printed letters. Letters on record copy of the Drawings shall be two inches high.
2. Keep record documents current consistent with the progress of the Work. Make entries on record documents within two working days of receipt of information required to record the change.
3. Do not permanently conceal the Work until required information has been recorded for Project record documents.
4. Accuracy of record documents shall be such that future searches for items shown on the record documents may rely reasonably on information obtained from ENGINEER-accepted record documents.
5. Marking of Entries:
   a. Use erasable, colored pencils (not ink or indelible pencil) for marking changes, revisions, additions, and deletions to record documents.
   b. Clearly describe the change by graphic line and make notations as required. Use straight-edge to mark straight lines. Writing shall be legible and sufficiently dark to allow scanning of record documents into legible electronic files in portable document format (".PDF").

c. Date each entry on record documents.
d. Indicate changes by drawing a “cloud” around the change(s) indicated.
e. Mark initial revisions in red. In the event of overlapping changes, use different colors for subsequent changes.

B. Drawings:
1. Record changes on copy of the Drawings. Submittal of CONTRACTOR-originated or -produced drawings as a substitute for recording changes on a copy of the Drawings is unacceptable.
2. Record changes on plans, sections, elevations, schematics, schedules, and details as required for clarity, making reference dimensions and elevations (to Project datum) for complete record documentation.
3. Record actual construction including:
a. Depths of various elements of foundation relative to Project datum.
b. Horizontal and vertical location of Underground Facilities referenced to permanent surface improvements and project elevation datum. For each Underground Facility, including pipe fittings, show and indicate dimensions to not less than two permanent, visible surface improvements.
c. Location of exposed utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure and, where applicable, to Project elevation datum.
d. Changes in structural and architectural elements of the Work, including changes in reinforcing.
e. Field changes of dimensions, arrangements, and details.
f. Changes made in accordance with Addenda, Change Orders, Work Change Directives, and Field Orders.
g. Changes in details on the Drawings. Submit additional details prepared by CONTRACTOR when required to document such changes.
4. Recording Changes for Schematic Layouts:
a. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items are shown schematically and are not intended to portray physical layout. For such cases, the final physical arrangement shall be determined by CONTRACTOR subject to acceptance by ENGINEER.
b. Record on the Project record documents all revisions to schematics on the Drawings, including: piping schematics, ducting schematics, process and instrumentation diagrams, control and circuitry diagrams, electrical one-line diagrams, motor control center layouts, and other schematics when included in the Drawings. Show and indicate actual locations of equipment, lighting fixtures, in-place grounding system, and other pertinent data.
c. When dimensioned plans and dimensioned sections or elevations on the Drawings show the Work schematically, indicate on the record documents, by dimensions accurate to within one inch in the field, centerline location of items of Work such as conduit, piping, ducts, and similar items

1) Clearly identify each item of the Work by accurate notations such as "cast iron drain", "rigid electrical conduit", "copper waterline", and similar descriptions.
2) Show by symbol or by note the vertical location of each item of the Work; for example, "embedded in slab", "under slab", "in ceiling plenum", "exposed", and similar designations. For piping not embedded, also indicate elevation dimension relative to Project elevation datum.
3) Descriptions shall be sufficiently detailed to be related to the Specifications.

d. ENGINEER may furnish written waiver of requirements relative to schematic layouts shown on plans, sections, and elevations when, in ENGINEER's judgment, dimensioned layouts of Work shown schematically will serve no useful purpose. Do not rely on such waiver(s) being issued.

5. Supplemental Drawings:
   a. In some cases, drawings produced during construction by ENGINEER or CONTRACTOR supplement the Drawings and shall be included with Project record documents submitted by CONTRACTOR. Supplemental record drawings shall include drawings or sketches that are part of Change Orders, Work Change Directives, and Field Orders and that cannot be incorporated into the Drawings because of space limitations.
   b. Supplemental drawings submitted with record drawings shall be integrated with the Drawings and include necessary cross-references between drawings. Supplemental record drawings shall be on sheets the same size as the Drawings.
   c. When supplemental drawings developed by CONTRACTOR using computer-aided drafting/design (CADD) software are to be included in record drawings, submit electronic files for such drawings in accordance with Section 01 31 26, Electronic Communication Protocols, as part of record drawing submittal. Label such files, "Supplemental Record Drawings", including with CONTRACTOR's name, Project name, and Contract designation.

C. Specifications and Addenda:
   1. Mark each Specifications Section to record:
      a. Manufacturer, trade name, catalog number, and Supplier of each material and equipment item actually provided.
      b. Changes made by Addendum, Change Orders, Work Change Directives, and Field Orders.

1.4 ELECTRONIC FILES FURNISHED BY ENGINEER

A. CADD files of the Drawings will be furnished by ENGINEER upon the following conditions:

1. CONTRACTOR shall submit to ENGINEER a letter on CONTRACTOR letterhead requesting CADD files of the Drawings and indicating specific definition(s) or description(s) of how such files will be used, and specific description of benefits to OWNER (including credit proposal, if applicable) if the request is granted.
2. CONTRACTOR shall execute ENGINEER's standard agreement for release of electronic files and shall abide by the provisions of such agreement for release of electronic files.
3. Layering system incorporated in CADD files shall be maintained as transmitted by ENGINEER. CADD files transmitted by ENGINEER containing cross-referenced files shall not be bound by CONTRACTOR. Drawing cross-references and paths shall be maintained. If CONTRACTOR alters layers or cross-reference files, CONTRACTOR shall restore all layers and cross-references prior to submitting record documents to ENGINEER.
4. CONTRACTOR shall submit record drawings to ENGINEER in same CADD format that files were furnished to CONTRACTOR.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 03 00 05

CONCRETE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install concrete, reinforcing, and related materials.
   2. The Work includes:
      a. Providing concrete consisting of portland cement, fine and coarse aggregates, water, and approved admixtures; combined, mixed, transported, placed, finished, and cured.
      b. Fabricating and placing reinforcing, including ties and supports.
      c. Design, erection, and removal of formwork.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate installation of items to be installed in the concrete Work.

C. Classifications of Concrete:
   1. Class “A” concrete shall be steel-reinforced and includes all concrete unless otherwise shown or indicated.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ACI 224R, Control of Cracking in Concrete Structures.
   2. ACI 301, Specifications for Structural Concrete for Buildings.
   3. ACI 304R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
   4. ACI 305R, Specification for Hot Weather Concreting.
   5. ACI 306R, Cold Weather Concreting.
   6. ACI 309R, Guide for Consolidation of Concrete.
   7. ACI 318, Building Code Requirements for Structural Concrete and Commentary.
   8. ACI 347, Guide to Formwork for Concrete.
   9. ACI SP-66, ACI Detailing Manual.
   10. ASTM A82/A82M, Specification for Steel Wire, Plain, for Concrete Reinforcement.
   11. ASTM A185/A185M, Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
   12. ASTM A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

13. ASTM C31/C31M, Practice for Making and Curing Concrete Test Specimens in the Field.
14. ASTM C33/C33M, Specification for Concrete Aggregates.
15. ASTM C39/C39M, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
16. ASTM C94/C94M, Specification for Ready-Mixed Concrete.
17. ASTM C138/C138M, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
19. ASTM C150/C150M, Specification for Portland Cement.
20. ASTM C172, Practice for Sampling Freshly Mixed Concrete.
21. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
22. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
23. ASTM C494/C494M, Specification for Chemical Admixtures for Concrete.
24. ASTM C579, Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
25. CRSI 1MSP, Manual of Standard Practice.

1.3 QUALITY ASSURANCE

A. Laboratory Trial Batch:
   1. Employ independent testing laboratory experienced in design and testing of concrete materials and mixes to perform material evaluation tests and to design concrete mixes.
   2. Each concrete mix design specified shall be verified by laboratory trial batch, unless indicated otherwise.
   3. Perform the following testing on each trial batch:
      a. Aggregate gradation for fine and coarse aggregates.
      b. Slump.
      c. Air content.
      d. Compressive strength based on three cylinders each tested at seven days and at 28 days.
   4. Submit for each trial batch the following information:
      a. Project identification name and number (if applicable).
      b. Date of test report.
      c. Complete identification of aggregate source of supply.
      d. Tests of aggregates for compliance with the Contract Documents.
      e. Scale weight of each aggregate.
      f. Absorbed water in each aggregate.
      g. Brand, type, and composition of cementitious materials.
      h. Brand, type, and amount of each admixture.
      i. Amounts of water used in trial mixes.
      j. Proportions of each material per cubic yard.
      k. Gross weight and yield per cubic yard of trial mixtures.
      l. Measured slump.
      m. Measured air content.

n. Compressive strength developed at seven days and 28 days, from not less than three test cylinders cast for each seven day and 28-day test, and for each design mix.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. List of concrete materials and concrete mix designs proposed for use. Include results of tests performed to qualify the materials and to establish the mix designs. Do not start laboratory trial batch testing until this submittal is approved by ENGINEER.
      b. Laboratory Trial Batch Reports: Submit laboratory test reports for concrete cylinders, materials, and mix design tests.
      c. Concrete placement drawings showing the location and type of all joints.
      d. Drawings for fabricating, bending, and placing concrete reinforcing. Comply with ACI SP-66. For walls provide elevations to a minimum scale of 1/4-inch to one foot. Show bar schedules, stirrup spacing, adhesive dowels, splice lengths, diagrams of bent bars, arrangements, and assemblies, as required for fabricating and placing concrete reinforcing.
   2. Product Data:
      a. Manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.

B. Informational Submittals: Submit the following:
   1. Delivery Tickets: Copies of all delivery tickets for each load of concrete delivered to or mixed at the Site. Each delivery tickets shall contain the information in accordance with ASTM C94/C94M along with project identification name and number (if any), date, mix type, mix time, quantity and amount of water introduced.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Transportation, Delivery, and Handling:
   1. Deliver concrete reinforcing products to Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings on approved Shop Drawings.
   2. Materials used for concrete shall be clean and free from foreign matter during transportation and handling and kept separate until measured and placed into concrete mixer.
   3. Implement suitable measures during hauling, piling, and handling to ensure that segregation of coarse and fine aggregate particles does not occur and grading is not affected.
   4. Deliver grout materials from manufacturers in unopened containers that bear intact manufacturer labeling.

B. Storage:
   1. Store formwork materials above ground on framework or blocking. Cover wood for forms and other accessory materials with protective, waterproof covering. Provide for adequate air circulation or ventilation under cover.
   2. Store concrete reinforcing materials to prevent damage and accumulation of dirt and excessive rust. Store on heavy wood blocking so that reinforcing does not come into contact with the ground. Space framework or blocking supports to prevent excessive deformation of stored materials.
   3. For storage of concrete materials, provide bins or platforms with hard, clean surfaces.
   4. Comply with Section 01 66 00, Product Storage and Handling Requirements.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C150/C150M, Type II.

B. Aggregates: ASTM C33/C33M.
   1. Fine Aggregate: Clean, sharp, natural sand free of loam, clay, lumps, and other deleterious substances. Dune sand, bank run sand, and manufactured sand are unacceptable.
   2. Coarse Aggregate:
      a. Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter.
      b. Coarse aggregate shall comply with the following:
         1) Crushed stone, processed from natural rock or stone.
         2) Washed gravel, either natural or crushed. Slag, pit gravel, and bank-run gravel are not allowed.
      c. Coarse Aggregate Size: ASTM C33/C33M, Nos. 57 unless otherwise approved by ENGINEER.

C. Water: Clean, potable.

D. Admixtures:
   1. Air-Entraining Admixture: ASTM C260.
   2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
   3. Water Reducing and Set-Adjusting Admixtures: ASTM C494/C494M, Types D and E.
   4. High Range Water-Reducing Admixture: ASTM C494/C494M, Type F/G.
   5. Use only admixtures that have been tested and approved in the mix designs.
   6. Do not use calcium chloride or admixtures containing chloride ions.

2.2 CONCRETE MIX

A. General:
   1. Normal weight: 145 pounds per cubic foot.
   2. Use air-entraining admixture in all concrete. Provide not less than four percent, nor more than eight percent, entrained air for concrete exposed to freezing and thawing, and provide from three to five percent entrained air for other concrete.

B. Proportioning and Design of Class "A" Concrete Mix:
   1. Minimum compressive strength at 28 days: 4,500 psi.
   2. Maximum water-cement ratio by weight: 0.42.
   3. Minimum cement content: 564 pounds per cubic yard.

C. Slump Limits:
   1. Proportion and design mixes to result in concrete slump at point of placement of not less than one inch and not more than four inches.
   2. When using high-range water reducers, slump prior to addition of admixture shall not exceed three inches. Slump after adding admixture shall not exceed eight inches at point of placement.

D. Adjustment of Concrete Mixes:
   1. Concrete mix design adjustments may be requested by CONTRACTOR when warranted by characteristics of materials, Site conditions, weather, test results, or other, similar circumstances.
   2. Submit for ENGINEER's approval laboratory test data for adjusted concrete mix designs, including compressive strength test results.
   3. Implement adjusted mix designs only after ENGINEER's approval.
   4. Adjustments to concrete mix designs shall not result in additional costs to OWNER.

2.3 FORM MATERIALS

A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection. CONTRACTOR shall be responsible for designing the formwork system to resist all applied loads including pressures from fluid concrete and construction loads.

B. Smooth Form Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces in accordance with ACI 301.

C. Unexposed Concrete Surfaces: Material to suit project conditions.

D. Provide 3/4-inch chamfer at all external corners. Chamfer is not required at re-entrant corners unless otherwise shown or indicated.

2.4 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 deformed bars.

B. Welded Wire Fabric: ASTM A185/A185M.

C. Steel Wire: ASTM A82/A82M.

D. Provide supports for reinforcing including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing in place.
   1. Use wire bar-type supports complying with CRSI MSP1 recommendations, except as specified in this Section. Do not use wood, brick, or other unacceptable materials.
   3. For all concrete surfaces where legs of supports are in contact with forms, provide supports having either hot-dip galvanized, plastic-protected, or stainless steel legs in accordance with CRSI MSP1.

E. Membrane-Forming Curing Compound: ASTM C309, Type I.

F. Epoxy Bonding Agent:
   1. Two-component epoxy resin bonding agent.
   2. Products and Manufacturers: Provide one of the following:
      a. Sikadur 32, Hi-Mod LPL, by Sika Corporation.
      b. Eucopoxy LPL, by the Euclid Chemical Company.
      c. Or equal.

G. Epoxy-Cement Bonding Agent:
   1. Three-component blended epoxy resin-cement bonding agent.
   2. Products and Manufacturers: Provide one of the following:
      a. Sika Armatec 110 EpoCem, by Sika Corporation.
      b. Duralprep A.C., by Euclid Chemical Company.
      c. Or equal.

PART 3 – EXECUTION

3.1 INSPECTION

A. CONTRACTOR shall examine the substrate and the conditions under which the Work will be performed and notify ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 FORMWORK

A. Construct formwork in accordance with ACI 347 such that concrete members and structures are of correct size, shape, alignment, elevation, and position.

B. Provide openings in formwork to accommodate the Work of other trades. Accurately place and securely support items required to be built into formwork.

C. Clean and adjust forms prior to placing concrete. Apply form release agents or wet forms as required. Re-tighten forms during and after concrete placing, when required, to eliminate cement paste leaks.

D. Removing Formwork:
   1. Comply with ACI 301 and ACI 347, except as otherwise indicated in the Contract Documents.
   2. Do not remove formwork and shoring until supported concrete members have acquired minimum of 90 percent of specified compressive strength. Results of suitable quality control tests of field-cured specimens may be submitted to ENGINEER for review as evidence that concrete has attained sufficient strength for removal of supporting formwork and shoring prior to removal times indicated in the Contract Documents.
   3. Removal time for formwork is subject to ENGINEER's acceptance.
   4. Repair form tie-holes following in accordance with ACI 301.

3.3 REINFORCING, JOINTS, AND EMBEDDED ITEMS

A. Comply with the applicable recommendations of Laws and Regulations and standards referenced in this Section, including CRSI MSP1, for details and methods of placing and supporting reinforcing.

B. Clean reinforcing to remove loose rust and mill scale, earth, ice, and other materials which act to reduce or destroy bond between reinforcing material and concrete.

C. Position, support, and secure reinforcing against displacement during formwork construction and concrete placing. Locate and support reinforcing by means of metal chairs, runners, bolsters, spacers, and hangers, as required.
   1. Place reinforcing to obtain minimum concrete coverages as shown on the Drawings and as required in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcing accurately in position during concrete placing. Set with ties so that twisted ends are directed away from exposed concrete surfaces.
   2. Do not secure reinforcing to formwork using wire, nails or other ferrous metal. Metal supports subject to corrosion shall not be in contact with formed or exposed concrete surfaces.

D. Provide sufficient quantity of supports of strength required to carry reinforcing. Do not place reinforcing more than two inches beyond the last leg of continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

E. Splices: Provide standard reinforcing splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown.

F. Install welded wire fabric in lengths as long as practical, lapping adjoining sections a minimum of one full mesh.

G. Do not place concrete until reinforcing is inspected and ENGINEER indicates that conditions are acceptable for placing concrete. Concrete placed in violation of this paragraph will be rejected. Notify ENGINEER in writing at least two working days prior to proposed concrete placement.

3.4 CONCRETE PLACING

A. Site Mixing: Use drum-type batch machine mixer, mixing not less than 1.5 minutes for one cubic yard or smaller capacity. Increase required mixing time by minimum of 15 seconds for each additional cubic yard or fraction thereof.

B. Ready-Mixed Concrete: Comply with ASTM C94/C94M.

C. Concrete Placing:
1. Place concrete in a continuous operation within planned joints or sections in accordance with ACI 304R.
2. Do not begin placing concrete until work of other trades affecting concrete is completed.
3. Wet concrete and subgrade surfaces to saturated surface dry condition immediately prior to placing concrete.
4. Deposit concrete as near its final location as practical to avoid segregation due to re-handling or flowing.
5. Avoid separation of the concrete mixture during transportation and placing. Concrete shall not free-fall for distance greater than four feet during placing.
6. Complete concrete placing within 90 minutes of addition of water to the dry ingredients.

D. Consolidate placed concrete in accordance with ACI 309R using mechanical vibrating equipment supplemented with hand rodding and tamping, such that concrete is worked around placing and other embedded items and into all parts of formwork. Insert and withdraw vibrators vertically at uniformly-spaced locations. Do not use vibrators to transport concrete within the formwork. Vibration of formwork or placing is not allowed.

E. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
1. In hot weather comply with ACI 305R.
2. In cold weather comply with ACI 306R.

3.5 QUALITY OF CONCRETE WORK

A. Make concrete solid, compact, smooth, and free of laitance, cracks, and cold joints.

B. Concrete for liquid-retaining structures and concrete in contact with earth, water, or exposed directly to the elements shall be watertight.

C. Cut out and properly replace to extent directed by ENGINEER, or repair to satisfaction of ENGINEER, surfaces that contain cracks or voids, are unduly rough, or are in defective in any way. Patches or plastering are unacceptable.

D. Repair, removal and replacement of defective concrete directed by ENGINEER shall be at no additional cost to OWNER.

3.6 CURING

A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by using moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until formwork is removed. Provide protection, as required, to prevent damage to exposed concrete surfaces. Total curing period shall not be less than seven days. Curing methods and materials shall be compatible with scheduled finishes.

3.7 FINISHING

A. Formed Finish:
   1. Provide smooth form concrete finish at exposed surfaces. Use largest practical form panel sizes to minimize form joints. Exposed surfaces include interior water-contacting surfaces of tanks, whether or not directly visible. All surfaces shall be considered as exposed, unless buried or covered with permanent structural or architectural material. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/8-inch in height. Where surface will be coated or will receive further treatment, remove all fins flush with concrete surface.
   2. Provide rough form finish at all unexposed surfaces. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/2-inch in height.

3.9 FIELD QUALITY CONTROL

A. Site Testing Services:
   1. OWNER will employ testing laboratory to perform field quality control testing for concrete. ENGINEER will direct the testing requirements.
   2. Testing laboratory will provide all labor, material, and equipment required for sampling and testing concrete, including: scale, glass tray, cones, rods, molds, air tester, thermometer, and other incidentals required.

B. Quality Control Testing During Construction:
   1. Perform sampling and testing for field quality control during concrete placing, as follows:

a. Sampling Fresh Concrete: ASTM C172.
b. Slump: ASTM C143/C143M; one test for each concrete load at point of discharge.
c. Concrete Temperature: ASTM C1064/C1064M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed. Test each load when time from batching to placement exceeds 75 minutes.
d. Air Content: ASTM C231; one for every two concrete load at point of discharge, and when a change in the concrete is observed.
e. Unit Weight: ASTM C138/C138M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed.
f. Compression Test Specimens:
    1) In accordance with ASTM C31/C31M, make one set of compression cylinders for each 50 cubic yards of concrete, or fraction thereof, of each mix design placed each day. Each set shall be four standard cylinders, unless otherwise directed by ENGINEER.
    2) Cast, store, and cure specimens in accordance with ASTM C31/C31M.
g. Compressive Strength Tests:
    1) In accordance with ASTM C39/C39M; one specimen tested at seven days, and three specimens tested at 28 days.
    2) Concrete that does not comply with strength requirements will be considered as defective Work.
h. Within 24 hours of completion of test, testing laboratory will transmit certified copy of test results to CONTRACTOR and ENGINEER.
i. When there is evidence that strength of in-place concrete does not comply with the Contract Documents, CONTRACTOR shall employ the services of concrete testing laboratory to obtain cores from hardened concrete for compressive strength determination. Cores and tests shall comply with ASTM C42/C42M and the following:

+ + END OF SECTION + +

SECTION 03 01 30

REPAIR AND REHABILITATION OF CONCRETE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to repair or rehabilitate, as required, all existing concrete shown or indicated in the Contract Documents as being repaired or rehabilitated.

B. Coordination:
1. Review installation procedures under this and other Sections and coordinate the Work that must be installed with or before repair and rehabilitation of concrete.

C. Related Sections:
1. Section 03 00 00, Concrete.
2. Section 03 37 13, Shotcrete
3. Section 09 85 00, Concrete Resurfacing and Lining

1.2 REFERENCES

A. Standards referenced in this Section are:
1. ASTM C109/C109M, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
2. ASTM C882/C882M, Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
3. ASTM D1042, Test Method for Linear Dimensional Changes of Plastics Under Accelerated Service Conditions.
4. ASTM D3574, Test Methods for Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams.
5. ASTM G109, Test Method for Determining the Effects of Chemical Admixtures on the Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments.

1.3 SUBMITTALS

A. Action Submittals: Submit the following:
1. Product Data: Information on all products proposed for use, including manufacturer's brochures, technical data, specifications, and other applicable data.

B. Informational Submittals: Submit the following:
   1. Manufacturer's Instructions: Manufacturer's recommended procedures for installing materials proposed for use.
   2. Special Procedure Submittals: When requested by ENGINEER, submit information on methods for supporting during demolition and repair Work existing structures, pipes, and other existing facilities affected by the Work.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling of Materials:
   1. Conform to Section 01 65 00, Product Delivery Requirements, and this Section.
   2. Clearly mark on containers manufacturer's name and label, name or title of material, manufacturer's stock number, and date of manufacture.
   3. Handle materials carefully to prevent inclusion of foreign matter.
   4. Do not open containers or mix components until necessary preparatory Work has been completed and application Work is to start immediately.

B. Storage of Materials:
   1. Conform to Section 01 66 00, Product Storage and Handling Requirements, and this Section.
   2. Store only approved materials at the Site.

PART 2 – PRODUCTS

2.1 SYSTEM REQUIRMENTS

A. All repair and rehabilitation materials shall be suitable for use in wastewater tankage.

2.2 REPAIR MORTAR

A. Product Description: Repair mortar shall be prepackaged, cement-based product specifically formulated for repairing concrete surface defects.

B. Products and Manufacturers: Provide one of the following:
   1. SikaTop 122 Plus, SikaTop 123 Plus, or SikaTop 126 Plus, by Sika Corporation.
   2. DuralTop Gel, DuralTop Flowable Mortar by Euclid Chemical Company.
   3. Or equal.

C. Materials:

1. Provide a two-component, polymer-modified, Portland cement, fast-setting, trowel-grade mortar. Repair mortar shall be enhanced with penetrating corrosion inhibitor, and shall have the following properties:

Physical Property	Value	ASTM Standard
Minimum Compressive Strength at One Day	2,000 psi	C109
Minimum Compressive Strength at 28 Days	6,000 psi	C109
Minimum Bond Strength at 28 Days	1,800 psi	C882*
* Modified for use with repair mortars.		

2. Where the least dimension of the placement in width or thickness exceeds four inches, extend repair mortar by adding aggregate as recommended by repair mortar manufacturer.

2.3 REPAIR OF EXPOSED REINFORCING STEEL

A. System Description: System for repair of exposed reinforcing steel shall consist of two components: an initial application of corrosion inhibitor and subsequent application of protective slurry mortar.

B. Corrosion Inhibitor:

1. Corrosion inhibitor shall penetrate the hardened concrete surface and form a protective layer on reinforcing steel.
2. Products and Manufacturers: Provide one of the following:
   a. Sika FerroGard 903, by Sika Corporation.
   b. Or equal.
3. Corrosion inhibitor shall:
   a. Not change the substrate's color, appearance, or texture.
   b. Penetrate independently of orientation (horizontal, vertical, overhead) at rate up to 1/10 to 4/5 inches per day, depending on density of concrete, measured using secondary neutron mass spectroscopy.
   c. Form on reinforcing steel a protective layer of high integrity of at least 100 angstroms thickness, measured using x-ray photon spectroscopy and secondary ion mass spectroscopy.
   d. Demonstrate reduction in corrosion currents after treatment as determined using cracked beam corrosion tests of concrete, as adapted from ASTM G109.

e. Be capable of reducing active corrosion rates by at least 65 percent. Reduction shall be demonstrated by project references and an independent corrosion engineer using linear polarization resistance.
f. Penetrate up to three inches in 28 days, measured using secondary neutron mass spectroscopy.

C. Protective Slurry Mortar:
1. Material shall be two-component, polymer-modified, cementious waterproofing and protective slurry mortar. Provide two coats at coverage of 50 square feet per gallon per coat.
2. Products and Manufacturers: Provide one of the following:
a. Sikatop Seal 107, by Sika Corporation.
b. Or equal.

2.4 CRACK INJECTION MATERIALS

A. Non-structural Crack Repair System:
1. Hydrophobic Polyurethane Chemical Grout:
a. Provide hydrophobic polyurethane that forms a flexible gasket.
b. Products and Manufacturers: Provide one of the following:
1) SikaFix HH LV, by Sika Chemical Company.
2) Hydro Active Flex SLV, by De Neef Construction Chemicals, Inc.
3) Or equal.
c. Shrinkage limit shall not exceed 4.0 percent in accordance with ASTM D1042.
d. Minimum elongation of 250 percent in accordance with ASTM D3574.
e. Minimum tensile strength of 150 psi in accordance with ASTM D3574.

2. Hydrophilic Acrylate-Ester Resin:
a. Hydrophilic crack repair system shall be acrylate-ester resin that forms a flexible gasket and increase in volume by at least 50 percent when in contact with water.
b. Products and Manufacturers: Provide one of the following:
1) Duroseal Multigel 850, manufactured by BBZ USA, Inc.
2) Or equal.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which the repair Work is to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely

completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation:

1. The Owner will drain and isolate the Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6 prior to making them available to the Contractor.
2. Prior to beginning Work, the Contractor shall remove all wastewater residue and debris from the structures by water wash and vacuum cleaning or by other suitable means. Blow down cleaning will not be acceptable.
3. As the initial step, degrease all surfaces to be treated using a water-based, emulsifying, biodegradable, non-flammable, phosphate-free cleaning solution, followed by rinsing with clean, potable water until all traces of contaminants including detergent have been removed. Rinse concrete surfaces multiple times with high-pressure water per SSPC-SP12 - High-Pressure Water Cleaning (HP WC), using a minimum pressure of 5,000 psi and a minimum volume of 6 gallons per minute. Use only potable water. All traces of degreasing and cleaning solutions shall be completely removed.
4. Remove and dispose of all debris and spent cleaning water by pumping and/or by vacuum cleaning. The cleaning liquid and debris shall not be deposited in sumps or drains or elsewhere at the treatment facility and must be removed from the site and legally disposed of by the Contractor.
5. Initial Surface Preparation: Remove by chipping, abrasive blasting, or hydro blasting all laitance, foreign material, and unsound concrete from entire area to be repaired. Further roughen surface as specified in this Section. Where non-shrink grout or repair mortar is used, perform additional surface preparation, if any, recommended by product manufacturer.
6. Wetting Procedure: Where repair concrete, shotcrete, or cement grout is used, and bonding agent is not required, or where repair mortar or non-shrink grout manufacturer recommends wet or saturated surface, perform the following:
    a. Continuously apply water for at least four hours to surface being repaired. Where large surface areas are to be repaired, use fog-spray nozzles, mounted on stands, in sufficient number so that entire surface to be repaired is contacted by fog spray cloud.
    b. Prevent concrete from drying until after repair is completed. Re-wet surfaces not yet repaired using water sprays at least a daily; should more than four days elapse without re-wetting surfaces not yet repaired, repeat the original saturating procedure.
    c. Remove standing water in areas to be repaired before placing repair material. Provide means to remove excess water from structure.

7. Preparation for Epoxy Bonding Agent: Where repair material manufacturer recommends use of epoxy-bonding agent, conform to recommendations of both repair material manufacturer and bonding agent manufacturer.

3.3 INSTALLATION, GENERAL

A. Construction Tolerances: Shall be as specified in Section 03 30 00, Cast-In-Place Concrete, except as specified in this Section and elsewhere in the Contract Documents.

B. Care shall be taken to fully consolidate repair material, completely filling all portions of space to be filled.

C. Bring surface being repaired into alignment with adjacent surfaces, providing uniform, even surface. Surface repaired shall match adjacent existing surfaces in texture and shall receive coatings or surface treatments, if any, provided for the existing surface adjacent to repaired surface.

D. Curing:
   1. Curing of repair mortar and non-shrink grout shall be in accordance with manufacturer's recommendations, except that minimum cure period shall be three days.
   2. Curing of other materials shall be in accordance with requirements of Section 03 00 05, Concrete.

3.4 REPAIR OF SURFACE DEFECTS

A. Surface defects are depressions in a concrete surface that do not extend all the way through the concrete. Surface defects can result from removal of an embedded item, removal of an intersecting concrete member, physical damage, or unrepaired rock pockets created during original placement. For spalls that result from corroded reinforcing steel or other embedment refer to Article 3.7 of this Section.

B. Preparation: Perform the following in addition to requirements of Article 3.2 of this Section:
   1. Remove by chipping all loose, damaged concrete to sound material.
   2. Where existing reinforcing is exposed, remove concrete to minimum of one-inch around exposed bars. If existing bars are cut through, cracked, or cross sectional area is reduced by more than 25 percent from original, immediately notify ENGINEER.
   3. Score-cut perimeter of area to be repaired to minimum depth of 1/2-inch and maximum depth that will not cut existing reinforcing steel. Chip out existing concrete to the score line so that minimum thickness of repair mortar will be 1/2-inch.

C. Repair Material:

1. Completely fill the surface defect with specified repair material, in accordance with material manufacturer's instructions and the Contract Documents.
2. Perform, with repair mortar, repairs of surface defects in concrete normally in contact with water or soil, and interior surfaces of structures that contain water.
3. Repair of other surface defects may be by applying repair mortar, repair concrete, shotcrete, or cement grout, as appropriate.

3.5 REPAIR OF DETERIORATED CONCRETE

A. This Article pertains to deteriorated concrete which has been damaged due to corrosion of reinforcing steel, physical damage due to abrasion, or damage due to chemical attack. Use repair mortar, as specified in this Article, for repairing deteriorated concrete. Where repaired surface will be subsequently covered with plastic liner material, coordinate finishing with requirements for installing plastic liner material.

B. Surface Preparation: In addition to requirements of Article 3.2 of this Section, perform the following surface preparation:
1. Remove loose, broken, softened, and acid-contaminated concrete by abrasive blasting and chipping to sound, uncontaminated concrete.
2. Upon completion of removal of deteriorated concrete, notify ENGINEER in writing. Allow two weeks for ENGINEER to evaluate the surface, perform testing for acid contamination if required, determine if additional concrete shall be removed, and to develop special repair details (if any) required. Should ENGINEER determine that additional concrete be removed to reach sound, uncontaminated concrete, allow another two-week period for further evaluation and testing following the additional removal.
3. Surface preparation shall conform to recommendations of repair mortar manufacturer.
4. Repair and rehabilitate isolated areas of exposed reinforcing bars in accordance with Article 3.4 of this Section. If extensive areas of reinforcing steel are uncovered after removal of deteriorated concrete, ENGINEER will determine the repair methods required.

C. Repair Mortar Placing:
1. Conform to manufacturer's recommended procedures for mixing and placing repair mortar.
2. After initial mixing of repair mortar, addition of water is not allowed.
3. Minimum Thickness:
    a. Install repair mortar to not less than minimum thickness recommended by manufacturer, and not less than 1/2-inch.
    b. Where removal of deteriorated concrete results in repair thickness of less than minimum required thickness to return to original concrete surface in isolated areas totaling less than ten percent of

total repair surface area, remove additional concrete to obtain at least the required minimum thickness.

c. Where surface area with repair thickness less than minimum required thickness exceeds ten percent of total repair area, notify ENGINEER.

d. Provide repair mortar so that minimum cover over existing reinforcing steel is two inches. Do not place repair mortar creating locally raised areas.

e. Where transitioning to or from wall surfaces not requiring repair, do not feather-out repair mortar at transition. Instead, form the transition by saw cutting a score line to not less than minimum required repair mortar depth and chip out concrete to the saw cut line. Do not cut or otherwise damage reinforcing steel.

4. Place repair mortar to an even, uniform plane to restore concrete member to its original surface. Out-of-plane tolerance shall be such that the gap between 12-inch long straight edge and repair mortar surface does not exceed 1/8-inch, and gap between a four-foot long straight edge and repair mortar surface shall not exceed 1/4-inch. Tolerances specified in this paragraph apply to straight edges placed in any orientation at any location.

D. Finishing:

1. Provide smooth, steel trowel finish to repair mortar.

2. When completed, there shall be no sharp edges. Provide exterior corners, such as at penetrations, one-inch radius. Interior corners shall be square, except corners to receive plastic lining which shall be made with two-inch fillet in repair mortar.

3.6 REPAIR OF EXPOSED REINFORCING

A. Remove, by abrasive blasting or hydro blasting, all corrosion, foreign materials, and unsound concrete from area to be repaired.

B. Surface shall be visually dry before applying corrosion inhibitor. Liberally apply corrosion inhibitor to achieve coverage of 100 square feet per gallon in two or more coats, by allowing corrosion inhibitor to soak into substrate. Time between coats shall be the longer of: one hour, or as recommended by corrosion inhibitor manufacturer. Apply using rollers, brushes, or hand-pressure spray equipment.

C. After applying final coat of corrosion inhibitor, minimum cure time of 24 hours is required.

D. Provide high-pressure wash to surfaces to be repaired to remove filmy residue from corrosion inhibitor.

3.7 CRACK INJECTION

A. Examine areas under which injection Work will be installed and locate cracks that require injection. Identify and inject cracks greater than 0.010-inch wide in structures that retain or contain water, wastewater, or similar liquid.

B. Install injection material in accordance with crack injection manufacturer's requirements.

C. After injecting and curing, verify that injected material penetrated the crack adequately and that there is no visible leakage through the crack. After injecting, if crack continues to leak, re-inject crack at no additional cost to OWNER until structure is watertight.

D. If proper penetration of crack cannot be achieved, submit to ENGINEER a proposed alternate approach for modifying the specified injection procedure to properly seal the crack. In new concrete and in concrete cracked as a result of CONTRACTOR's operations, perform modifications to crack injection procedure and fully repair the crack without additional cost to OWNER or extension of the Contract Times.

3.8 SITE QUALITY CONTROL

A. OWNER will employ and pay for services of testing laboratory for Site quality control testing. ENGINEER will direct the number of tests and specimens required, including providing necessary materials for making and facility for storing test specimens. CONTRACTOR shall make standard compression test specimens as specified in this Section under the observation of ENGINEER. CONTRACTOR shall provide:

1. Necessary assistance required by ENGINEER.
2. All labor, material, and equipment required, including rods, molds, thermometer, curing in heated storage box, and all other incidentals required, subject to approval by ENGINEER.
3. All necessary storage, curing, and transportation required for testing.
4. CONTRACTOR will be charged for cost of additional testing and investigation, if any, for Work performed that is not in accordance with the Contract Documents or is otherwise defective.

B. Site Tests of Cement-based Grouts and Repair Mortar:

1. Obtain compression test specimens during construction from first placement of each type of mortar or grout, and at intervals thereafter as selected by ENGINEER, to verify compliance with the Contract Documents. Specimens will be made by ENGINEER or ENGINEER's representative.
2. Compression tests and fabrication of specimens for repair mortar and non-shrink grout will be performed in accordance with ASTM C109. Set of three specimens will be made for each test. Tests will be made at seven

days, 28 days, and additional time periods as deemed appropriate by ENGINEER.

3. Material, already placed, failing to conform to the Contract Documents, is defective.

C. Repair Concrete: Repair concrete shall be tested as required in Section 03 30 00, Cast-In-Place Concrete.

+ + END OF SECTION + +

SECTION 03 37 13

SHOTCRETE

PART 1 GENERAL

1.01 SUMMARY

A. The Work specified in this section consists of providing all labor, materials, and equipment necessary to furnish and install wet-mix shotcrete as indicated on the Contract Drawings and as specified herein.

B. Work includes producing shotcrete consisting of Portland Cement fine and coarse aggregate, water, and approved admixtures; proportioned, mixed, transported, placed, finished, and cured as specified.

1.02 RELATED SECTIONS

A. Section 03 00 05 – Concrete

1.03 REFERENCES

A. American Concrete Institute (ACI):
1. ACI 117 Standard Tolerances for Concrete Construction and Materials
2. ACI 301 Specifications for Structural Concrete
3. ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete
4. AC 305R Hot Weather Concreting
5. ACI 306R Cold Weather Concreting
6. ACI 506R Guide to Shotcrete
7. ACI 506.2 Specification for Shotcrete
8. ACI 506.3R Guide to Certification of Shotcrete Nozzlemen
9. ACI 506.4R Guide for the Evaluation of Shotcrete

B. American Society for Testing and Materials (ASTM)
1. ASTM C 33 Standard Specification for Concrete Aggregates
2. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
4. ASTM C 94 Standard Specification for Ready-Mixed Concrete
5. ASTM C 173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
6. ASTM C143 Test Method for Slump of Hydraulic-Cement Concrete
7. ASTM C 150 Standard Specification for Portland Cement
8. ASTM C 260 Standard Specification for Air-Entraining Admixtures for Concrete
9. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete
10. ASTM C 618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

11. ASTM C 989 Standard Specification for Slag Cement for Use in Concrete and Mortars
12. ASTM C 1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
13. ASTM C 1140 Standard Practice for Preparing and Testing Specimens for Shotcrete Test Panels
14. ASTM C 1141 Standard Specifications for Admixtures for Shotcrete
15. ASTM C 1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
16. ASTM C 1436 Specification for Materials for Shotcrete
17. ASTM E 329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

C. Concrete Plant Manufacturer's Bureau (CPMB) - "Concrete Plant Standards."

D. Concrete Reinforcing Steel Institute (CRSI):
1. CRSI – "Manual of Standard Practice"
2. CRSI – "Placing Reinforcing Bars"

E. Definitions
1. The following items are defined for general use in these specifications:
   a. Nozzlemen — Worker on the shotcrete crew who manipulates the nozzle, controls air addition at the nozzle, and controls final deposition of the material.
   b. Shotcrete - Concrete or mortar pneumatically projected at high velocity onto a surface.
   c. Wet-Mix Shotcrete — Shotcrete with ingredients, including mixing water, are thoroughly mixed before introduction into the shotcrete delivery system, and compressed air is introduced to the material flow at the nozzle.

1.04 DESCRIPTION

A. Classes of Concrete:
1. Class A (4.500 psi) - use for all concrete unless indicated otherwise.

1.05 GENERAL REQUIREMENTS

A. Tinted Shotcrete Work:
1. Where indicated herein and where noted on the contract documents, shotcrete work shall be tinted per the requirements of this Section.

1.06 QUALITY ASSURANCE

A. General:
1. Work performed under this specification shall comply with the applicable provisions and recommendations of the publications listed in Article 1.04 above.

2. Contractor shall employ, at its own expense, a testing laboratory experienced in the design and testing of concrete materials and mixes. This laboratory shall be responsible for all concrete mix design and trial batch testing.
3. Testing agencies that perform testing services on shotcrete shall meet the requirements of ASTM E 329.
4. Testing and inspection shall be conducted in accordance with the requirements of ASTM C 1077 and other applicable standards.

B. Qualifications:
1. The shotcrete Contractor's crew foreman and nozzlemen shall meet the following requirements:
   a. Have at least 5-years of experience in reinforced shotcrete construction work on projects of similar size and character.
   b. Nozzlemen are certified by the American Concrete Institute (ACI) for application of shotcrete to vertical surfaces, using the wet-mix shotcrete process.
   c. The nozzlemen shall pass a preconstruction mock-up test, described herein, demonstrating ability to satisfactorily construct the reinforced shotcrete structural elements required for this project.

C. Evaluation Prior to Construction:
1. Preconstruction Tests:
   a. A preconstruction test shall be performed to evaluate the ability of the proposed materials, shotcrete mixture, equipment, and crew to produce shotcrete conforming to the project specifications prior to the commencement of construction work. Additionally, the preconstruction mockup will demonstrate the color, finish, and curing methods as specified in the contract documents. See Specification 03 00 05 - Concrete for requirements for the various finishes.
   b. The preconstruction test shall be used to prequalify the nozzlemen proposed for use on the project. Nozzlemen who have not been prequalified shall not be permitted to apply shotcrete on the project. Each nozzlemen shall prepare a panel demonstrating each shooting orientation and each proposed design mix. The test panel shall be a representative of the project and simulate job conditions as closely as possible.
   c. Preparation of test panels and testing shall comply with ASTM C 1140.
   d. The test panel shall be 48-inch by 48-inch with thickness and reinforcing shall reproduce the thickest and most congested area specified in the structural design.
   e. The equipment used in preconstruction testing shall be the same equipment used to produce the work.
   f. Construction of test panels shall be witnessed by the special inspection agency, construction manager responsible for the shotcrete construction, and by the Owner's Representative.
   g. Accepted test panel shall remain in a safe and visible location for the duration of the shotcrete operations and shall remain on site until concurrence for its removal if obtained by Owner's Representative.

h. Accepted test panel shall be used to determine the acceptance of the production work in terms of color and finish.

2. Sampling and Testing of Mockup. All sampling and testing of shotcrete shall be performed by a licensed concrete testing laboratory. Cores taken from the test panel shall be used to demonstrate that the proposed mix design meets the requirements of this Specification. Six core samples shall be obtained from each preconstruction test panel. Strength testing shall be performed in accordance with ASTM C39 at 28-days. Test panel shall be cured in the same manner and with the same materials as the contracted work.
   a. Three specimens with no reinforcing steel shall be sampled and prepared in accordance with ASTM C 42.
   b. Three samples with reinforcing steel. Bonding of shotcrete to reinforcing steel shall be evaluated during testing.
3. Evaluation of Strength Tests for Preconstruction Mockup. The shotcrete test panel shall be deemed acceptable if the mean compressive strength of each set of three cores shall equal or exceed f'c with no individual cores less than 0.75 f'c.

1.07 SUBMITTALS

A. General:
1. Review of required submittals shall be by Owner's Representative for acceptance unless specifically noted otherwise.
2. Prior to changing the brand, type, size or source of cementitious materials, aggregates, water, ice or admixtures, new historical field strength test data, data from new trial mixtures or evidence which indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted.

B. Shop Drawings
1. Prior to ordering of any materials, the Contractor shall submit to the Owner's Representative for review, a design mix indicating the proposed proportioning of materials to be used for the shotcrete, together with documentation of certified test results supplied by a qualified independent testing laboratory for the shotcrete verifying that the proportions meet the specified requirements. The design mix submittal shall include, but is not necessarily limited to the following:
   a. Names of all Suppliers and/or Manufacturers.
   b. Distance, in miles, from the Mixing Plant to the Job Site.
   c. Certification of compliance of materials with ASTM Specifications as here in before specified.
   d. Proposed proportioning of materials.
   e. Admixtures required and/or proposed and dosage of each for all temperature ranges proposed.
   f. Sieve analyses for each aggregate size.
   g. Required cylinder test results and curves.
   h. Signed statement that the proposed proportions meet all Specification requirements, including required average compressive strength shall consist of a field strength test record, several strength test records, or trial mixtures.

2. Qualifications of shotcrete nozzlemen and personnel performing the work.
3. A list of proposed shotcreting equipment, including brand name, model, and capacity of proposed pump and air compressor.
4. Details of proposed means of preparing surface to receive shotcrete.
5. A description of proposed curing procedures and protection to be provided to shotcrete.
6. Details of proposed methods for control and disposal of waste materials, including waste shotcrete, rebound, and overspray.

C. Additional Submittals for Tinted Shotcrete Work:
1. Submit manufacturer's complete technical data sheets for tinting admixture and curing compound, if applicable.
2. Submit laboratory trial batch information for each mix that is to be used as tinted shotcrete.
3. Samples: Submit for each approved mix, three 12" x 12" x 2" samples, cast vertical, simulating the shotcrete techniques to be used in production for verification of color and determination of acceptable variation of color.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Properly deliver and handle materials to prevent contamination, segregation, or damage to materials.
B. Cement shall be stored in weathertight buildings, bins or silos which will provide protection from dampness and contamination and will minimize warehouse set.

1.09 AGGREGATE STOCKPILES SHALL BE ARRANGED AND USED IN A MANNER TO AVOID EXCESSIVE SEGREGATION OR CONTAMINATION WITH OTHER MATERIALS OR WITH ANY OTHER SIZES OF LIKE AGGREGATES

A. Stockpiles of natural sand shall be allowed to drain freely to minimize variations in moisture content throughout the stockpile. Frozen or partially frozen materials shall not be used.

B. Admixtures shall be stored in such a manner as to avoid contamination, evaporation, freezing, or other damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Not Used

2.02 MATERIALS / EQUIPMENT
A. General
1. Shotcrete shall be composed of cement, aggregate, water, and an air-entraining admixture, all in conformance with ACI 506R.

B. Cementitious Materials
1. Cement:

a. ASTM C 150 - Portland Cement, Type II.
b. Do not use cement which has deteriorated.

2. Ground Granulated Blast Furnace Slag:
   a. Ground granulated blast furnace slag (GGBF) mineral admixture, when used, shall meet the requirements of ASTM C 989, Grade 100 or better.
   b. A higher percentage of GGBF slag of the total cementitious material in concrete shall be permitted as approved by the Owner's Representative to suit the project needs.
3. Silica Fume:
   a. Silica fume mineral admixture shall be the dry compacted or slurry form and shall meet the requirements of ASTM C 1240. Silica Fume shall be considered a cementitious material. Application rate shall be 7-percent by weight of cement, unless indicated otherwise.

C. Aggregate:
1. Coarse and fine aggregates shall meet the requirements of ASTM C33. Aggregates shall be hard, dense, durable and conform to the limits for allowable quantities of deleterious substances as given in ASTM C33.
2. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces. Marine dredged aggregates shall not be used.
3. The gradation of the combined coarse and fine aggregate mixture shall be within the following limits:

U.S. Standard Sieve Size	Percent by Weight Passing **Individual** Sieves	
	Gradation No. 1	Gradation No. 2
3/4 inch	100	100
1/2 inch	100	100
3/8 inch	100	90-100
No. 4	95-100	70-85
No. 8	80-98	50-70
No. 16	50-85	35-55
No. 30	25-60	20-35
No. 50	10-30	8-20
No. 100	2-10	2-10

4. Aggregates shall be uniformly well graded and shall not exhibit extremes of gradation.
5. Fine aggregate shall be composed of clean, sharp, hard, strong, durable, insoluble, uncoated, natural sand, manufactured sand, or a combination thereof. Shall be free from loam, clay lumps or other deleterious substances.
6. Coarse aggregate shall be crushed stone processed from natural rock or stone and shall consist of clean, hard, strong, durable, insoluble, unweathered, and uncoated pieces of uniform quality throughout; and shall be free from such alkali, decomposed minerals, organic material, clay, mica, schist, or other foreign matter that will render it unsuitable.

D. Admixtures

1. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instructions. All admixtures shall be compatible and by a single manufacturer capable of providing qualified field service representation. Do not use admixtures which have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by Owner's Representative.
2. Air entraining admixtures shall conform to the requirements of ASTM C 260.
3. Admixtures such as water reducers, high-range water reducers (superplasticizers), and retarders shall conform to the requirements of ASTM C1141.
4. Do not use any shotcrete accelerators without written authorization by the Owner's Representative.
5. Do not use admixtures containing chlorides.

E. Water

1. Water used in shotcrete production shall be clean and free from objectionable mineral salts and from injurious amounts of oils, acids, alkalis, organic materials, or other substances that may be deleterious to concrete or steel. Water shall meet the requirements of ASTM C 94.

F. Reinforcement

1. Use reinforcing steel of type, size, and dimensions shown in the Contract Drawings.

G. Proportioning and Mix Design

1. The Contractor shall be responsible for shotcrete mixture proportioning. Proportion shotcrete mix in accordance with ACI 506R and ACI 506.2 to achieve 4,500 psi compressive strength at 28-days. Maintain maximum water cement ratio of 0.42 by weight.

2. Air Content:
   a. All concrete shall be air entrained unless indicated otherwise.
   b. Air content for normal weight shotcrete, prior to shooting, shall be in accordance with ASTM C 173 as follows:

Nominal Maximum Aggregate Size (in.)	Total Air Content, percent by Volume (+/- 1.5%)
Greater than 3/8	6
Less than 3/8	7

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

1. Inspection
   a. Contractor and its installer shall examine the substrate and the conditions under which Work is to be performed and notify Owner's Representative in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Owner's Representative.
2. Batching, Mixing and Transporting
   a. All shotcrete shall be batched, mixed and transported in accordance with the requirements of ASTM C94.
   b. Proportions of aggregates and cement shall be accomplished on a weight basis at the supply plant and transported to the Site by transit mixing trucks of a suitable weight.
   c. All wet-mix shotcrete shall be applied within 90 minutes after addition of mixture water to the batch. Shotcrete loads shall be of such batch size that this requirement is met.
   d. Weather Conditions:
      1) General requirements for hot and cold weather concrete detailed in ACI 305R and ACI 306R apply to the shotcrete work.
   e. Ensure materials and surrounding air temperature are a minimum 40°F prior to, during, and for a period of at least 7-days after the application of shotcrete.
   f. Cold Weather:
      1) Shotcreting may only proceed if the substrate to which the shotcrete is applied is above 41°F.
      2) Do not use frozen materials or materials containing ice or snow.
      3) Do not place shotcrete on frozen surfaces or surfaces containing frozen materials.
      4) Do not use calcium chloride, salt, or other materials containing antifreeze agents.
   g. Hot Weather:
      1) Terminate shotcrete application if the ambient temperature rises above 86°F, unless the Contractor adopts special hot-weather shotcreting procedures that are approved by the Owner's Representative.
   h. Suspend shotcrete operations during high winds, rainy weather, hot weather, or near freezing temperatures when work cannot be protected.

3. Surface Preparation
   a. Before applying shotcrete, remove unsound or loose materials and contaminants that may inhibit shotcrete bonding. Chip or scarify areas to be sprayed to extent necessary to provide sound substrate.
   b. Clean rock surfaces of loose materials, mud, and other foreign matter that might weaken shotcrete bonding.
   c. Prior to placement of shotcrete, the surface shall be dampened, but no material shall be placed where the surface is completely water saturated, spongy, or has freestanding water present.
   d. Any surface preparation which has not been performed to the satisfaction of the Owner's Representative shall be made good prior to any shotcrete operation.
4. Alignment
   a. Shotcrete shall be applied to the minimum thickness shown on the Contract Drawings. Provide alignment wires to establish thickness and plane of required surfaces.
   b. Shotcrete shall be applied without voids and shall thoroughly cover all steel or wire reinforcement with at least 2-inches of cover, unless otherwise indicated on the Contract Drawings.
5. Equipment
   a. Shotcrete delivery equipment shall be pneumatic feed or positive displacement type capable of delivering a steady stream of uniformly mixed material to discharge nozzle at the proper velocity and rate of discharge.
   b. Clean, dry air adequate for maintaining sufficient nozzle velocity, uniformly steady for work while simultaneously operating blow pipe for cleaning away rebound.
   c. The delivery equipment shall be thoroughly cleaned at the end of each shift. Any build-up of coatings in the delivery hose and nozzle shall be removed. The air ring and nozzle shall be regularly inspected, cleaned, and replaced if needed.
   d. Contractor is responsible to provide suitable scaffolding, man lifts, or other devices to provide the nozzlemen, helpers, and inspectors with free unhindered access to the work area.

3.02 IMPLEMENTATION

1. Application
   a. The shotcrete shall emerge from the nozzle in a steady, uninterrupted flow perpendicular to the surface to ensure maximize compaction, binding, cohesion and density, minimize shadowing, rebound, and segregation, and prevent sagging of the applied shotcrete. Should the flow become intermittent for any reason, the nozzlemen shall direct it away from the work until it again becomes constant.
   b. Build up thickness by layers, in multiple passes of the nozzle over the work area. Follow a routing that will fill and completely encase reinforcement, using maximum layer thickness.
   c. When shotcreting walls, beginning at the bottom and work upwards.
   d. Allow each shotcrete layer to stiffen sufficiently before applying next layer of shotcrete. If shotcrete has set and hardened, high-pressure water blast with clean

water and bring to a saturated surface-dry (SSD) condition at the time of application of the next layer of shotcrete.

e. Use a shooting technique that provides full encapsulation of all reinforcing steel and maintains reinforcement position during shooting.

f. Reinforcement steel and wire reinforcement shall be sufficiently fastened to prevent dislodgement under shotcrete application. Reinforcement that becomes dislodged shall be reset and securely fastened into position. Reapply shotcrete as needed to fill void from resetting reinforcement.

g. Allow easy access to shotcrete surfaces for screening and finishing to permit uninterrupted application.

h. Trim shotcrete with a cutting rod or other suitable device to the specified line and grade.

i. Under no circumstances shall rebound be worked back into the construction. All rebound shall be removed and disposed of at an approved off-site location at the Contractor's expense.

j. Protect all adjacent surfaces from build-up of rebound, overspray, and shotcrete trimmings.

k. Remove any excess shotcrete applied outside of the specified areas to be shot as shown on the Contract Drawings. Leave work area in a clean condition on completion of the work, free from contamination by excess shotcrete trimmings, rebound, overspray, or slurry from shotcrete operations.

2. Surface Finish

a. After screeding/rodding the final shotcrete layer to the specified line and grade, provide a finish as specified on the contract drawings. Refer to General Specification 03 00 05 — Concrete for description of finishes.

3. Shotcrete Curing and Protection

a. General:

1) Protect all freshly deposited concrete from premature drying, from weather elements, from defacement, from flowing water, and from mechanical injury.

2) Shotcrete shall be kept continuously moist for 24-hours after shotcreting is complete.

3) Provisions shall be made for maintaining the shotcrete in a moist condition for a period of at least 7-days.

b. Curing Methods:

1) The Contractor shall use one of the following methods to ensure that the concrete remains in a moist condition for
the minimum period stated above.

a) Ponding or continuous fogging or sprinkling.

b) Application of mats or fabric kept continuously wet.

3.03 FIELD TESTING / QUALITY CONTROL

1. Evaluation During Construction

a. Strength Tests During Construction: Strength tests for shotcrete shall be made by an approved agency contracted to do testing work by the Owner on specimens that are representative of the work, and that are sampled and prepared

in accordance with ASTM C 42 and ASTM C 1140. Strength tests shall be obtained at both 7-days and at 28-days. Specimens to be tested shall be cored from test panels. Reinforcing bars shall be excluded from test panel.

b. Sampling: Two test panels shall be shot for each 50 cubic yards of shotcrete or portion thereof, but not less than once for each shift per day. Panels shall be shot in the same position as the work, during the work and by the nozzlemen doing the work. The conditions under which the panels are cured shall be the same as the work. Three cores shall be obtained from each test panel per ASTM C 42 and ASTM C 1140.

c. Panel Criteria: The test panels shall have minimum dimensions of 24- inches by 24-inches and a minimum depth of 3 'Z2 - inches. The form for receiving the shotcrete shall be either wood or steel construction and sufficiently rigid to prevent dislodging of the shotcrete through vibration or deformation.

d. Acceptance criteria: The average compressive strength of three cores from the test panel tested at 28-days in accordance with ASTM C39 shall equal or exceed 0.85f'c with no single core less than 0.75I'c. To check accuracy, locations represented by erratic core strengths shall be retested.

2. Repairs

a. Shotcrete that is identified as being defective while still in a plastic state shall be removed by using trowels, scrapers, or other suitable mechanical devices.

b. Any shotcrete that does not attain minimum specified strength required, shall be removed, and replaced at no additional cost.

c. Hardened shotcrete that exhibits segregation, honeycombing, shows cracking, or other deficiencies shall be removed and replaced with acceptable shotcrete at no additional cost to the Owner using the following process:

1) Remove unsound or loose materials and contaminants that may inhibit bond of shotcrete repairs.

2) Chip or scarify areas to be repaired to extent necessary to provide sound substrate. Cut edges square and /›-inch deep at perimeter of work, tapering remaining shoulder at 1:1 slope into cavity to eliminate square shoulders. Care shall be taken to prevent damage to reinforcing steel bars or embedment’s adjacent to sound shotcrete.

3) Dampen surfaces and apply new shotcrete.

4) Repair shotcrete shall be placed, finished, cured, and protected in the same manner specified for shotcrete work.

5) Limits of work may be increased to minimize potential differences in appearance between repaired shotcrete and surrounding shotcrete. The cured repair shall be placed to match surrounding shotcrete in finish and color to the greatest extent possible.

d. The Contractor shall bear the costs for all repair and tests for nonconforming shotcrete.

3.04 ADJUSTING / PROTECTION / CLEANUP

A. Remove and dispose of rebound and overspray materials from final shotcrete surfaces and areas not intended for shotcrete placement.

+ + END OF SECTION + +

SECTION 03 60 00

GROUTING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install grout and perform grouting Work.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before grouting Work.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 43 26 23, Stainless Steel Slide Gates.

D. Application and Grout Material:
   1. The following is a listing of grouting applications and the corresponding type of grout material to be provided for the associated application. Unless shown or indicated otherwise in the Contract Documents, provide grout in accordance with the following:

TABLE 03 60 00-A, GROUT APPLICATIONS AND MATERIAL TYPES

Application	Required Grout Material Type
Grout for setting slide gates and filling gaps in wastewater channel.	Class 1 Non-shrink Grout

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ACI 211.1, Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
   2. ACI 301, Structural Concrete for Buildings.
   3. ASTM C33/C33M, Specification for Concrete Aggregates.
   4. ASTM C109/C109M, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
   5. ASTM C230/C230M, Specification for Flow Table for Use in Tests of Hydraulic Cement.
   6. ASTM C531, Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
   7. ASTM C579, Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

8. ASTM C827, Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
9. ASTM C882/C882M, Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
10. ASTM C939, Text Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
11. ASTM C1107/C1107M, Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
12. ASTM C1181, Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
13. NSF/ANSI 61, Drinking Water System Components - Health Effects.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Shall have a minimum of five years experience of producing products substantially similar to that required and shall be able to submit documentation of at least five satisfactory installations that have been in successful operation for at least five years each.

B. Trial Batch:
   1. Each grout fill and construction joint grout mix proportion and design shall be verified by laboratory trial batch or field experience methods. Comply with ACI 211.1 and submit to ENGINEER a report with the following data:
      a. Complete identification of aggregate source of supply.
      b. Tests of aggregates for compliance with specified requirements.
      c. Scale weight of each aggregate.
      d. Absorbed water in each aggregate.
      e. Brand, type, and composition of cement.
      f. Brand, type, and amount of each admixture.
      g. Amounts of water used in trial mixes.
      h. Proportions of each material per cubic yard.
      i. Unit weight and yield per cubic yard of trial mixtures.
      j. Measured slump.
      k. Measured air content.
      l. Compressive strength developed at seven days and 28 days, from not less than three test specimens cast for each seven-day and 28-day test, and for each design mix.
   2. Field Experience Method: When field experience methods are used to select grout proportions, establish proportions as specified in ACI 301.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Schedule of Project-specific grout applications, installation locations, and the grout type proposed for each.

b. List of grout materials and proportions for the proposed mix designs. Include data sheets, test results, certifications, and mill reports to qualify the materials proposed for use in the mix designs. Do not start laboratory trial batch testing until submittal is approved by ENGINEER.

2. Product Data:
   a. Data sheets, certifications, and manufacturer's specifications for all materials proposed for use.

B. Informational Submittals: Submit the following:
   1. Manufacturer's Instructions:
      a. Special instructions for shipping, storing, protecting, and handling.
      b. Installation instructions for the materials.
   2. Field Quality Control Submittals:
      a. Report field testing results for each required time period. (e.g., seven-day tests, 28-day tests). Submit within 24 hours after completion of associated test. Each test report shall include results of all testing required at time of sampling.
   3. Supplier Reports:
      a. Submit written report of results of each visit to Site by Supplier's field service technician, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.
   4. Qualifications Statements:
      a. Testing laboratory, when not submitted under other Sections.
      b. Manufacturer, when submittal of qualifications is required by ENGINEER.
      c. Manufacturer's field service technician, when submittal of qualifications is required by ENGINEER.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Storage of Materials: Store grout materials in a dry location, protected from weather and protected from moisture.

PART 2 – PRODUCTS

2.1 NON-SHRINK GROUT MATERIALS

A. General: Non-shrink grout shall be a prepackaged, inorganic, flowable, non-gas-liberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or container in which the materials are packaged. Specific formulation for each type or class of non-shrink grout specified in this Section shall be that recommended by the grout manufacturer for the particular application.

B. Class I Non-Shrink Grout:

1. Class I non-shrink grouts shall have a minimum 28-day compressive strength of 7,000 psi. Use grout for precision grouting and where water-tightness and non-shrink reliability in both plastic and hardened states is critical, in accordance with Table 03 60 00-A in this Section.
2. Products and Manufacturer: Provide one of the following:
    a. Masterflow 928, by Master Builders, Inc.
    b. Five Star Grout, by Five Star Products, Inc.
    c. Hi-Flow Grout, by Euclid Chemical Company.
    d. Or equal.
3. Comply with ASTM C1107/C1107M, Grade C and B (as modified below) when tested using amount of water required to achieve the following properties:
    a. Fluid consistency (20 to 30 seconds) shall be in accordance with ASTM C939.
    b. At temperatures of 45, 73.4, and 95 degrees F.
4. Length change from placing to time of final set shall not have shrinkage greater than the expansion measured at three or fourteen days. Expansion at three or fourteen days shall not exceed the 28-day expansion.
5. Non-shrink property shall not be based on chemically-generated gas or gypsum expansion.
6. Fluid grout shall pass through the flow cone, with continuous flow, one hour after mixing.

2.2 CURING MATERIALS

A. Curing materials shall comply with Section 03 00 05, Concrete and shall be as recommended by the manufacturer of prepackaged grouts.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine substrate and conditions under which grouting will be performed and notify ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:
    1. Place grout as shown and indicated, and in accordance with Laws and Regulations and grout manufacturer's instructions. If manufacturer's instructions conflict with the Contract Documents, obtain clarification or interpretation from ENGINEER before proceeding.
    2. Consistency of non-shrink grouts shall be as required to completely fill the space to be grouted for the particular application. Do not install grout for dry-packing without approval of ENGINEER. When dry-packing is approved by ENGINEER, dry-pack consistency shall be such that grout has sufficient water

to ensure hydration and grout strength development, and remains plastic, moldable, and that does not flow.

3. Grouting shall comply with temperature and weather limitations in Section 03 00 05, Concrete.
4. Cure grout in accordance with grout manufacturer's instructions for prepackaged grout.

B. Equipment Bases/Frames:
   1. Install equipment in accordance to manufacturer's recommendations, Laws, and Regulations, and the Contract Documents. After shimming equipment to proper elevation, securely tighten anchors. Properly form around base plates/frames, allowing sufficient room around edges for placing grout. Provide adequate depth between bottom of equipment base and top of concrete base to ensure that voids are completely filled with non-shrink grout.

3.3 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction:
   1. Grout Fill: Perform sampling and testing for field quality control during grout fill placing as follows:
      a. Sampling Fresh Grout Fill: ASTM C172.
      b. Slump: ASTM C143; one test for each load of grout at point of discharge.
      c. Air Content: ASTM C231; one sample for every two grout loads at point of discharge, and when a change in the grout is observed.
      e. Compression Test Specimens:
         1) In accordance with ASTM C109/C109M; make one set of compression cubes for each 50 cubic yards of grout, or fraction thereof, of each mix design placed each day. Each set shall be four standard cubes, unless otherwise directed by ENGINEER.

B. Evaluation of Field Quality Control Tests:
   1. Do not use grout, delivered to final point of placement, having slump or total air content that does not comply with the Contract Documents.
   2. Compressive strength tests for laboratory-cured cubes will be acceptable if averages of all sets of three consecutive compressive strength test results equal or exceed the required 28-day design compressive strength of the associated type of grout.
   3. If the compressive strength tests do not comply with the requirements in the Contract Documents, the grout represented by such tests will be considered defective and shall be removed and replaced, or subject to other action required by ENGINEER, at CONTRACTOR's expense.

C. Manufacturer's Services:
   1. Manufacturers of proprietary materials shall make available upon 72 hours notification the services of qualified, full time employee, experienced in serving as a field service technician for the products required, to aid in assuring proper use of products under the actual conditions at the Site.

+ + END OF SECTION + +

SECTION 05 05 33

ANCHOR SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all professional services, labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install anchor systems.
   2. This Section includes all anchor systems required for the Work, but not specified under other Sections.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before anchor systems Work.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ACI 318, Building Code Requirements for Structural Concrete.
   2. ACI 350, Code Requirements for Environmental Engineering Concrete Structures.
   3. ACI 355.2, Qualification of Post-Installed Mechanical Anchors in Concrete.
   4. ANSI B212.15, Cutting Tools - Carbide-tipped Masonry Drills And Blanks For Carbide-tipped Masonry Drills.
   5. ANSI/MSS SP-58, Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation.
   6. ASTM A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
   7. ASTM A276, Specification for Stainless Steel Bars and Shapes.
   8. ASTM A493, Specification for Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging.
   9. ASTM A563, Specification for Carbon and Alloy Steel Nuts.
   10. ASTM A1011/A1011M, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
   11. ASTM B633, Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
   12. ASTM C307, Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.
   13. ASTM C881/C881M, Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
   14. ASTM D695, Test Method for Compressive Properties of Rigid Plastics.

15. ASTM D790, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
16. ASTM E329, Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
17. ASTM E488, Test Methods for Strength of Anchors in Concrete and Masonry Elements.
18. ASTM F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
19. ASTM F594, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
20. ASTM F1554, Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength.
21. FS A-A-1922A, Shield, Expansion (Caulking Anchors, Single Lead).
22. FS A-A-1923A, Concrete Expansion Anchors.
23. FS A-A-1925A, Shield, Expansion (Nail Anchors).
24. FS A-A-55614, Shield, Expansion (non-drilling expansion anchors).
25. ICC-ES AC01, Acceptance Criteria for Expansion Anchors in Masonry Elements.
26. ICC-ES AC58, Acceptance Criteria for Adhesive Anchors in Masonry Elements.
27. ICC-ES AC60, Acceptance Criteria for Anchors in Unreinforced Masonry Elements.
28. ICC-ES AC193, Acceptance Criteria for Mechanical Anchors in Concrete Elements.
29. ICC-ES AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.
30. ISO 3506-1, Mechanical Properties of Corrosion-Resistant Stainless Steel Fasteners -- Part 1: Bolts, Screws and Studs.
31. NSF/ANSI 61, Drinking Water System Components – Health Effects.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Testing Laboratory: Shall comply with ASTM E329 and shall be experienced in tension testing of post-installed anchoring systems.
   2. Professional Engineer:
      a. CONTRACTOR or delegated system manufacturer shall retain a registered professional engineer legally qualified to practice in the same state as the Site.
      b. Responsibilities include:
         1) Reviewing anchor system performance and design criteria stated in the Contract Documents.
         2) Preparing written requests for clarifications or interpretations of performance or design criteria for submittal to ENGINEER by CONTRACTOR.
         3) Preparing or supervising preparation of design calculations and related Shop Drawings.

4) Signing and sealing all design calculations and Shop Drawings.
5) Certifying that:
   a) Design of anchor systems has been performed in accordance with performance and design criteria stated in the Contract Documents, and
   b) Design conforms to all applicable local, state, and federal Laws and Regulations, and to prevailing standards of practice.

4. Post-installed Anchor Installer:
   a. Mechanical and Adhesive anchors, except as noted in 1.3.A.4.b: Installer shall be experienced and trained by post-installed anchor system manufacturer in proper installation of manufacturer's products. Product installation training by distributors or manufacturer's representatives is unacceptable unless the person furnishing the training is qualified as a trainer by the anchor manufacturer.
   b. Adhesive Anchors: Installation of horizontal or vertically inclined adhesive anchors shall be performed by personnel certified under an applicable certification program. Certification shall include written and performance tests in accordance with the ACI/CRSI Adhesive Anchors Installer Certification Program, or equivalent. Description of equivalent programs shall be submitted for ENGINEER's approval and acceptance by the building official having jurisdiction.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Listing of all anchor systems products intended for use in the Work including product type, intended location in the Project, and embedded lengths.
   2. Product Data:
      a. Manufacturer's specifications, load tables, dimension diagrams, acceptable base material conditions, acceptable drilling methods, and acceptable bored hole conditions.
      b. Copies of valid ICC ES reports that presents load-carrying capacities and installation requirements for anchor systems.

B. Delegated Design Submittals:
   1. Design Data: Submit the following:
      a. Design Calculations for delegated anchor systems. Structural calculations shall include all specified performance criteria. The magnitude of delegated system/anchorage reactions to supporting structure shall be clearly noted. Design calculations shall be signed, sealed and dated by CONTRACTOR's professional engineer.

C. Informational Submittals: Submit the following:
   1. Certificates:
      a. For each type of anchor bolt or threaded rod, submit copies of

laboratory test reports and other data required to demonstrate compliance with the Contract Documents.

b. Post-installed anchor system manufacturer's certification that installer received training in the proper installation of manufacturer's products required for the Work.

c. For each required adhesive anchor installer, submit ACI/CRSI Adhesive Anchor Installer Certification.

2. Manufacturer's Instructions:

a. Installation instructions for each anchor system product proposed for use, including bore hole cleaning procedures and adhesive injection, cure and gel time tables, and temperature ranges (storage, installation and in-service).

3. Field Quality Control Submittals:

a. Submit results of field quality control testing and inspections performed by testing laboratory.

1.5 DELIVERY, STORAGE AND HANDLING

A. Storage and Protection:

1. Keep materials dry during delivery and storage.
2. Store adhesive materials within manufacturer's recommended storage temperature range.
3. Protect anchor systems from damage at the Site. Protect products from corrosion and deterioration.

PART 2 – PRODUCTS

2.1 SYSTEM PERFORMANCE

A. General:

1. At locations where conditions dictate that Work specified in other Sections is to be of corrosion resistant materials, provide associated anchor systems of stainless-steel materials, unless other corrosion-resistant anchor system material is specified. Provide anchor systems of stainless-steel materials where stainless steel materials are required in the Contract Documents.
2. Stainless Steel Nuts:

a. For anchor bolts and adhesive anchors, provide ASTM A194/A194M, Grade 8S (Nitronic 60) stainless steel nuts for stainless steel anchors used for anchoring equipment, gates, and weirs, and other locations, if any, where the attachment will require future removal for operation or maintenance. Provide lock washer or double nuts on each anchorage device provided for equipment, as required by equipment manufacturer.

b. For other locations, provide for each anchorage device a nut as specified or as required by anchor manufacturer. When ASTM A194/A194M, Grade 8S (Nitronic 60) nuts are not required for anchor

bolts and adhesive anchors as specified in this Section, provide anti-seizing compound where stainless steel rods are used with stainless steel nuts of the same type.

B. Design Criteria

1. Size, Length, and Load-carrying Capacity: Comply with the Contract Documents. When size, length or load-carrying capacity of anchor system is not otherwise shown or indicated, provide the following:
   a. Anchor Bolts: Provide size, length, and capacity required to carry design load based on values and requirements of Paragraph 3.2.A of this Section. For conditions outside limits of critical edge distance and spacing in Paragraph 3.2.A of this Section, minimum anchor bolt embedment as shown or indicated in Paragraph 3.2.A of this Section apply and capacity shall be based on requirements of Laws and Regulations, including applicable building codes.
   b. Adhesive Anchors, Expansion Anchors, or Concrete Inserts: Provide size, length, type, and capacity required to carry design load. Anchor capacity shall be based on the procedures required by the building code in effect at the Site. Where Evaluation Service Reports issued by the ICC Evaluation Service are required in this Section, anchor capacities shall be based on design procedure required in the applicable ICC Evaluation Service Report.
      1) General: Determine capacity considering reductions due to installation and inspection procedures, embedment length, strength of base fastening materials, spacing, and edge distance, as indicated in the manufacturer's design guidelines. For capacity determination, concrete shall be assumed to be in the cracked condition, unless calculations demonstrate that the anchor system will be installed in an area that is not expected to crack under any and all conditions of design loading.
      2) Concrete Adhesive Anchors: Unless otherwise shown or indicated in the Contract Documents or approved by ENGINEER, provide minimum embedment depth of the greater of the following: required to develop tensile strength of anchor, or a minimum embedment of 10 anchor diameters; and minimum anchor spacing and edge distance of 12 anchor diameters.

2. Delegated Design: When anchor systems are used for supporting materials, equipment, or systems delegated to CONTRACTOR, Subcontractor, or Supplier, provide anchor system suitable for loads indicated in delegated design documents and consistent with the design intent expressed in the Contract Documents. Anchor system shall be designed by a professional engineer, retained by CONTRACTOR, Subcontractor, or Supplier, registered in the same state as the Site, with proper consideration of concrete strength, spacing and edge distance

a. Design Loads. Comply with the Contract Documents. When design load of supported material, equipment, or system is not otherwise shown or indicated, provide the following:
   1) Equipment Anchors: Use design load recommended by equipment manufacturer. When equipment can be filled with fluid, use loads that incorporate equipment load and load imposed by fluid.

2.2 MATERIALS

A. Anchor Bolts:
   1. Exterior, Buried, Submerged Locations, or When Exposed to Wastewater: Provide stainless steel straight threaded rods complying with ASTM F593, AISI Type 316, Condition A, with ASTM F594, AISI Type 316, stainless steel nuts. Provide ASTM A194/A194M, Grade 8S (Nitronic 60) stainless steel nuts where required. Other AISI types may be used when approved by ENGINEER. Hooked bolts are unacceptable.
   2. Equipment: Provide anchor bolts complying with material requirements of this Section and equipment manufacturer's requirements relative to size, embedment length, and anchor bolt projection. Anchor bolts shall be straight threaded rods with washers and nuts as specified in this Section. Hooked bolts are unacceptable.

B. Concrete Adhesive Anchors:
   1. General:
      a. Adhesive anchors shall consist of threaded rods anchored into hardened concrete using an adhesive system.
   2. Products and Manufacturers: Provide one of the following:
      a. HIT-RE 500-V3 Injection Epoxy Adhesive Anchoring System, by Hilti Fastening Systems, Inc.
      b. HIT-HY 200-A and HIT-HY 200-R Adhesive Anchoring System, by Hilti Fastening Systems, Inc
      c. SET-XP Adhesive anchoring system, by Simpson Strong-Tie Company, Inc.
      d. Or equal.
   3. Adhesive:
      a. Adhesive system shall use two-component adhesive mix.
      b. Adhesives shall have a current evaluation report by ICC Evaluation Service for use in both cracked and uncracked concrete with seismic recognition for SDC A through F as tested and assessed in accordance with ICC-ES AC308, which incorporates the requirements of ACI 355.4-11

c. Adhesives shall have minimum bond strength and minimum design bond strength in accordance with Table 05 05 33-A:

TABLE 05 05 33-A:
ADHESIVE BOND STRENGTH [1,2]

Bond Strength (psi)					
Rod Diameter	**Uncracked Concrete**	**Cracked Concrete**	**Dowel Size**	**Uncracked Concrete**	**Cracked Concrete**
1/2-inch	1670	880	#4	1500	1080
5/8-inch	1670	750	#5	1460	1090
3/4-inch	1670	665	#6	1415	1015
7/8inch	1525	610	#7	1370	835
1-inch	1360	595	#8	1330	760
-	-	-	#9	1560	850
1.25-inch	1070	595	#10	1240	475

Table Notes:
1. Bond strengths listed for hammer-drilled, dry hole.
2. Bond strengths listed for maximum short term concrete temperature of 130 degrees F and maximum long term concrete temperature of 110 degrees F.

4. Anchor:
   a. Provide continuously-threaded, AISI Type 316 stainless steel adhesive anchor rod. Threaded rods shall comply with the concrete adhesive anchor manufacturer's specifications as included in the ICC Service Evaluation Report for the anchor submitted. Nuts shall have specified proof load stresses equal to or greater than the minimum tensile strength of the stainless steel threaded rod used. Provide ASTM A194/A194M, Grade 8S (Nitronic 60) stainless steel nuts where required.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials will be installed and advise ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Anchor Bolts:
   1. Provide anchor bolts as shown or indicated in the Contract Documents, or as required to secure structural element to the appropriate anchor surface.

2. Locate and accurately set anchor bolts using templates or other devices as required, prior to placing concrete. Wet setting of anchor bolts is unacceptable.
3. Protect threads and shank from damage during installation and subsequent construction operations.
4. Unless otherwise shown or approved by ENGINEER anchor bolts shall comply with Table 05 05 33-B:

TABLE 05 05 33-B:
SINGLE ANCHOR BOLT ALLOWABLE LOADS ON ANCHOR BOLTS [1]

Bolt Diameter (inch)	F1554 Grade 36 F593 Type 316, Condition A				F1554 Grade 55			
	Minimum Embedment (inch)	Minimum Edge Distance and Spacing[2] (inch)	Shear[3,4] (lb)	Tension[3] (lb)	Minimum Embedment (inch)	Minimum Edge Distance and Spacing[2] (inch)	Shear[3] (lb)	Tension[3] (lb)
1/2	6	9	1,262	2,420	8.5	12.75	1,660	3,190
5/8	7.5	11.25	2,010	3,860	10.5	15.75	2,640	5,080
3/4	9	13.5	2,974	5,720	13	19.5	3,910	7,520
7/8	10.5	15.75	4,106	7,890	15	22.5	5,400	10,390
1	12	18	5,386	10,360	17	25.5	7,090	13,450
1 1/8	13.5	20.25	6,787	13,052	19	28.5	8,930	16,580
1 1/4	15	22.5	8,617	16,572	21	31.5	11,340	20,040

Table Notes:
1. Anchor bolt table is based on ACI 318 Chapter 17 and ACI 350, Appendix D, f'_c = 4000 psi. Table 05 05 33-B is not applicable to anchor bolts embedded in grouted masonry.
2. Critical edge distance and spacing are indicated in the table. Capacity of anchor bolts for other combination of edge distances and spacing shall be evaluated in accordance with ACI 318 Chapter 17 and ACI 350, Appendix D.
3. Values for shear and tension listed are not considered to act concurrently. Interaction of tension and shear will be evaluated by ENGINEER in accordance with ACI 318 Chapter 17 and ACI 350, Appendix D.

B. Adhesive Anchors, Undercut Anchors, and Expansion Anchors – General:
1. Prior to drilling, locate existing reinforcing steel in vicinity of proposed holes. If reinforcing conflicts with proposed hole location, obtain ENGINEER's approval of alternate hole locations to avoid drilling through or damaging existing reinforcing bars.

C. Adhesive Anchors:
1. Installation conditions shall comply with all requirements of the approved product Evaluation Service Report (ESR), including "Conditions of Use." Comply with manufacturer's written installation instructions and the following.
2. Drill holes to adhesive system manufacturer's recommended drill bit diameter to the specified depth. Drill holes in hammering and rotation mode with carbide-tipped drill bits that comply with the tolerances of ANSI

B212.15. Core-drilled holes are unacceptable.

3. Before setting adhesive anchor, hole shall be made free of dust and debris by method recommended by adhesive anchor system manufacturer. Hole shall be brushed with adhesive system manufacturer-approved brush and blown clean with clean, dry, oil-free compressed air to remove all dust and loose particles. Hole shall be dry as defined by adhesive system manufacturer.
4. Before injecting adhesive, obtain ENGINEER's concurrence that hole is dry and free of oil and other contaminants.
5. Prior to injecting adhesive into the drilled hole, dispense, to a location appropriate for such waste, an initial amount of adhesive from the mixing nozzle, until adhesive is uniform color.
6. Inject adhesive into hole through injection system-mixing nozzle and necessary extension tubes, placed to bottom of hole. Discharge end shall be withdrawn as adhesive is placed but kept immersed to prevent formation of air pockets. Fill hole to depth that ensures that excess material is expelled from hole during anchor placement.
7. Twist anchors during insertion into partially-filled hole to guarantee full wetting of rod surface with adhesive. Insert rod slowly to avoid developing air pockets.
8. Provide adequate curing in accordance to adhesive system manufacturer's requirements prior to continuing with adjoining Work that could place load on installed adhesive anchors. Do not begin adjoining Work until adhesive anchors are successfully tested or when allowed by ENGINEER.
9. Limitations:
    a. Core drilled holes shall not be allowed.
    b. At time of anchor installation, concrete shall have compressive strength (f'c) of not less than 3,000 psi.
    b. At time of anchor installation, concrete shall have age of not less than 21 days.
    c. Installation Temperature: Comply with manufacturer's instructions for installation temperature requirements. Provide temporary protection and other measures, such as heated enclosures, necessary to ensure that base material temperature complies with anchor systems manufacturer's requirements during installation and curing of adhesive anchor system.
    d. Oversized Holes: Advise ENGINEER immediately if size of drilled hole is larger than recommended by anchor system manufacturer. Cost of corrective measures, including but not limited to redesign of anchors due to decreased anchor capacities, shall be paid by CONTRACTOR.
    e. Embedment depths shall be based on installation in normal-weight concrete with compressive strength of 3,000 psi when embedded in existing concrete, and 4,000 psi when embedded in new concrete.
    f. Obstructions in drill path: When existing reinforcing steel is encountered during drilling, stop and do not damage existing

reinforcing. Obtain ENGINEER approval for any required modifications.

3.3 CLEANING

A. After embedding concrete is placed, remove protection and clean bolts and inserts.

3.4 FIELD QUALITY CONTROL

A. Site Tests:
   1. CONTRACTOR will employ testing agency to perform field quality tensile testing of production adhesive anchors at the Site, unless otherwise specified.
      a. Testing shall comply with ASTM E488.
      b. Test at least ten percent of all types of adhesive anchors. If one or more adhesive anchors fail the test, CONTRACTOR shall pay cost of testing all anchors of the same type installed in the Work. CONTRACTOR shall be responsible for retesting costs.
      c. ENGINEER will direct which adhesive anchors are to be tested and indicate test load to be used
      d. Apply test loads with hydraulic ram.
      e. Displacement of post-installed anchors shall not exceed D/10, where D is nominal diameter of anchor being tested.

B. Manufacturer's Services:
   1. Provide at the Site services of qualified adhesive manufacturer's representative during initial installation of adhesive anchor systems to train CONTRACTOR's personnel in proper installation procedures. Manufacturer's representative shall observe to confirm that installer demonstrates proper installation procedures for adhesive anchors and adhesive material.

+ + END OF SECTION + +

SECTION 09 85 00

CONCRETE RESURFACING AND LINING

PART 1 – GENERAL

1.01 Scope of Work

A. This section covers all workmanship, materials, supervision and quality requirements for concrete surface preparation, repair and resurfacing; and protective coating and lining work on the following structures at the East Providence, Rhode Island Water Pollution Control Facility (WPCF).

1. Prepare, apply resurfacing, and epoxy lining to all concrete surfaces as shown on drawings for the Headworks including Influent Channels and corresponding structures, Primary Clarifier Splitter Structure, Primary Clarifier 1, 2, 3, and 4 Effluent Channels and Manholes, Primary Clarifier Raised Manhole, and Aeration Tanks Splitter Box Structure. Include sawcut termination of lining system as required.

B. The scope of work also includes all lining system terminations, necessary environmental controls and the legal collection, temporary storage, removal, and disposal of all debris.

C. Refer to the System Thickness Requirements in 3.13 of this Section.

1.02 Related Work

A. Division 00 – Bidding and Contracting Requirements

B. Division 01 – General Requirements

C. Section 03 01 30 – Repair and Rehabilitation of Cast-In-Place Concrete

1.03 Definitions

A. Terminology used in this section is in accordance with definitions contained in ASTM D 16, ASTM D 3960, and the following definitions:

1. Abrasive: Material used for blast cleaning, such as sand, grit or shot.

2. Abrasive Blast Cleaning: Cleaning/surface preparation by abrasive propelled at high speed.

3. Anchor Pattern: Profile of prepared surface(s).

4. Bug Holes: Small cavities resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.

5. Coating/Paint/Lining Thickness: The total dry film thickness of primer, intermediate and/or finish coats.

6. Coating Consultant: Corrosion Probe, Inc. (CPI)
7. Dew point: Temperature of a given air/water vapor mixture at which condensation starts.
8. Drying Time: Time interval between application and curing of material.
9. Dry to Recoat: Time interval between application of material and ability to receive next coat.
10. Dry to Touch: Time interval between application of material and ability to touch lightly without damage.
11. Feather Edging: Reducing the thickness of the edge of paint.
12. Feathering: Operation of tapering off the edge of a point with a comparatively dry brush.
13. Field Coat: The application or the completion of application of the coating system after installation of the surface at the site of the work.
14. Filler/Surfacer: See Resurfacer/Resurfacing Material
15. Hold Point: A defined point at which work shall be halted for QC and/or QA related inspection.
16. Holiday: a discontinuity, skip, or void in coating or coating system film that results in low dielectric strength.
17. Honeycomb: Segregated condition of hardened concrete due to non-consolidation.
18. Hydro blast: A term meaning the same as high or ultra-high-pressure water jetting.
19. Incompatibility: Inability of a coating to perform well over another coating because of bleeding, poor bonding, or lifting of old coating; inability of a coating to perform well on a substrate.
20. Immersion: Refers to a service condition in which the substrate is below the waterline or submerged in water or wastewater at least intermittently if not constantly.
21. Inspection and Test Plan: A plan by the CSA that incorporates all of the required QC testing into the CSA's work plan for the project. The I&TP systematically lists the inspection hold points, test methods, and acceptance criteria for each procedure in each phase of the project Work.
22. Laitance: A layer of weak, non-durable concrete containing cement fines that is brought to the surface through bleed water because of concrete finishing and/or over-finishing.
23. Mil: 0.001 inch.
24. Overspray: Dry spray, particularly such paint that failed to strike the intended surface.

25. Pinhole: A small diameter discontinuity in a coating or coating system film that is typically created by outgassing of air from a void in a concrete substrate resulting in exposure of the substrate or a void between coats.
26. Pot Life: Time interval after mixing of components during which the coating can be satisfactorily applied.
27. Process Control Procedure: Documents one process, such as mobilization and setup, abrasive blasting, coating mixing, coating application and curing, clean-up, etc. that together make up the work plan.
28. Quality Assurance: An audit process conducted to verify (after the fact) that the work performed meets the specifications and to validate the testing and measurements conducted through the QC program. QA incudes visual observation along with various physical tests and measurements (many of the same tests performed in the QC program) at defined hold points. QA may be performed by the Contractor, CSA, or Owner's representative.
29. Quality Control: The program, designed and managed by the CSA, to control the project execution parameters through visual observation, measurements, physical tests, policies, procedures, and training programs in order to produce a final product that complies with the project specifications. QC includes testing that identifies deficiencies while the work is progressing so that methods and techniques can be modified to meet the specification requirements.
30. Resurfacer/Resurfacing Material: Also, filler/surfacer, a layer of cementitious and/or resin-base material used to fill or otherwise restore surface continuity to worn or damaged concrete surfaces.
31. Shelf Life: Maximum storage time for which a material may be stored without losing its usefulness.
32. Shop Coat: One or more coats applied in a shop or plant prior to shipment to the site of the work, where the field or finishing coat is applied.
33. Spreading Rate: Area covered by a unit volume of paint at a specific thickness.
34. Stripe Coat: A separate coat of paint applied to all weld seems, pits, nuts/bolts/washers and edges by brush. This coat shall not be applied until any previous coat(s) have cured and, once applied, shall be allowed to cure prior to the application of the subsequent coat(s).
35. Tie Coat: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.
36. Touch-Up Painting: The application of paint on areas of painted surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
37. Ultrahigh-Pressure Water jetting (UHPWJ) – A method of surface preparation employing clean water as the media at or above 210 MPa (30,000 psi).
38. Weld Spatter: Beads of metal scattered near seam during welding.

B. The following abbreviations may be used herein:

1. ANSI - American National Standards Institute
2. CSM - Coating System Manufacturer. Refers to the acceptable coating system manufacturer.
3. CSA – Coating System Applicator. A generic reference to the specialty subcontractor or subcontractors retained by the Contractor to install the coating systems specified in this Section. If no specialty subcontractor is retained, the CSA may be the same entity as the Contractor.
4. CTR - Coating System Manufacturer's Technical Representative. Refers to the technical representative(s) of the acceptable Coating System Manufacturer and is abbreviated as CTR.
5. DFT - Dry Film Thickness. Thickness of cured film, usually expressed in mils (0.001 inch).
6. I&TP – Inspection & Testing Plan
7. ICRI - International Concrete Repair Institute
8. NACE - National Association of Corrosion Engineers
9. NSF – National Sanitation Foundation
10. PCP – Process Control Procedure
11. QA – Quality Assurance
12. QC – Quality Control
13. SHT – Sludge Holding Tank
14. SSD - Surface Saturated Dry. Refers to concrete surface condition where the surface is saturated (damp) without the presence of standing water.
15. SSPC - The Society for Protective Coatings
16. TPC - Technical Practice Committee
17. VOC - Volatile Organic Compound. The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter (g/l) or pounds per gallon (lb./gal). VOC is determined by EPA Method 24.
18. WFT - Wet Film Thickness. The primer or coating film's thickness immediately following application. Wet film thickness is measured in mils or thousandths of an inch (0.001 inch) and is abbreviated WFT.

1.04 Reference Standards

A. 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.

B. 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 STANDARDS	
Reference	**Title**
American Concrete Institute (ACI)	
ACI 308	Recommended Practice for Curing Concrete
ACI 318	Building Code Requirements for Reinforced Concrete and Commentary
ACI 350	Code Requirements for Environmental Engineering Structures
ANSI (American National Standards Institute)	
ANSI/ASC 29.4 Exhaust Systems	Abrasive Blasting Operations – Ventilation and Safe Practice
ANSI B74.18	Grading of Certain Abrasive Grain on Coated Abrasive Material
ASTM D16	Standard Terminology for Paint, Related Coatings, Materials, and Applications
ASTM (American Society for Testing and Materials)	
ASTM A615	Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement
ASTM A706	Standard Specification for Low Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM C42	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

REFERENCE STANDARDS	
Reference	**Title**
ASTM C348	Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
ASTM C496	Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C882	Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
ASTM C1107	Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)
ASTM C1583	Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2200 (SSPC-VIS1)	Pictorial Surface Preparation Standards for Painting Steel Surfaces
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D4262	Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
ASTM D4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4285	Standard Test Method for Indicating Oil or Water in Compressed Air
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness by Notch Gages
ASTM D4417	Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D4541	Standard Test Methods for Pull-Off Strength of Coatings on Metal Substrates Using Portable Adhesion Testers
ASTM D4787	Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates
ASTM D5162	Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
ASTM D7234	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Adhesion Testers.
ASTM E337	Standard Test Method for Measuring Humidity with a Psychrometer
ASTM F1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

REFERENCE STANDARDS	
Reference	**Title**
Concrete Reinforcing Steel Institute	
	Manual of Standard Practice
ICRI (International Concrete Restoration Institute)	
ICRI 310.2	Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
NACE (National Association of Corrosion Engineers)	
NACE Publication 6D-163	A Manual for Painter Safety
NACE Publication 6F-163	Surface Preparation of Steel or Concrete Tank/Interiors
NACE Publication 6G-164 A	Surface Preparation Abrasives for Industrial Maintenance Painting
NACE Standards	January 1988 Edition of the National Association of Corrosion Engineers, TPC.
NACE SP0188	Standard Practice – Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE SP0288	Standard Recommended Practice, Inspection of Linings on Steel and Concrete
NACE SP0892	Standard Recommended Practice, Linings Over Concrete in Immersion Service
NACE Publication TPC2	Coatings and Linings for Immersion Service
NACE SP0178	Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
NAPF (National Association of Pipe Fabricators)	
NAPF 500-03	Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings
NAPF 500-03-04	Abrasive Blast Cleaning for Ductile Iron Pipe
NAPF 500-03-05	Abrasive Blast Cleaning for Cast Ductile Iron Fittings
OSHA (U.S. Occupational Safety and Health Administration)	
OSHA 1910.144	Safety Color Code for Marking Physical Hazards

REFERENCE STANDARDS	
Reference	**Title**
OSHA 1915.35	Standards – 29CFR - Painting
SSPC (The Society for Protective Coatings)	
SSPC	Paint Application Specification No. 1.
SSPC-AB 1	Mineral and Slag Abrasives
SSPC-PA 1	Shop, Field, and Maintenance Painting of Steel
SSPC-PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
SSPC-PA 9	Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages
SSPC-PA Guide 1	Guide for Illumination of Industrial Painting Project
SSPC-PA Guide 3	A Guide to Safety in Paint Application
SSPC-PA Guide 6	Guide for Containing Debris Generated During Paint Removal Operations
SSPC-PA Guide 11	Guide for Coating Concrete
SSPC SP1	Solvent Cleaning
SSPC SP2	Hand Tool Cleaning
SSPC SP3	Power Tool Cleaning
SSPC SP5	White Metal Blast Cleaning
SSPC SP6	Commercial Blast Cleaning
SSPC SP7	Brush-Off Blast Cleaning
SSPC SP10	Near-White Blast Cleaning
SSPC SP11	Power Tool Cleaning to Bare Metal
SSPC WJ 1-4	Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High-Pressure Water Jetting Prior to Recoating
SSPC SP13	Surface Preparation of Concrete
SSPC-SP CAB1	Thorough Abrasive Blast Cleaning of Concrete & Masonry Surfaces
SSPC-TR2	Wet Abrasive Blast Cleaning
SSPC-TU-3	Overcoating
SSPC- Guide 15	Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates.
SSPC V2	Systems and Specifications: Steel Structures Painting Manual, Volume 2
SSPC-VIS 1	Visual Standard for Abrasive Blast Cleaned Steel
SSPC-VIS 3	Visual Standard for Power and Hand – Tool Cleaned Steel
SSPC-VIS 4	Visual Standards (Water Jetting)
SSPC-VIS 5	Visual Standards (Wet Abrasive Blast Cleaning)

REFERENCE STANDARDS	
Reference	**Title**
U.S. Army Corps of Engineers Standard (CRD)	
CRD C 621	Corps of Engineers Specification for Nonshrink Grout
WPCF (Water Pollution Control Federation)	
WPCF Manual of Practice No. 17	Paints and Protective Coatings for Wastewater Treatment Facilities. Guide and Paint Application Specifications.
AMPP (Association for Materials Protection and Performance)	
AMPP	NACE and SSPC are now AMPP, The Association for Materials Protection and Performance

1.05 Quality Requirements

A. Contractor Qualifications:

1. The CSA shall be an approved applicator of that system by the CSM. This shall be documented in writing by the CSM. Contractor shall provide AMPP QP1 certified applicators for this Project.

2. Employ only supervisory and lead applicator trades people who have at least 5 years of experience performing similar work in operating wastewater treatment facilities to perform any of the surface preparation and installation work as specified herein.

    a. All main applicators (not including laborers) require AMPP CAS (Coating Application Specialist) certificates. If products require plural component application, the pump operator shall have a AMPP Plural Component Certification.

3. The Contractor shall at all time have a competent superintendent or supervisor in charge who is thoroughly familiar with the work in progress. The superintendent or supervisor shall represent the Contractor and shall have authority to receive and respond to all questions and non-conformance issues raised by the Consultant/Engineer.

4. The CSA shall be a firm with at least five (5) years of experience properly preparing concrete substrates by ultrahigh-pressure water jetting and abrasive blast cleaning and applying cementitious restoration/resurfacing and waterborne epoxy cementitious mortar, as well as applying specialty spray applied epoxy coating and lining materials over concrete substrates in operating wastewater treatment facilities. This experience requirement shall be documented with at least five (5) verifiable project references going back no more than 5 years with contact name, telephone numbers, and email addresses.

5. All of the CSA's application crew to be assigned to the work covered by this Section shall be trained in the proper, hands-on application of the concrete restoration materials, specified resurfacing materials, and epoxy lining materials by the CSM. This training to be performed off-site at the CSA's shop facilities or elsewhere shall ensure that the same application tools, equipment, and methods to be used on the Work are used by the CSA's application personnel during the training exercise. All application crew personnel shall have mixed and applied the specified materials during the training. This training shall be documented in writing by the CSM and the CSA in letters stating the employees' names, the dates of the training, the products applied, and certifying that all listed personnel received the training. All employees' signatures shall also be provided in these letters from both the CSM and the CSA. This can be done as a joint letter. The training provided shall be given by technical service personnel from the CSM experienced in the application of all of the specified materials. This training shall not be given by regional or national sales or marketing personnel from the CSM or its agents. This training shall consist of a minimum of 8 hours of hands-on/classroom training.

B. Standardization:

1. Materials and supplies provided shall be the standard products of CSMs. Materials in each coating system shall be the products of a single CSM.

2. The standard products of CSMs other than those specified may be acceptable when it is demonstrated to the Engineer that they are equal in composition, durability, usefulness, and convenience for the purpose intended. Requests for consideration of CSMs other than those specified in this Section will be considered, provided the following minimum conditions are met. Such requests are not a substitution for submittals after the alternative CSMs have been considered and accepted.

   a. The proposed coating system shall use an equal or greater number of separate coats to achieve the required total dry film thickness.

   b. The proposed coating system (all materials including resurfacing mortars, repair mortars and coating/lining materials) shall be of the same generic type as that specified including curing agent type if an epoxy coating and any internal reinforcement. However, if the proposed alternate coating provides similar performance for the expected service conditions specified herein for the standard coating system, please provide a written explanation of its generic type (including curing agent or type) and provide performance data which compares it to the specified products.

   c. The CSM shall provide a list of at least three (3) references for the proposed product where the coating of the same generic type or performance capabilities has been applied and has performed successfully for over 5 years in similar service conditions. The reference list shall include the project name, city, state, owner, phone number of owner; coating system reference and number; type of facility in which it was used, generic type, and year coating was applied.

C. Minimum Contractor Quality Assurance Requirements

1. The Contractor is solely responsible for the workmanship and quality of the coating system installation. Inspections by the Engineer, Coating Consultant or the CTR will not relieve or limit the Contractor's responsibilities.
2. The Contractor shall prepare an Inspection and Test Plan (I&TP) that complies with this Section for all aspects of the resurfacing and lining application.
3. A pre-job meeting shall be conducted with the Contractor to review the quality program I&TP and the production schedule. Coating Inspection requirements shall be based on NACE SP0288.
4. The CSA shall at all times have a competent superintendent or supervisor in charge who is thoroughly familiar with the work in progress. The superintendent or supervisor shall represent the CSA and shall have authority to receive and respond to all questions and non-conformance issues raised by the Engineer and the Owner.
5. The CSA's methods shall conform to requirements of this specification and the standards referenced in this Section. Changes in the coating system installation requirements will be allowed only with the written acceptance of the Engineer before work commences.
6. Contaminated, outdated, diluted materials, and/or materials from previously opened containers shall not be used.
7. The CSA shall provide all points of access for inspection by the Owner's Inspector. The CSA shall provide ventilation, ingress and egress, and other means necessary for the Owner's Inspector personnel to access safely the work areas.
8. The Contractor shall conduct the work so that the coating system is installed as specified and shall inspect the work continually to ensure that the coating system is installed as specified. Coating system work that does not conform to the specifications or is otherwise not acceptable shall be corrected as specified or as required in writing by the CSM at no additional cost to the Owner.
9. The CSA shall prepare Process Control Procedures (PCP) for all processes to be utilized on this project and combine these in to a coherent Work Plan which describes in detail the CSAs schedule and plan to effectively execute these specifications and complete the Work.
10. The CSA shall provide written daily QC reports that present, in summary form, test data, work progress, surfaces covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation. The CSA's QC manager shall certify the Work is in compliance with these specifications. QC reports for each day of Work shall be available for review by the Owner or any representative of the Owner on the following day.
    a. The QS manager shall have a minimum AMPP/NACE or SSPC Level 2 Certification. All other QC personnel shall have a minimum AMPP/NACE or SSPC Level 1 (basic) Certification.

11. The CSA shall provide all the necessary environmental control required to complete the work and maintain the required environmental conditions (including air temperature and humidity) including, but not limited to, shelters, enclosures, dehumidification equipment, fans, heating equipment, and fuels for all equipment at no additional cost to the Owner.

D. Minimum QC Inspection Requirements (Acceptance Criteria in 3.10 of this Section):

As part of its overall Quality Control program, the CSA shall conduct Quality Control inspections during the concrete resurfacing and coating system installation and record the results from those inspections. These daily inspection reports shall be provided to the QA team and Owner daily. Include identifiers such as "QC items requiring immediate attention". QC Items requiring immediate attention should be issued immediately upon occurrence via a "Flash Email Report' to the designated personnel or QA team for immediate response. The CSA shall coordinate such inspections with the Owner's inspector such that the Owner's inspector may observe CSA's inspections or conduct separate independent Quality Assurance inspections on a scheduled basis. The minimum QC milestones shall be as follows:

1. Inspect all materials upon receipt to ensure that all are supplied by the approved manufacturer.
2. Provide specified storage conditions for the all materials, solvents, and abrasives.
3. Conditions Prior to Surface Preparation - Prior to coating application all surfaces shall be inspected by the CSA and any issues or conditions that would prevent compliance with this Section shall be brought to the attention of the Owner in writing.
4. If dry abrasive blast cleaning is required, a paper blotter test in accordance with ASTM D 4285 shall be performed by the CSA on each air compressor being used at the beginning of each work day and again once for every 4 hours worked to determine if the air is sufficiently free of oil to not produce detrimental effects on coating system adhesion.
5. Post Surface Preparation Cementitious Surfaces – Upon completion of the surface preparation, the CSA shall inspect for proper degree of surface preparation as specified in this Section and in the CSM's written instructions. Degree of surface preparation shall be in accordance with this Section and ICRI 310.2. This shall include inspecting for the achievement of the specified concrete surface profile in accordance with ICRI 310.2.
6. Post Surface Preparation Metallic Surfaces – Following initial blast cleaning, test for the presence of soluble salts using the retrieval and analysis method designated as Method 4.2.2, Adhesively Bonded Latex Patch or Cell as described in SSPC-TG 15 (2013). Testing shall be in accordance with ISO 8502-6/8502-9 at the rate of one (1) test per metallic surface.
7. Post Surface Preparation Metallic Surfaces – Following initial blast cleaning, measure the surface profile of the prepared surface in accordance with ASTM D4417.

8. Post Surface Preparation Metallic Surfaces – Upon completion of the surface preparation, the CSA shall inspect for proper degree of surface cleanliness as specified in this Section and in the CSM's written instructions. Degree of surface preparation shall be in accordance with ASTM D2200.

    a. Verifying that the surface is maintained in a condition of SSD (Saturated Surface Dry) throughout the application of cementitious repair mortars.

9. Unless stipulated otherwise by the CSM, after application of all cementitious resurfacing materials but prior to application of any polymer-based liners, perform concrete substrate moisture tests per ASTM D 4263 on each different surface (i.e., wall, floor, ceiling, etc.). The plastic sheet test shall be performed to assure there is no moisture problem with the coating. The test shall be performed over the resurfaced concrete prior to lining to assure proper sealing of the plastic sheet to the substrate. Do not apply coating or lining materials until acceptable results are obtained.

10. pH testing of the concrete by the CSA shall be performed at the minimum rate of one test per every 100 square feet (or any part thereof) of surface area using Hydrion Insta-Check Jumbo 0-13 or equal. The surface of the concrete shall be lightly abraded to expose loose cement paste particles. The paper shall be touched to the surface once using moderate pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the exposure of the paper to the substrate which has been abraded, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.

    When a dry substrate is encountered, the surface where the pH test is to be performed shall be abraded as described above and sprayed lightly with distilled, de-ionized water from a commercially available spray bottle that has been properly rinsed to preclude any dissolved solids. The spray shall just wet the surface to a "shiny" appearance and water shall not run. Wait 30 seconds to allow chemical equilibrium to be established and then test the pH of the water on the surface and record the value.

11. Environment and Site Conditions - Prior to commencing an activity associated with coating system installation, the CSA shall measure, record, and confirm acceptability of ambient air temperature, substrate surface temperature and relative humidity as well as other conditions such as proper protective measures for surfaces not to be coated at a minimum of once prior to the start of coating application and thereafter every two hours during coating application. Perform relative humidity measurements in accordance with ASTM E337. The acceptability of the weather and/or environmental conditions within the structure shall be determined by the requirements specified by the CSM of the coating system being used.

12. Provide correct mixing of all materials in accordance with the manufacturer instructions.

13. Conduct adhesion testing in accordance with ASTM C1583 in each separate structure that is part of this scope of work at a minimum of 1 location for small

structures and 2 locations for larger structures on the cementitious resurfacing material applied to concrete substrates. The locations tested shall be equally distributed throughout the Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6 and shall be representative of all surfaces (i.e., ceiling, floor, walls etc.). Repair of these locations will be the Contractor's responsibility in accordance with the CSM's recommendations at no additional cost to the Owner. Each test location shall consist of three separate adhesion tests within a 300 mm by 300 mm (12 in. by 12 in.) area. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. The Contractor shall be responsible for resurfacing material removal and replacement in areas demonstrating unacceptable adhesion.

14. Monitoring of Coatings Application – The CSA shall inspect, measure, and record the wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, holidays, etc. as the application work proceeds. Perform WFT measurements in accordance with ASTM D4414 at a minimum rate of one measurement for every 10 SF coated.

15. Post Application Inspection – The CSA shall identify defects in application work including pinholes, holidays, excessive runs or sags, inadequate or excessive film thickness and other problems as may be observed.

16. Verify curing of the coating in accordance with the manufacturer's instructions.

17. Post Cure Evaluation – Upon completion of the lining system installation, surfaces shall be cleaned and prepared to permit close visual inspection by the Consultant/Engineer at any given location. Any and all deficiencies or defective work (not in compliance with this section or related sections) will be marked for repair or removal/replacement by the CSA at no additional cost to the Owner. Following cure, coatings and linings shall be measured for dry film thickness by the CSA. The DFT shall be measured:

    a. For carbon steel surfaces, this shall be performed in accordance with SSPC-PA 2.

    b. Method 1 for concrete surface shall be performed in accordance with SSPC-PA 9 using ultrasonic thickness gauges calibrated in accordance with the instrument manufacturer's instructions.

    c. Method 2 for concrete surfaces shall utilize either a Tooke Gage or by the removal of small core samples through the lining system

    Any coating found to be below the specified DFT shall receive additional applications of the coating or lining or shall be removed or reapplied as required to meet the total DFT requirements specified in this Section at no additional cost to the Owner.

18. Conduct high voltage holiday detection over 100% of coated concrete surfaces in accordance with ASTM D4787 and follow the CSM's recommendations for appropriate voltage settings.

19. Conduct adhesion testing in accordance with ASTM D7234 in each structure at a minimum of 1 location for small structures and 2 locations for larger structures on the lining system applied to concrete substrates. The locations tested shall be equally distributed throughout the Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6 and shall be representative of all surfaces (i.e., ceiling, floor, walls etc.). Repair of these locations will be the Contractor's responsibility in accordance with the CSM's recommendations at no additional cost to the Owner. Each test location shall consist of three separate adhesion tests within a 300 mm by 300 mm (12 in. by 12 in.) area. The Contractor shall be responsible for lining system removal and replacement in areas demonstrating unacceptable adhesion at no additional cost to the Owner.

20. Follow-up to corrective actions and Final Inspection. The CSA shall measure and re-inspect corrective coating work performed to repair defects identified at prior Hold Points. This activity also includes final visual inspection along with follow-up tests such as holiday detection, adhesion tests, and DFT surveys.

1.06 Submittals

A. Submit the following in accordance with Division 01:

1. A detailed work plan, which shall incorporate the Inspection & Test Plan, including scope of work, methods of staging, equipment and methods to be used for cleaning and coating application for each surface, contingencies and a bar chart schedule which shall include at a minimum:
   a. Mobilization
   b. Removal/relocating/protection of mechanical equipment
   c. Erection of staging/scaffolding
   d. Protection
   e. Containment
   f. Surface preparation
   g. Concrete repair and resurfacing work
   h. Lining and coating application
   i. Testing
   j. Clean-up
   k. De-mobilization

2. Manufacturer's current printed recommendations and product data sheets for all products including performance criteria, surface preparation and application requirements, volatile organic compound (VOC) data, and safety requirements.

3. Material Safety Data Sheets (MSDS) for any materials brought on-site including all coating materials, solvents, abrasive blast media or any other materials intended to be used for the work specified.

4. Storage requirements including temperature, humidity, and ventilation for all materials to be used for the specified work.

5. Applicators' certification that materials comply with federal, state, and local regulations for VOC (Volatile Organic Compounds).

6. Letter(s) certifying that surfaces to be treated have been prepared in accordance with manufacturer's printed instructions and are ready for installation work, citing location thereof. Marked-up drawings that show location of all Work will be submitted. Reference drawings provided in the bid package can be used.

7. Letter signed by CSM certifying that submitted products are suitable for application on the surfaces to be treated and for the service conditions.

8. Certification that the entity installing the coating/lining system is an approved applicator of the CSM for the specified repair products, resurfacing products and coating system.

9. Submit documentation evidencing work experience of project superintendent, supervisors, abrasive blasters, and lining applicators.

10. Letter(s) certifying that all of the CSA's application personnel received hands-on training by the CSM in accordance with 1.05 A. 5. of this Section.

11. Submit written letter of approval from CSM, product data sheets, and material safety data sheets for concrete restoration curing compound products to be used on this project.

12. The Contractor shall provide the Owner with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site.

13. Prior to starting work, submit a scaffold/rigging plan for the project that includes methods for protection of the skimmer mechanism such that it can be reviewed by the Engineer prior to scaffold installation.

1.07 Delivery, Storage and Handling

A. Provide in accordance with Division 01 and as specified herein.

B. Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold in accordance with the CSM instructions. Flammable materials shall be stored in accordance with State and Local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site. Cold storage or heated storage to be provided by the Contractor if required to ensure proper storage of the materials.

C. Store all materials only in areas designated by the Owner solely for this purpose. Confine mixing, thinning, associated operations, clean up and storage of materials and related debris to authorized areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the storage temperature is maintained in accordance with the manufacturer recommendations.

D. Mix all materials in various areas as needed to complete the work. These enclosed areas must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area. Protect the ground from splash or spillage of all materials using plastic, drop cloths and other appropriate materials.

E. Do not use any process drains or storm drains within the treatment facility for disposal of waste or materials.

F. The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with all materials as described on the pertinent Material Safety Data Sheets and container labels.

G. Deliver all materials to the job site in their original, unopened containers. Each container shall bear the manufacturer's name and label.

1. Labels on all material containers must show the following information:
    a. Name or title of product.
    b. Federal specification number if applicable.
    c. Manufacturer's batch number and date of manufacture.
    d. Manufacturer's name.
    e. Generic type of material.
    f. Application and mixing instructions.
    g. Hazardous material identification label.
    h. Shelf-life date.
    i. Storage requirements.

2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.

3. All materials shall be handled and stored to prevent damage or loss of label.

H. New reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

I. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings.

J. Reinforcing steel shall be stored off the ground, protected from moisture and kept free from dirt, oil, or other injurious contaminants. Coated reinforcing steel shall be stored on padded wooden or steel cribbing. Coatings damaged by fabrication, handling or installation shall be repaired to conform to the applicable coating requirements.

1.08 Coordination of Work

A. Work Areas:

1. The work areas on the job site will be designated by the Owner. The Contractor's personnel shall not be permitted in any area other than those expressly designated by the Owner.

B. Use of Facilities:

1. The Owner will make available a hydrant from which the CSA may obtain potable water. The hydrant will be metered and the CSA will be required to pay for the volume of water used.

2. Electricity

1.09 Safety

A. Provide in accordance with the requirements of Division 00 and Division 01 and the requirements included herein.

B. General - Personnel safety is the Contractor's responsibility. The Contractor is responsible for assuring compliance with all applicable federal, state, and local safety requirements and the Contractors own approved Safe Work Plan.

C. The Contractor's work forces should comply with any and all applicable federal, State, and local regulations and the provisions outlined in the following documents:

1. SSPC-PA 10 - “Guide to Safety and Health Requirements for Industrial Painting Projects”
2. NACE Publication - “A Manual for Painter Safety”

D. The Contractor shall provide personnel with all safety equipment necessary to protect them during any phase of the work. This shall include, but not be limited to safety glasses, face shields, fresh air breathing hoods, goggles, earplugs, hard hats, steel toed work shoes, appropriate protective clothing, gloves, and plant approved respirators where required.

E. Keep any flammable materials such as solvents, thinners, coating or sealant materials away from open flames, sparks or temperatures higher than 38^{o}C (100^{o}F). Drums containing flammable materials will be properly grounded at all times. Only small quantities of solvents for smoothing the lining will be allowed inside containment enclosures or permitted confined spaces during installation work.

F. Power tools are to be in good working order to avoid open sparking. All electrical tools used on this project will be equipped with ground fault interrupters (GFIs).

G. The Contractor shall fireproof all work areas by maintaining a clean work area and having Underwriter's Laboratories approved fire extinguishers on-hand. The Contractor shall furnish these fire extinguishers.

H. Workers doing abrasive blasting or water jetting operations shall wear a fresh air supplied protective helmet and hood and personal protective clothing acceptable to industry standards and all government regulations.

I. Dispose of rags used for wiping up coating materials, solvents, and thinners by drenching them with water and placing in a metal container with a tight-fitting metal cover. Complete this disposal process at the end of each day. Remove these materials from the plant site at the end of every shift. Final disposal of these materials is the Contractor's responsibility.

J. Matches, flames, or sparks resulting from any source including welding, must be remote from the work area during coating work. Smoking is only permitted in areas designated by the Owner.

1.10 Job Conditions

A. The jobsite is an operating wastewater treatment facility that will continue to operate prior to and during the work specified herein. No work performed by the Contractor shall interrupt plant operations.

1.11 Warranty

A. Contractor's Warranty:

1. For a period of three (3) years from the date of beneficial use of the specific Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6, the Contractor warrants to the Owner that the concrete restoration, repair and lining installation work provided under this specification Section conforms to these specifications and is free from defects in materials and workmanship. The date of beneficial use shall be concurrent with the date of the final inspection indicated in 3.12 of this Section, provided the requirements of said Section have been accomplished by the Contractor. The Contractor shall repair or replace, at the sole option of and at no cost to the Owner, any work found to be defective within said warranty period. Such repair or replacement shall include the cost of removal and reinstallation.

2. The quality of both materials and workmanship for the installed concrete restoration and lining work shall be the sole responsibility of the Contractor. It is hereby warranted that should these installed materials delaminate, disbond, crack cohesively, blister, or otherwise fail due to improper surface preparation, improper mixing or application, or lack of proper cure of the materials due to inadequate control of substrate or ambient conditions within the structures by the Contractor or due to a lack of quality of the materials provided by the Coating System Manufacturer, the Contractor shall be solely responsible for performing and or paying for the repair or replacement work required by the Owner to remedy the failed materials and workmanship to meet the original requirements of this Section and all contract drawings at no cost to the Owner and at the Owner's convenience. This warranty further stipulates that any incompatibility with or error in formulation or manufacturing of the restoration or lining materials installed which results in an installed restoration or lining material failure be and remain a financial matter strictly between the Contractor and the CSM. The financial responsibility and accountability for such a material related failure would remain solely with the Contractor with respect to this warranty made to the Owner.

3. The Contractor guaranties to replace or repair defective work for which he is accountable in an expeditious manner at the Owner's convenience and at no cost to the Owner. Any failure of the installed restoration or lining materials which results from mechanical or physical damage from plant maintenance or process work performed by PVSC or others, or other conditions which are not considered normal to the facility operation will not be the Contractor's responsibility for repair or replacement under this warranty to the Owner.

B. Coating System Manufacturer's Warranty:

1. The Contractor shall obtain from the manufacturer (CSM) its warranty, equivalent in duration to the Warranty provided by the Contractor to the Owner, that the restoration, repair and lining products provided will be free from defects in formulated or manufactured material quality which could cause the installed work to fail. Defects are defined as materials not meeting the CSM's formulation standards. The Coating System Manufacturer's Warranty shall be provided on the CSM's letterhead and shall be signed and dated by a company officer to the CSM. This Warranty shall be notarized by a Notary Public in the State of Rhode Island. This Warranty will cover the costs of replacement and related shipping costs for materials required to correct the failed coating systems and restoration/repair materials.

C. Warranty Period Inspections:

1. The Owner shall perform periodic inspections (as operating conditions permit) within the established warranty periods to determine the need for remedial work as required under paragraphs A. and B of 1.11 above.

2. The Contractor is encouraged to participate in each periodic inspection, however mandatory contractor attendance shall be required only one time, at a date to be established by the owner prior to expiration of the Contractor warranty. The Owner shall notify the Contractor thirty (30) days prior to the required mandatory inspection.

PART 2 - PRODUCTS

2.01 Manufacturer

A. The following Coating System Manufacturers (CSM) are approved for this project:

1. The Sherwin Williams Company
   101 W. Prospect Ave.
   Cleveland, OH 44115
   Local Contact: Heather Stiner
   717-360-0951

2. Sauereisen, Inc.
   160 Gamma Dr.
   Pittsburgh, PA 15238
   Local Contact: Tony Oswald
   (412) 952-6625

3. Tnemec Company
   123 W. 23rd Avenue
   Kansas City, MO 64116
   Local Contact: Righter Group, Inc.
   Larry Mitkus
   (978) 697-0153

4. Or Equal

2.02 Approved Materials

A. The following repair materials and linings are approved for this project:

1. Sherwin-Williams
    a. Concrete Lining – Dura-Plate 5900 epoxy
    b. Metallic Lining – Dura-Plate 5900
    c. Epoxy Filler/Surfacer – Steel Seam FT910 (also used for crack repair).
    d. Polymer Modified Cementitious Filler/Surfacers – Dura-Plate 2300
    e. Cementitious Resurfacing Material – CEMTEC SILATEC MSM - Microsilica Mortar

2. Sauereisen
    a. Concrete Lining - SewerGard 210S fiber-filled epoxy
    b. Metallic Lining – SewerGard 210
    c. Epoxy Filler/Surfacer - RestoKrete 209HB epoxy filler (also used for crack repair).
    d. Cementitious Resurfacing Material - RestoKrete F-120 or F-121 cementitious repair mortar

3. Tnemec
    a. Concrete Lining - Series G436 fiber-reinforced epoxy
    b. Metallic Lining – Series G435 Perma-Glaze
    c. Epoxy Filler/Surfacer - Series 215 surfacing epoxy (also used for crack repair).
    d. Polymer Modified Filler/Surfacer - Series 218 epoxy modified cementitious mortar
    e. Cementitious Resurfacing Material - Series 217 cementitious repair mortar

4. Or Equal

B. Abrasive Blast Media shall comply with SSPC AB1.

1. The Contractor shall utilize blast media free of all chlorides or other materials which may contaminate or become imbedded in the profile of the metallic or concrete substrates.

2. The blast media shall be of a size and shape capable of producing the specified concrete surface profile on metallic and concrete substrates.

3. Blast media shall be single use. No recycling of blast media will be permitted on this project.

PART 3 - EXECUTION

3.01 General Requirements

A. Initial Cleaning of all structures to be rehabilitated

1. The Owner will drain and isolate the Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6 prior to making them available to the Contractor.

2. Prior to beginning Work, the Contractor shall remove all wastewater residue and debris from the structures by water wash and vacuum cleaning or by other suitable means. Blow down cleaning will not be acceptable.

3. As the initial step, degrease all surfaces to be treated using a water-based, emulsifying, biodegradable, non-flammable, phosphate-free cleaning solution, followed by rinsing with clean, potable water until all traces of contaminants including detergent have been removed. Rinse concrete surfaces multiple times with high-pressure water per SSPC-SP12 - High-Pressure Water Cleaning (HP WC), using a minimum pressure of 5,000 psi and a minimum volume of 6 gallons per minute. Use only potable water. All traces of degreasing and cleaning solutions shall be completely removed.

4. Remove and dispose of all debris and spent cleaning water by pumping and/or by vacuum cleaning. The cleaning liquid and debris shall not be deposited in sumps or drains or elsewhere at the treatment facility and must be removed from the site and legally disposed of by the Contractor.

B. Scaffolding System Erection and Access Requirements

1. A scaffolding/platform system shall be erected to allow continuous access to all wall surfaces. The scaffold/platform shall provide safe and convenient access to all surfaces within the limits of construction for installation of the terminations, surfacing, lining and all required testing.

2. Erect the scaffolding system to ensure that the necessary minimum load support capacity, strength, rigidity, and durability are provided to reliably support the concrete repair and lining work.

3. Shoring shall be installed securely against the floor slabs to provide sufficient support to scaffolding system for all dead and live loads during construction. However, it shall not be wedged, or jacked in such a way that floor slab is deformed, destabilized, or damaged.

4. Lateral bracing/anchorage shall be provided as required to maintain stability of the scaffolding system. Shoring shall have sufficient strength and rigidity to withstand loads and vibrations caused by construction operations during repair and lining work. When outriggers or lateral bracing is used or removed and reinstalled for the scaffolding system, a neoprene pad or similar material shall be placed between the wall and the outrigger pad to protect the concrete repair work

or new lining from damage. Bracing will have to be removed and reinstalled as work progresses.

5. Adjustment of the scaffolding system shall be performed if necessary to maintain support for the structure as construction progresses.

6. Scaffolding shall bear against the structure only at areas of sound concrete.

C. Protection

1. If the structures include mechanical components. It is the Contractors responsibility, at his discretion, to protect all of the mechanical components during the surface preparation and resurfacing/lining work. Any damage to any mechanical component during the Work will be the sole responsibility of the Contractor.

2. Cover or otherwise protect finish work or other surfaces not being coated.

3. Do not coat over nameplates, tagging or other identification devices on equipment, piping, etc.

4. Erect and maintain protective tarps, enclosures and/or masking to contain debris generated during any and all work activities from adversely affecting personnel or property outside the work area. This includes, but is not limited to, the use of dust/debris collection apparatus as required.

5. Provide protection of the structures internal piping during abrasive blast cleaning and concrete restoration material and lining installation work to prevent over blast cleaning of ductile iron or steel substrates and to prevent application of the concrete restoration or protective lining materials from being applied on the pipe surfaces where not specifically required by these specifications.

D. Initial Inspection of Surfaces to Be Lined:

1. Contractor shall examine the areas and conditions under which the protective lining Work is to be performed in accordance with NACE SP0892 and SSPC-SP13/NACE No. 6, and notify Owner in writing of conditions unfavorable to the proper and timely completion of the Work and/or compliance with these Specifications. It is the responsibility of the Contractor to inspect and report unacceptable surface conditions to the Owner prior to the commencement of surface preparation activities. Unacceptable surface conditions are defined as the presence of deteriorated substrates with deep depressions or other substrate conditions not acceptable for quality coating or lining material application.

2. Commencement of the Work of this Section shall indicate that the substrate and other conditions of installation are acceptable to the Contractor and his CSA and will produce a finished product meeting the requirements of the Specifications. All defects resulting from accepted conditions shall be corrected by Contractor at his own expense.

E. Environmental

1. Comply with CSM's recommendations regarding ambient environmental conditions under which the specified materials may be applied and cured.

2. Contractor is responsible for all environmental controls necessary to maintain the CSM's recommended environmental conditions throughout the duration of the project. These controls include but are not limited to enclosure, heating with indirect fired heaters, dehumidification, etc.

3. Do not apply materials when dust is being generated.

4. The Contractor shall provide all temporary lighting inside the structure and at all levels of the scaffold during the work equivalent to 200 foot-candles per Table 1 of SSPC-Guide 12.

F. Enclosures

1. Provide the following per SSPC-Guide 6 based on surface preparation method:

   a. Class 2A – Containment A2, B1, C2, D1, E2, Ventilation F2, G2, H2, I1, J1, Level 2 Emissions.
   b. Class 2W – Containment A2, B3a, C2, D1, E3, Ventilation F2, G2, H3, I2, J2, Level 2 Emissions.
   c. Class 3P – Containment A2, B2a, C3, D2, E4, Ventilation F2, G2, H3, I2, J2, Level 2 Emissions.

G. Thinners and Solvents

The Contractor shall use only solvents and thinners approved by the CSM.

H. Weirs

The weirs will be removed and replaced for this work. The Contractor is responsible for protecting the weirs during the work and for removing and reinstalling the weirs. Any weirs damaged during the work will be replaced by the Contractor at the Contractors sole expense.

3.02 Lining System Termination Details

A. Prior to performing overall surface preparation work on metal and concrete substrates, perform all work necessary to complete all detail treatment for lining system termination as shown on the Drawings.

B. All lining system details must be inspected and approved by the Engineer prior to the commencement of lining system installation work.

C. Any terminations necessary for the proper application of the lining system that are not specifically provided in the Drawings, shall be performed by the Contractor in accordance with the CSM's termination detail requirements.

3.03 Control of Ambient Conditions

A. It shall be the Contractor's responsibility to control ambient conditions within the Headworks structure, Primary Clarifier effluent channels, Aeration Tank splitter box, and Primary Clarifier splitter structure, raised manhole and manholes 4 & 6 via protective enclosures, heating/ventilation and/or dehumidification apparatus during surface preparation, application, and curing, to meet the specified conditions or conditions recommended by the CSM for application and curing of the specified materials.

1. The substrate temperature shall be 5 degrees F above the dew point at all times during coating or lining application.

B. The minimum ambient condition requirements for application work shall be in strict accordance with CSM's written recommendations.

C. The Contractor shall provide all means necessary to exhaust harmful gases/fumes, dust and odors during execution of the work specified herein. No dust generation shall be allowed during coating or lining or concrete restoration material application.

3.04 Surface Preparation

A. Surface Preparation Requirements

1. All specified surface preparation shall be performed in accordance with the latest version of the SSPC, NACE and ICRI standards referenced herein. Employ methods as specified herein to ensure that the degree of cleanliness and surface profile for all substrates, as specified herein, are attained.

2. Perform field quality control inspection and testing as specified in 1.05 of this Section.

3. If, between final surface preparation work and lining system application, contamination of the prepared and cleaned substrates occurs, or if the prepared substrates' appearances darken or change color, re-cleaning shall be required until the specified degree of cleanliness is reclaimed.

4. The Contractor is responsible for dust control and for protection of mechanical, electrical, and all other equipment within, adjacent to and surrounding the work area as specified. The Contractor shall protect existing equipment and structures within the work area as specified.

5. Cleaning, surface preparation and material application shall be scheduled so that dust and spray from the cleaning process will not fall on wet, newly resurfaced or coated substrates.

6. The Contractor shall be responsible for cleaning of only those surfaces to be resurfaced or coated or those surfaces on which his work has caused contamination.

7. Regulators, gauges, filters, and separators will be in good working order for all of the compressor air lines to blasting nozzles at all times during this work.

8. The quality, volume, and velocity of life support and ventilation air used during surface preparation shall be in accordance with applicable safety standards to ensure adequate air volume, and dissipation of airborne debris that would adversely affect the health of the public or personnel working for the Contractor, CSA, Subcontractors, Owner, Coating Consultant, Engineer, or anyone who may be affected by on-site work activities.

9. The Contractor must provide adequate ventilation for airborne particulate evacuation and lighting (meeting all pertinent safety standards) to optimize visibility for both blast cleaning and inspection of the substrate during surface preparation work.

B. Concrete Surface Preparation

1. Use methods as specified herein and as delineated in SSPC-SP 13/NACE 6 and ICRI Guideline No. 310.2 to prepare concrete surfaces to produce a sound, clean substrate free of all existing coatings, carbonated concrete, laitance, surface contaminants, loose materials, or substances otherwise deleterious to good resurfacing material or lining system adhesion. Leaving shelled over, hidden air voids ("bugholes") beneath the exposed concrete surface will not be acceptable. All bugholes are to be completely opened up by surface preparation. See Drawings.

2. Surface preparation (regardless of method chosen) shall produce a uniform minimum concrete surface profile of CSP 6 in accordance with ICRI 310.2 with a minimum surface pH of 9.0 as outlined in 3.10 of this Section. Follow the requirements in 1.05 of this Section for pH testing procedures.

3. All abandoned, metallic components embedded in the concrete such as threaded rods, dowels, etc., shall be torch cut or ground below the existing concrete surface. These metallic components shall be cleaned to the equivalent of an SSPC SP 5 White Metal Blast Cleaning and coated with the specified epoxy filler/surfacer.

C. Resurfacing Material Surface Preparation Requirements

1. After curing and prior to the application of the topcoats, prepare cementitious surfaces by lightly sweep blasting all cementitious resurfacing material to remove all loose material and laitance and achieve a minimum concrete surface preparation of CSP 4 in accordance with ICRI 310.2 with a minimum surface pH outlined in 3.10 of this Section. Follow the requirements in 1.05 of this Section for pH testing procedures.

2. Prior to the application of the lining, resurfacing material recoat limitations (if any) shall not be exceeded.

3. If the thickness of resurfacing required is greater than that indicated herein, such resurfacing shall be provided and installed at no additional cost to the Owner.

3.05 Surface Preparation Methods

Initial surface preparation of all concrete surfaces shall be performed by ultra-high pressure water jetting (UHPWJ). All metallic surface preparation shall be performed by dry abrasive blasting with a grit size sufficient to produce the required surface profile. Surface preparation of the cementitious resurfacing and structural repair materials shall be performed by either wet or dry abrasive blast cleaning.

A. Wet or Dry Abrasive Blast Cleaning:

1. Pressure wash all surfaces to receive lining.

2. The compressed air used for blast cleaning will be filtered free of oil and moisture. Traps will be cleaned at least once every two hours or more frequently as is appropriate.

3. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. Oil separators shall be cleaned at least once every four hours or more frequently as is appropriate.

4. The abrasive blast nozzles used shall be the venturi or other high velocity type supplied with a minimum of 100 psi air pressure and suitable volume to obtain the required blast cleaning production rates and specified degrees of cleanliness.

5. Following surface preparation, thoroughly vacuum clean all concrete surfaces to be lined to remove all loose dust, dirt, and spent abrasive leaving a dust free, sound concrete or concrete repair material substrate. Allow concrete surfaces to dry thoroughly prior to application of any lining materials. Verify substrate moisture content in accordance with the requirements in 1.05 of this Section.

6. Following application, all cementitious concrete repair or restoration materials shall be either wet cured as required by the CSM prior to being abrasive blast cleaned before the application of any lining materials.

B. Water Jetting

1. It is the intent of this Specification that all concrete surface preparation be done with ultra-high pressure water jetting (UHPWJ) at a pressure sufficient to achieve the specified level of cleanliness, surface pH, surface profile.

2. Use only clean, potable water.

General Resurfacer/Coating Application Requirements

A. Material Systems

1. Field coats shall consist of one or more prime coats and one or more finish coats to build up the coating to the specified dry film thickness. Unless otherwise specified, coatings shall not be applied until previously applied coats have been inspected.

2. Repair materials shall be applied at the thicknesses required to restore surface continuity without interruption or alteration to pitch or slope. Unless otherwise specified, linings shall not be applied until all repair work has been inspected.

3. The completed lining work shall provide a satisfactory film and smooth even surface. Materials shall be thoroughly stirred, strained (as required) and kept at a uniform consistency during application. Materials consisting of two or more components shall be mixed in strict accordance with the manufacturer's instructions. The volatile organic content (VOC) of any material (as applied) shall comply with prevailing air pollution control regulations. Unless otherwise specified, materials shall not be thinned or reduced beyond manufacturer recommendations to obtain the proper application characteristics. Thinners (as applicable) shall be as recommended by the specific material manufacturer.

B. General Requirements

1. Products shall not be used until the Engineer has inspected the materials, the CSM's representative has instructed the CSA and the Engineer in the surface preparation, mixing, and application of products.
2. Accurate scales shall be provided on the site by the Contractor for measuring the water component of the repair or resurfacing materials before mixing. The water component shall be measured by weight and not by volume. The components shall be power mixed continuously for 5 minutes to obtain a uniform consistency. Mix only enough material that can be applied in 15-20 minutes. DO NOT add water to repair or resurfacing material that have hardened prior to placing.
3. No solvent, additive, or adulterant shall be added to any component or mixed material.
4. Surfaces not to be coated shall be masked using duct tape or other protection materials to prevent these surfaces from being coated or lined.
5. The Contractor must follow the minimum and maximum recoat or reapplication limitation times and related temperature range restrictions between successive coats for all products specified herein.
6. Each spray applied pass of any coating material shall be at 90-degree angles to the prior pass to ensure uniform coverage.
7. All equipment used for coating system application shall be as recommended by the CSM.
8. Coated or lined surfaces shall be free from runs, drips, ridges, waves, and laps. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Coating work shall be done in accordance with the requirements of SSPC Paint Application Specification No. 1.
9. The Contractor's equipment shall be approved by the CSM for application of the materials specified. Spray equipment shall be equipped with mechanical agitators, pressure gages, and pressure regulators, and spray nozzles of the proper sizes.
10. Care shall be exercised to avoid over spraying or spattering materials on surfaces not to be lined, coated or sealed.
11. Adjacent areas and installations not to be coated shall be protected by taping, drop cloths, or other suitable measures.

12. Unless specified elsewhere herein, the Contractor shall comply with the CSM's most recent written instructions with respect to the following:
    a. Mixing of all materials.
    b. Protection and handling of all materials.
    c. Recoat limitation and cure times and surface preparation of coatings or lining to be overcoated or recoated.
    d. Minimum ambient and substrate temperatures, substrate's degree of dryness, relative humidity, and dew point of air.
    e. Application.
    f. Final curing.
    g. Use of proper application equipment
13. The applied coating and lining systems, including all resurfacing and repair materials, shall be protected from damage during curing and shall be cured as recommended by the CSM.
14. Pay special attention to manufacturer's recommendations with regard to substrate moisture, substrate temperature, moisture vapor emissions and monitoring and testing thereof prior to the installation of coatings, linings, and repair materials. Unless stipulated otherwise by the CSM, allow wetted concrete surfaces to dry for a minimum period of 48 hours at 75ºF & 50% (or less) relative humidity prior to coating/lining application. Prior to coating application, all concrete substrates must pass testing requirements as proscribed in 1.05 of this Section.
15. Pay special attention to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times at certain temperatures for all materials.
16. Install all terminations of the lining system in accordance with the detail Drawings attached to this specification section.
17. Refer to schedule in 3.13 of this Section for required thicknesses.
18. Prior to the application of each coat of the specified coating on ferrous metal substrates, all edges, corners, intersections, bolts, nuts, washers, weld seams and other deviation from smooth surface shall be given a stripe coat by brush.
19. Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the lining system materials. Whole kits shall be mixed and applied only to avert off-ratio materials problems.

3.07 Specific Application Requirements

A. Crack Repair

1. After initial blast cleaning and prior to any resurfacing or lining work, the Consultant/Engineer shall mark cracks for repair by the Contractor.
2. The crack repair shall be performed in accordance with the Drawings and these Specifications.
3. Recoat Times - Strictly adhere to manufacturer's recommendations with regard

to minimum and maximum recoat times and cure times for all materials.

4. All crack repair materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.

5. Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

6. This repair shall be paid for under Item 9 of the Bid Form.

B. Corner Cove Details

1. After surface preparation and prior to resurfacing, the cementitious resurfacing material shall be applied to all interior corners and all 90° transitions including wall to wall, wall to ceiling, wall to floor and any raised curbs, berms or pads within the battery limits of construction (i.e., wall to wall intersection) such that the corner is smoothed with a minimum 3/4-inch cove radius in accordance with Drawings.

2. Prior to resurfacing, all exterior corners within the limits of construction shall be ground to a minimum radius of 1/8 inch.

3. This repair shall be included in the Base Bid.

C. Resurfacing of Concrete that has Experienced Deep Attack

This section will apply to concrete surfaces that, after surface preparation, require an application of surfacing material greater than or equal to 1/4 inch but less than or equal to 2 inches to restore the concrete's original surface profile.

1. The concrete substrate surface shall be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. Note: Do not over-saturate the surface.

2. Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.

3. Apply in strict accordance with the CSM written instructions, the Cementitious Resurfacing material to build up the surface to its original contour. Depending on the depth of attack, method of application and the manufacturer's instructions, the application of the resurfacing material may require multiple lifts.

4. Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

D. Resurfacing Concrete and that has experienced Shallow Attack

This section will apply to concrete surfaces that, after surface preparation, require an application of surfacing material less than 1/4 inch or equal to restore the concrete's

original surface profile.

1. The concrete substrate surface shall be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. Note: Do not over saturate the surface.
2. Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
3. Apply in strict accordance with the CSM written instructions, the Resurfacing material to build up the surface to its original contour. The CSA may, at his discretion based on the depth of repair, use the Epoxy Filler/Surfacer or the Filler Surfacer for the Shallow Attack. Depending on the depth of attack and the manufacturer's instructions, the application of the resurfacing material may require multiple lifts.
4. Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

E. Lining All Cementitious Surfaces

This section will apply to all prepared and surfaced concrete surfaces in the listed structures

1. Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
2. All coating and lining materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
3. Apply the Concrete Lining to all resurfaced and prepared surfaces in strict accordance with the CSM's written instructions.
4. Refer to schedule in 3.13 of this Section for required thicknesses.
5. Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.
6. This repair shall be shall be included in the Base Bid.

3.08 Ventilation Requirements

A. Requirements for ventilation shall be in accordance with SSPC Paint Application Guide No. 3 and all Federal, State, and local regulations standards.

3.09 Field Quality Assurance Inspection Testing

A. Inspection by the Coating Consultant, Engineer or others does not limit the CSA's responsibilities for quality control inspection and testing as specified herein or as required by the CSM's written instructions and recommendations.

B. As a part of a Quality Assurance program, the Owner may conduct any or all of the testing detailed in 1.05 of this Section to verify the Contractors compliance with the specifications and to validate the results of the Contractors Quality Control testing. The Contractor shall cooperate with the Owners inspector by providing access to all of the surfaces that the Owners inspector directs (including rigging and scaffolding as necessary), managing the confined space access program, and providing lighting and ventilation. The Contractor shall cease other Work during these inspections.

3.10 Acceptance Criteria

A. Surface Preparation Work

1. All surfaces shall be prepared in accordance with the specification and referenced standards herein.

2. The minimum surface profile of concrete surfaces and metallic surfaces meeting the requirements of this Section and the CSM written requirements.

3. The pH of the concrete and the repair or resurfacing materials shall be a minimum of 9.0 prior to coating application.

4. The target threshold or tolerance level for soluble salt contamination on metallic surfaces is 30 micro siemens/cm in accordance with current US Coast Guard requirements.

B. Material System Application Work

1. Dry Film Thickness (DFT) by individual coats or layers must meet the requirements as detailed in 3.13 of this Section. Film thickness tolerance variations in Dry Film Thickness for this work shall be as follows:

In accordance with SSPC PA-2 and SSPC PA-9 – Restriction Level 2.

2. The concrete surfaces passing the plastic sheet moisture test with no visible condensation prior to coating application.

3. ASTM C1538 - Acceptable adhesion test results. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. If the average of each three-test group shall be a minimum of 250 psi (and at least 85% of the failure plane within the resurfacing mortar or concrete).

4. ASTM D7234 - Acceptable adhesion test results. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. If the average of each three-test group does not meet or exceed 250 psi (and at least 85% of the failure plane within the resurfacing mortar or concrete), additional testing may be performed to determine the extent of the adhesion problem area.

5. Acceptable work will be based upon the following:

a. Complete hiding of previously applied coats.
b. No excessive runs, sags, sloughs ridges, trowel marks, protrusions, or depressions.
c. No pinholes or holidays.
d. No intercoat bond failures between coats.
e. No dry spray.
f. Proper curing.
g. Finish texture shall be uniform.
h. No show-through of substrate cracks or resurfacing materials in finishes.

6. Rework required on any holidays or any other inadequacies found by the Owner in the quality of the coating work shall be marked. Such areas shall be recleaned and recoated by the Contractor according to these specifications and the manufacturer's recommendations at no additional cost to the Owner.

7. The Contractor is responsible for keeping the Owner informed of all progress so that inspection for quality can be achieved in a productive and supportive manner.

8. No embedded dirt or debris will be allowed in the applied coatings. Any show-through of such =dirt, etc. must be removed and the area recoated until the finish coating meets acceptance criteria. Any such required rework shall not result in additional cost to the Owner.

3.11 Clean Up

A. Upon completion of coating, the Contractor shall remove surplus materials, equipment, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray, spatter or other related damage. The surrounding surface areas including and all other surfaces shall be restored to their pre-project condition.

3.12 Final Inspection

A. Perform a final inspection to determine whether the material system work meets the requirements of these specifications. The Consultant/Engineer will conduct final inspection with the Contractor.

3.13 System Thickness Requirements and Coating Schedule

A. The Contractor is required to attain the total thickness (DFT) regardless of substrate condition, application method or number of coats required.

B. Protective Lining System Thickness Requirements are as follows:

Substrate	Material	Dry Film Thickness (DFT)
Concrete	Shallow Restoration Polymer Mod. Cement Mortar	All surfaces 1/8" to 1/4"
	Deep Restoration Cementitious Mortar	1/4" to 2" See Bid Form for quantity estimate
	Lining Material (Over restored surface)	100 -125 mils

Substrate	Material	Dry Film Thickness (DFT)
Resurfaced Concrete	Void filling shallow resurfacing Epoxy Filler/Surfacer	1/8" to 1/4"
	Lining Material	100-125 mils

3.14 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01 77 19.

+ + END OF SECTION + +

SECTION 31 20 00

EARTH MOVING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals required to perform all excavating, filling, and grading, and disposing of earth materials as shown, specified, and required for construction of the Watchemoket Pump Station force main bypass, and other facilities required to complete the Work.
   2. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof, except rock requiring drilling, blasting or special equipment for removal which is under Section 31 23 16.26, Rock Removal. Rock removal is not expected for installation of the force main bypass; however, a nominal amount is included in Section 31 21 16.26, Rock Removal.
   3. Test Pits are required and included in the Contract to determine exact location of Watchemoket Pump Station force main and to identify exact outer diameter of existing pipe for bypass installation.
   4. Surface Restoration. Provide 4-inch minimum of loam in areas disturbed by construction. Provide seed to match the sun exposure. Water daily as recommended by manufacturer until fully germinated (4-weeks minimum).

B. Work Performed By Others:
   1. None.

C. Related Sections:
   1. Section 03 30 00, Cast-in-Place Concrete.
   2. Section 31 23 16.26, Rock Removal.
   3. Section 33 05 05, Buried Piping Installation.
   4. Section 40 05 19, Ductile Iron Process Pipe.
   5. Section 40 05 53, Process Valves

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASTM D422, Test Method for Particle-Size Analysis of Soils.
   2. ASTM D698, Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).
   3. ASTM D1556, Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

4. ASTM D1557, Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
5. ASTM D2216, Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
6. ASTM D4253, Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
7. ASTM D4254, Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
8. ASTM D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
9. ASTM D6938, Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
10. ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.

1.3 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Subgrade" is the uppermost surface of native soil material unmoved from cuts; the bottom of excavation.

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. CONTRACTOR's Testing Laboratory:
      a. Retain the services of independent testing laboratory to perform testing and determine compliance with the Contract Documents of the materials specified in this Section.
      b. Testing laboratory shall comply with ASTM E329 and requirements of Section 01 45 29.13, Testing Laboratory Services Furnished by Contractor.
      c. Testing laboratory shall be experienced in the types of testing required.
      d. Selection of testing laboratory is subject to ENGINEER's acceptance.

B. Quality Assurance Testing:
   1. Quality assurance testing is in addition to field quality control testing required under Part 3 of this Section.
   2. Materials used in the Work may require testing and retesting, as directed by ENGINEER, during the Project. Allow free access to material stockpiles and facilities at all times. Tests not specifically indicated to be performed at OWNER's expense, including retesting of rejected materials and installed Work, shall be performed at CONTRACTOR's expense.
   3. CONTRACTOR's Testing Laboratory Scope:
      a. Collect samples and perform testing of proposed fill materials in the laboratory and in the field to demonstrate compliance of the Work with the Contract Documents.

b. Testing laboratory shall perform testing required to obtain data for selecting moisture content for placing and compacting fill materials.
c. Submit to ENGINEER and CONTRACTOR written report results of each test.

4. Required Quality Assurance Material Testing by CONTRACTOR's Testing Laboratory:
   a. Gradation in accordance with ASTM D422. Perform one test for every 1,000 cubic yards of each material incorporated into the Work.
   b. Atterberg limits in accordance with ASTM D4318. Perform one test for every 1,000 cubic yards of the following types of materials incorporated into the Work: general fill, and pipe bedding material.
   c. Moisture/density relations in accordance with ASTM D698, ASTM D1557, ASTM D4253, or ASTM D4254, as applicable. Perform one test for every 5,000 cubic yards of each material incorporated into the Work.
   d. Moisture content of stockpiled or borrow material in accordance with ASTM D2216. Perform one test for every 1,000 cubic yards of each material incorporated into the Work.

C. Regulatory Requirements:
   1. Perform excavation work in compliance with requirements of authorities having jurisdiction and Laws and Regulations, including:
      a. OSHA, 29 CFR Part 1926, Section .650 (Subpart P – Excavations).
   2. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners and permits from environmental authorities having jurisdiction over discharge of water from excavations.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Modifications to the Work proposed due to intended excavation plan.

B. Informational Submittals: Submit the following:
   1. Procedure Submittals:
      a. Excavation Plan: Prior to starting excavation operations, submit written plan to demonstrate compliance with OSHA 29 CFR Part 1926.650. As a minimum, excavation plan shall include:
         1) Name of CONTRACTOR's "competent person" in responsible charge of excavation and fill Work.
         2) Excavation method(s).
         3) Copies of required permits and approvals, from authorities having jurisdiction and affected utility owners, for excavation methods proposed.
      b. Proposed compaction procedure and compaction equipment proposed for use. Where different procedures or equipment will be used for

compacting different types of material or at different locations at the Site, indicate where each procedure and equipment item will be used.

2. Quality Assurance Test Results Submittals:
   a. Submit results of quality assurance testing performed by in accordance with Paragraph 1.4.B of this Section, unless included as part of another submittal under this Section. Submit results for the following quality assurance testing:
      1) Tests on borrow fill material.
      2) Optimum moisture – maximum dry density curve for each type of fill material.
3. Field Quality Control Submittals:
   a. Submit results of testing and inspection performed in accordance with the field quality control Article in Part 3 of this Section, including:
      1) Field density testing.
4. Qualifications Statements:
   a. Quality Assurance Testing laboratory. Submit name and qualifications of testing laboratory to be employed, and qualifications of testing laboratory's personnel that will perform quality assurance testing required in this Section.

1.6 SITE CONDITIONS

A. Soil borings and other exploratory operations may be made by CONTRACTOR, at no additional cost to OWNER. Coordinate CONTRACTOR-performed test borings and other exploratory operations with OWNER and utility owners as appropriate. Perform such explorations without disrupting or otherwise adversely affecting operations of OWNER or utility owners. Comply with Laws and Regulations relative to required notifications.

B. Existing Structures:
   1. The Contract Documents show or indicate certain structures and Underground Facilities adjacent to the Work. Such information was obtained from existing records and is not guaranteed to be correct or complete. CONTRACTOR shall explore ahead of the excavation to determine the exact location of all existing structures and Underground Facilities. Existing structures and Underground Facilities shall be supported and protected from damage by CONTRACTOR. Immediately repair and restore existing structures and Underground Facilities damaged by CONTRACTOR without additional cost to OWNER.
   2. Movement or operation of construction equipment over Underground Facilities shall be at CONTRACTOR's sole risk and only after CONTRACTOR has prepared and submitted to ENGINEER and utility owners (as applicable), and received acceptance therefrom, a plan describing CONTRACTOR's analysis of the loads to be imparted and CONTRACTOR's proposed measures to protect structures and Underground Facilities during the Project.
   3. Coordinate with utility owners for shut-off of services in active piping and conduits. When required by utility owner, OWNER will assist

CONTRACTOR with utility owner notifications. Completely remove buried piping and conduits indicated for removal and not otherwise indicated as being abandoned or to remain in place.

4. Do not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when such interruption is indicated in the Contract Documents or when allowed in writing by ENGINEER after acceptable temporary utility services are provided by CONTRACTOR for the affected structure or property.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Select Fill:

1. Material shall be well-graded, crushed aggregate, free of organic material, complying with the following:

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
1.25-inch	100
No. 4	38 to 65
No. 8	25 to 60
No. 30	10 to 40
No. 200	3 to 12

B. General Fill:

1. Material shall be free of: rock and gravel larger than three inches in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter.
2. Fill shall have a liquid limit not greater than 45, and plasticity index not greater than 25.
3. Previously-excavated materials complying with the Contract Documents requirements for general fill may be used for general fill.
4. When on-Site materials are found unsuitable for use as general fill, provide select fill or approved off-Site general fill materials. Prior to using off-Site material as general fill, furnish submittal for and obtain ENGINEER's approval of the material proposed for use.

C. Subbase Material:

1. Material shall be naturally- or artificially-graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand, complying with the gradation requirements below. Crushed slag is unacceptable.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
2-inch	100
1-inch	70 to 100
3/4-inch	50 to 90

No. 4	30 to 60
No. 30	9 to 33
No. 200	0 to 15

D. Pipe Bedding Material:

1. Aggregate material shall be crushed stone and gravel, free of: rock or gravel larger than one-inch in any dimension, debris, waste, frozen materials, organic material and other deleterious matter. Material shall comply with gradation requirements below:

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
1-inch	100
3/8-inch	30 to 65
No. 4	25 to 55
No. 10	15 to 40
No. 40	8 to 20
No. 200	2 to 8

2. Sand material, where required, shall consist of natural or manufactured granular material and shall contain no organic material. Sand shall be non-plastic, when tested in accordance with ASTM D4318, 100 percent shall pass a 1/2-inch screen and not more than five percent shall pass a No. 200 screen.

E. Topsoil (Loam)

1. All topsoil, whether obtained from on-site or off-site sources, shall comply with specified topsoil analysis.

2. Provide fertile, friable, natural loam, surface soil, capable of sustaining vigorous plant growth; free of any admixture of subsoil, clods of hard earth, plants or roots, sticks, stones larger than 1-inch in diameter, or other extraneous material harmful to plant growth, in compliance with ASTM D 5268. Provide topsoil with the following analysis:

   a. 3/4-inch mesh: 100 percent passing.

   b. No. 4-sieve: 90 to 100 percent passing.

   c. No. 200-sieve: 0 to 10 percent passing.

   d. Clay content of material passing No. 200-sieve not greater than 60 percent, as determined by hydrometer tests.

3. pH-adjusted with ferrous sulphate or ground limestone to provide pH 5.5 to pH 7.0 at time of installation of lawns, grass and meadow areas, unless

particular species of grass or wildflower stand requires a different pH to meet its growing needs.

4. Electrical conductivity of a 1:2 soil-water suspension shall not exceed 1.0 milliohm per centimeter and with less than 200 parts per million of extractable aluminum.

5. Cation Exchange Capacity: 5, minimum.

6. Organic content not less than five percent, as determined by ignition loss of oven-dried samples passing No. 10-sieve (Muffle Furnace Temperature: 110 plus or minus five degrees C for eight hours).

7. Free of pests and pest larvae.

8. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil, as specified. Clean surface soil of roots, plants, sod, stones, clay lumps, and other materials harmful to plant growth.

    a. Supplement surface soil with manufactured topsoil from off-site sources, when quantities available on Site are insufficient to complete the Work.

9. Topsoil shall not contain stones, stumps, roots, branches, or similar objects larger than 2-inches in any dimension, noxious weeds, and shall have not less than a 5.8 pH value. When soil to be seeded has a pH value of less than 5.8, sufficient lime shall be evenly spread to increase the soil pH to approximately 6.5. The amount of lime required to raise the ph of a 4-inch topsoil layer as specified hereinafter, shall be determined by the landscape supervisor.

10. Soils with the following characteristics or taken from the following sources shall not be used as a topsoil:
    a. Soils having less than a 4.1 or more than a 7.0 pH value.

    b. Chemically contaminated soils or soils exposed to salt.

    c. Areas from which the original surface has been stripped and/or covered over such as borrow pits, open mines, demolition sites, dumps and sanitary landfills.

    d. Wet excavation.

F. LAWN GRASS SEED

1. Lawn Grass Seed Mixture: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by AOSA. Provide

seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, specified.

2. Seed Species:

a. Seed of grass species as follows, with not less than 95 percent germination, not less than 80 percent pure seed, and not more than 0.25 percent weed seed by weight:

1. Full Sun: Kentucky Bluegrass (Poa pratensis), a minimum of three cultivars.

2. Sun and Partial Shade: Proportioned by weight as follows:

1) 50 percent Kentucky Bluegrass (Poa pratensis).

2) 30 percent Chewings Red Fescue (Festuca rubra variety).

3) 20 percent Perennial Ryegrass (Lolium perenne).

3. Shade: Proportioned by weight as follows:

1) 50 percent Chewings Red Fescue (Festuca rubra variety).

2) 35 percent Rough Bluegrass (Poa trivialis).

3) 15 percent Redtop (Agrostis alba).

2.2 SOURCE QUALITY CONTROL

A. Perform quality assurance testing, and submit results to ENGINEER, in accordance with the 'Quality Assurance" Article in Part 1 of this Section.

PART 3 – EXECUTION

3.1 INSPECTION

A. Provide ENGINEER with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading will be performed. ENGINEER will advise CONTRACTOR in writing when ENGINEER is aware of conditions that may be detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 TEST PITS

A. General:

1. In advance of the construction, excavate, make observations and measurements, and fill test pits to determine conditions or location of the existing Underground Facilities and structures. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, filling, and replacing pavement for test pits. CONTRACTOR shall be responsible for the definite location of each existing force main involved within the area of excavation for the Work. Exercise care during such location work to avoid damaging and disrupting the affected force main or structure. CONTRACTOR shall be responsible for repairing, at his expense, damage to exiting force main or structure caused during the Work.

B. Payment for Test Pits:
   1. All payment for test pits shown or indicated in the Contract Documents will be part of the lump sum Contract Price.
   2. Separate payment will not be made for test pits.

3.3 PREPARATION

A. Site Preparation:
   1. Clear areas to be occupied by permanent construction of all trees, brush, roots, stumps, logs, wood and other materials and debris. Clean and strip vegetation, sod, topsoil, and organic matter from subgrades where fills will be placed, and from areas where structures will be constructed. Remove from the Site and properly dispose of all waste materials.
   2. Burning is not allowed at the Site.

B. Use of Explosives:
   1. Use of explosives is not allowed.

C. Dust Control:
   1. Control objectionable dust caused by CONTRACTOR's operation of vehicles and equipment, clearing, and other actions. To minimize airborne dust, apply water or use other methods subject to ENGINEER’s acceptance and approval of authorities having jurisdiction.

D. Maintenance and Protection of Traffic:
   1. Keep all streets and traffic ways open for passage of traffic and pedestrians during the Project, unless otherwise approved by owner of the street, traffic way, or right-of-way, as applicable
   2. When required to cross, obstruct, or temporarily close a street or traffic way, provide and maintain suitable bridges, detours, and other acceptable temporary expedients to accommodate traffic. Closings of street or traffic way shall be for shortest time practical, and passage shall be restored immediately after completion of fill and temporary paving or bridging.
   3. Give required advance notice to fire department, police department, and other emergency services as applicable of proposed construction operations.

4. Give reasonable notice to owners or tenants of private property who may be affected by construction operations. Give such notice not less than three (3) days prior to construction that will affect the property.
5. Hydrants, valves, fire alarm boxes, postal boxes and delivery service boxes, and other facilities that may require access during construction shall be kept accessible for use.
6. Provide temporary signage, signals, barricades, flares, lights and other equipment, service, and personnel required to regulate and protect traffic and warn of hazards. Such Work shall comply with requirements of owner of right-of-way and authorities having jurisdiction at the Site. Remove temporary equipment and facilities when no longer required, and restore grounds to original or to specified conditions, as applicable.

3.4 DEWATERING

A. Dewatering – General:
1. Provide and maintain adequate drainage and dewatering equipment to remove and dispose of all surface water and ground water entering excavations, or other parts of the Work and work areas. Keep each excavation dry during excavation, subgrade preparation, and continually thereafter until the structure to be built therein is acceptable to ENGINEER and backfilling operations are completed and acceptable to ENGINEER.
2. Keep all working areas at the Site free of surface water at all times. Provide temporary drainage ditches and temporary dikes, and provide required temporary pumping and other work necessary for diverting or removing rainfall and all other accumulations of surface water from excavations and fill areas. Perform diversion and removal of surface water in manner that prevents accumulation of water behind permanent or temporary structures and at any other locations in the construction area where such accumulations may be detrimental.
3. Water used for working or processing, resulting from dewatering operations, or containing oils or sediments that will reduce the quality of the surface water or groundwater downstream of the point of discharge, shall not be directly discharged. Divert such waters through temporary settling basin or filter before discharging to surface water, groundwater, or drainage routes.
4. CONTRACTOR shall be responsible for condition of piping, conduits, and channels used for drainage and such piping, conduits, and channels shall be clean and free of sediment.
5. Remove water from excavations as fast as water collects.

B. Disposal of Water Removed by Dewatering System:
1. CONTRACTOR’s dewatering system shall discharge to a suitable location acceptable to the OWNER, in accordance with Laws and Regulations.
2. Dispose of water removed from excavations in a manner that does not endanger health and safety, property, the Work, and other portions of the Project.
3. Dispose of water in manner that causes no inconvenience to OWNER, others involved in the Project, and adjacent and downstream properties.

3.5 EXCAVATION

A. Perform all excavation required to complete the Work as shown, specified, and required. Excavations shall include removing and handling of earth, sand, clay, gravel, hardpan, soft, weathered or decomposed rock, pavements, rubbish, and other materials within the excavation limits. Where the excavation includes rock that requires drilling, or specialized equipment for removal, remove rock in accordance with Section 31 23 16.26, Rock Removal.

B. Excavation Protection:
   1. Provide excavation protection system(s) in accordance with Laws and Regulations to prevent injury to persons and property, including Underground Facilities.
   2. Excavation Less Than Five Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
   3. Excavations Greater Than Five Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.

C. Maintain excavations in dry condition in accordance with "Dewatering" Article in Part 3 of this Section.

D. Elevation of existing force main is approximate. ENGINEER may direct such minor changes in dimensions and elevations as may be required to secure a satisfactory base.

E. When excavations are made below required grades without written order of ENGINEER, fill such excavations with compacted select fill, as directed by ENGINEER, at CONTRACTOR's expense.

F. Extend excavations sufficiently on each side of structures, footings, and similar construction to allow setting of forms, installation of excavation supports, and the safe sloping of banks, as necessary.

G. Subgrades – General:
   1. Subgrades shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Subgrades that are otherwise solid but become soft or mucky on top due to construction operations shall be reinforced with subbase material. Finished elevation of stabilized subgrades shall not be above subgrade elevations shown.
   2. If, in ENGINEER's opinion, subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause within CONTRACTOR's control, subgrade shall be excavated to firm material,

trimmed, and backfilled with select fill material at CONTRACTOR's expense.

H. Pipe Trench Preparation:
   1. Not more than 15 feet of trench may be opened in advance of installing pipe in trench.
   2. Trench width shall be minimized to greatest extent practical, and shall comply with the following:
      a. Trench width shall be sufficient to provide space for installing, jointing and inspecting piping. Refer to the Drawings for trench requirements. In no case should trench be wider at top of pipe than pipe barrel OD plus two feet, unless otherwise shown or indicated.
      b. Enlargement of trench width at pipe joints may be made when required and approved by ENGINEER.
      c. Trench width shall be sufficient for shoring and bracing, or shielding and dewatering.
      d. Trench width shall be sufficient to allow thorough compaction of fill adjacent to bottom half of pipe.
      e. Do not use excavating equipment that requires the trench to be excavated to excessive width.
   3. Depth of trench shall be as shown or indicated. If required and approved by ENGINEER in writing, depths may be revised.
   4. Where ENGINEER considers existing material beneath bedding material unsuitable, remove and replace such unsuitable material with select fill material.

3.6 UNAUTHORIZED EXCAVATION

A. All excavations outside lines and grades shown or indicated and that are not approved by ENGINEER, together with removing and disposing of the associated material, shall be at CONTRACTOR's expense. Fill unauthorized excavations with properly-compacted select fill material at CONTRACTOR's expense.

3.7 EROSION AND SEDIMENT CONTROLS

A. Provide temporary erosion and sediment controls in accordance with Section 01 57 05, Temporary Controls. When applicable, also comply with requirements of the erosion and sediment control plan approved by authorities having jurisdiction.

3.8 SHEETING, SHORING, AND BRACING

A. General:
   1. Provide sheeting, shoring, bracing, and similar excavation supports as shown, specified, and required for the Work.
   2. CONTRACTOR is responsible for adequacy of all sheeting, shoring, bracing, and similar excavation supports.
   3. Materials:

a. Previously-used materials shall be in good condition, and shall not be damaged or excessively pitted. All steel or wood sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary sheeting, shoring, and bracing.
b. All steel work for sheeting, shoring, bracing, cofferdams and other excavation supports, shall be in accordance with ANSI/AISC 360, except that field welding will be allowed.

4. As excavation progresses, carry down shoring, bracing, and similar excavation supports to required elevation at bottom of excavation.
5. Comply with Laws and Regulations regarding sheeting, shoring, bracing, and similar excavation supports.
6. Maintain sheeting, shoring, bracing, bracing, and other excavation supports in excavations regardless of time period excavations will be open.
7. Unless otherwise shown, specified, or directed, remove materials used for temporary construction when the Work is completed. Perform such removal in manner not injurious to the structures and Underground Facilities, their appearance, and adjacent construction.

B. Removal of Sheeting and Bracing:
1. Remove sheeting and bracing from excavations, unless otherwise directed by ENGINEER in writing. Perform removal to avoid damaging the Work and adjacent construction. Removal shall be equal on both sides of excavation to ensure no unequal loads on structures and Underground Facilities.
2. Defer removal of sheeting and bracing, where removal may cause soil to come into contact with concrete, until the following conditions are satisfied:
a. Concrete has cured for not less than seven days.
b. Wall and floor framing, up to and including grade level floors, is in place.

3.9 TRENCH SHIELDS

A. Excavation of earth material below bottom of trench shield shall not exceed the limits established in Laws and Regulations.

B. When using a shield for installing piping:
1. Portions of trench shield extending below the mid-diameter of an installed, rigid pipe, such as prestressed concrete pipe and other types of rigid pipe, shall be raised above the pipe's mid-diameter elevation prior to moving the shield along the trench for further construction.
2. Bottom of shield shall not at any time extend below mid-diameter of installed pipe that is flexible or has flexing capability, such as steel, ductile iron, PVC, CPVC, polyethylene, and other pipe that has flexing capability.

C. When using a shield for installing structures, bottom of the shield shall not extend below the top of the bedding for the structures.

D. When removing the shield or moving the shield ahead, exercise extreme care to prevent moving piping, structures, and other Underground Facilities, and prevent disturbance of bedding material for piping, structures, and other Underground Facilities. When piping, structures, or Underground Facilities are disturbed, remove and reinstall the disturbed items in accordance with the Contract Documents.

3.10 FILL AND COMPACTION – GENERAL PROVISIONS

A. Provide and compact all fill required for the finished grades as shown and as specified in this Section.

B. Place fill in excavations as promptly as progress of the Work allows, but not until completing the following:
   1. ENGINEER's authorization after observation of construction below finish grade, including dampproofing, waterproofing, perimeter insulation, and similar Work.
   2. Inspection, testing, approval, and recording of locations of Underground Facilities.
   3. Removal of concrete formwork.
   4. Removal of shoring and bracing, and filling of voids with satisfactory materials.
   5. Removal of trash and debris.
   6. Permanent or temporary horizontal bracing is in place on horizontally-supported walls.

C. Fill that includes organic materials or other unacceptable material shall be removed and replaced with approved fill material in accordance with the Contract Documents.

D. Placement – General:
   1. Place fill to the grades shown or indicated. Bring up evenly on all sides fill around structures and Underground Facilities.
   2. Place fill materials at moisture content and density as specified in this Article's requirements on compaction density. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials requires moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content in excess of specified limit shall be dried by aeration or stockpiled for drying.
   3. Perform compaction with equipment suitable for the type of fill material placed. Select and use equipment capable of providing the minimum density required in the Contract Documents. Use light compaction

equipment, with equipment gross weight not exceeding 7,000 pounds within horizontal distance of ten feet from the wall of completed, below-grade structures. Furnish and use equipment capable of compacting in restricted areas next to structures and around piping and Underground Facilities. Effectiveness of the equipment selected by CONTRACTOR shall be tested at start of compacted fill Work by constructing a small section of fill within the area where fill will be placed. If tests on the test section of fill indicate that required compaction is not obtained, do one or more of the following: increase the amount of coverages, decrease the lift thicknesses, or use different compactor equipment.

4. Place fill materials in horizontal, loose lifts, not exceeding specified uncompacted thickness. Place fill in a manner ensuring uniform lift thickness after placing. Mechanically compact each lift, by not less than two complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.
5. Do not place fill materials when standing water is present on surface of the area where fill will be placed. Do not compact fill when standing water is present on the fill to be compacted. Do not place or compact fill in a frozen condition or on top of frozen material. Fill containing organic materials or other unacceptable material previously described shall be removed and replaced prior to compaction.
6. If required densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly-functioning compaction equipment, CONTRACTOR shall perform all work required to provide the required densities. Such work shall include, at no additional cost to OWNER, complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill is provided.
7. Repair, at CONTRACTOR's expense, observed or measured settlement. Make repairs and replacements as required within 30 days after being so advised by ENGINEER.

E. Fill in Pipe Trenches:
   1. Piping Installed in Fills Above Pre-construction Grade:
      a. Prior to installing piping, place the fill in accordance with the Contract Documents until the fill reaches a minimum elevation two feet higher than the top of piping to be installed. Excavate the trench; install the piping, and backfill. Subsequently provide the remainder of the fill required for the Work.
   2. Piping trenches may be backfilled prior to testing of piping, unless nature of the test requires observation of pipe during testing. Do not construct building or structure over piping until piping has been successfully tested and passed.
   3. Pipe Bedding: Pipe bettering material shall be as follows:

a. Install PVC, CPVC, HDPE, and FRP piping on a layer of sand. Sand shall extend to 12 inches above top of pipe and to the trenchwalls on each side of the pipe.
b. Unless otherwise shown, install other types of piping on not less than six-inch layer of aggregate pipe bedding material. Aggregate pipe bedding material shall extend 12 inches above top of the pipe.

4. Placing and Compacting Pipe Trench Fill: Unless otherwise shown, placement and compaction of pipe trench fill materials shall comply with the following:
   a. Pipe bedding material shall be spread and the surface graded to provide a uniform and continuous support beneath piping at all points between bell holes or pipe joints. Slight disturbance of installed pipe bedding material surface during withdrawal of pipe slings or other lifting tackle is acceptable.
   b. After each pipe's bedding material has been graded, and the piping has been aligned, joined in accordance with the Contract Documents, and placed in final position on bedding material, provide and compact sufficient pipe trench fill material under and around each side of the pipe and back of the bell or end thereof to hold piping in proper position and maintain alignment during subsequent pipe jointing and embedment operations. Deposit and compact pipe trench fill material uniformly and simultaneously on each side of piping to prevent lateral displacement of piping. Place and compact pipe trench fill material to an elevation 12 inches above top of pipe, unless otherwise shown or specified.
   c. Each layer of pipe trench fill material shall be compacted by at least two complete coverages of all portions of surface of each lift using appropriate compaction equipment.
   d. Method of compaction and compaction equipment used shall be appropriate for material to be compacted and shall not transmit damaging shocks to the piping.

F. Subbase Placement:
   1. Provide subbase material where shown to the limits shown or indicated.
   2. Place subbase material in compacted lifts not exceeding depth of six inches each.

G. Compaction Density Requirements:
   1. Minimum density for fill materials shall be 100 percent of maximum density obtained in the laboratory in accordance with ASTM D698. Compaction of fill materials less than five feet below final grade, behind concrete walls, and pipe bedding materials when not located below structures or pavement shall be 95 percent of maximum density in accordance with ASTM D698.
   2. Place fill in trenches below Underground Facilities, foundations or paved areas in horizontal, uncompacted lifts not greater than eight inches deep, and thoroughly compact each lift before placing the next lift. In other pipe trenches, horizontal uncompacted lifts shall be six inches deep.

3. Fill shall be wetted and thoroughly mixed to achieve optimum moisture content plus-or-minus three percent, with the following exceptions:
   a. On-site clayey soils: Optimum to plus three percent.
4. Replace natural, undisturbed soils or compacted soil subsequently disturbed or removed by construction operations with materials compacted as indicated.
5. Field quality control testing for density; to verify that specified density was obtained, will be performed during each day of compaction Work. Responsibility for field quality control testing is specified in the "Field Quality Control" Article in Part 3 of this Section.
6. When field quality control testing indicates unsatisfactory compaction, provide additional compaction necessary to obtain the specified compaction. Perform additional compaction Work at no additional cost to OWNER until specified compaction is obtained. Such work includes complete removal of unacceptable (as determined by ENGINEER) fill areas and replacement and re-compaction until acceptable fill is provided in accordance with the Contract Documents.

H. Replacement of Unacceptable Excavated Materials: In cases where over-excavation to replace unacceptable soil materials is required, backfill the excavation to required subgrade with select fill material and thoroughly compact in accordance with the "Compaction Density Requirements" in this Article. Slope the sides of excavation in accordance with the maximum inclinations specified for each structure location.

3.11 GRADING

A. General:
   1. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas.
   2. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3.12 SURFACE RESTORATION

A. Immediately prior to dumping and spreading loam, clean subgrade of all stones greater than 2-inches and remove from Site.

B. Do not spread wet, muddy or frozen loam. Do not spread loam more than five days before seeding or planting.

C. Spread loam to a depth of at least four inches to meet finish grades after light rolling and natural settlement.

   1. Spread approximately one-half the thickness of indicated loam depth. After spreading loam, rototill, disk or harrow loam and subgrade to bring top 2-

inches of subgrade upward into loam layer, so that there is a transitional layer between loam and subgrade.

2. Spread remainder of loam to indicated finish grades.

3. Compact each lift to reduce settling, but not enough to prevent the movement of water and feeder roots through loam. After compaction spread loam should offer firm, even resistance when a soil sampling tube is inserted.

4. Phase the placement of the final lift so that wheeled vehicles do not have to travel over areas where final lifts are already in-place.

5. Spread and compact to a smooth, uniform surface plane, to within plus or minus 1/2-inch of finish elevations. Roll and rake and remove all ridges, and fill depressions. Remove all stones larger than 1-inch in any dimension and all sticks, roots and trash.

D. Spread ground limestone or acidulant and fertilizer, as specified. Mix ground limestone with dry loam before spreading fertilizer and work lightly into the top 4-inches of loam by harrowing or tilling at least three days before applying commercial fertilizers.

E. Grade planting areas to smooth, even surface with loose, uniformly fine texture. Remove all stones and extraneous material in excess of 1-inch diameter. Roll, rake and remove ridges and fill depressions to meet finish grades.

F. Moisten prepared areas before seeding. Water and allow surface moisture to dry before planting. Do not create a muddy loam condition.

G. Prior to seeding, restore loam to specified condition, (level and true) if eroded or otherwise disturbed.

3.13 SEEDING

A. Rake or harrow all seedbeds immediately prior to seeding to produce a rough, grooved surface, no deeper than 1-inch. Seed only when seedbed is in a friable condition and not muddy or hard.

B. Distribute seed evenly over entire area by sowing equal quantity in two directions at right angles to each other.

C. Sow lawn grass seed mixture at the rate of not less than eight pounds for every 1000 square feet.

1. Spread straw mulch to form a continuous loose blanket not less than 1-1/2-inch deep over seeded areas at the approximately rate of two tons-per acre.

D. Using a uniform fine spray, thoroughly and evenly water seeded areas. Provide adequate water to moisten seedbed to a depth of 2-inches.

1. Repeat this process when peat mulch color lightens. Maintain all seedbeds in a uniformly moist condition, conducive to seed germination and plant establishment, as specified. Identify watering schedule, method and means in master planting schedule.

E. Reseed areas that remain without mulch for longer than three days.

F. Prevent damage or staining of walkways, lawns and plantings adjacent to mulched areas. Immediately clean damaged or stained areas at no additional cost to the Authority.

G. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched areas. Reseed areas damaged as a result of such activity at no additional cost to the Authority.

3.14 RECONDITIONING EXISTING LAWNS

A. Recondition existing lawn damaged by Contractor's operations, including areas used for storage of materials or equipment and areas damaged by movement of vehicles.

B. Provide fertilizer, seed or sod and soil amendments, as specified for new lawn. Provide new loam to fill low spots and meet new finish grades.

C. Till stripped, bare, and compacted areas to a depth of 12-inches.

D. Remove topsoil containing oil drippings, stone, gravel and other construction materials at no additional cost to the Owner.

3.15 PAVEMENT SUBBASE COURSE

A. Not Used.

3.16 DISPOSAL OF EXCAVATED MATERIALS

A. General:
1. CONTRACTOR shall haul away material removed from excavations that does not comply with requirements for fill, or is in excess of the quantity required for fill.
2. Disposal of materials shall be in compliance with Laws and Regulations, at no additional cost to OWNER.

3.15 FIELD QUALITY CONTROL

A. Site Tests: CONTRACTOR will employ a testing laboratory to perform field quality control testing.
   1. Testing Laboratory Scope:
      a. Perform field moisture content and density tests to ensure that the specified compaction of fill materials has been obtained.
      b. Tests of actual unconfined compressive strength or bearing tests on each stratum.
      c. Report results of each test to ENGINEER and OWNER.
   2. Required Material Tests:
      a. Compaction: Comply with ASTM D1556 and ASTM D6938, as applicable.
   3. Authority and Duties of Testing Laboratory:
      a. Technicians representing the testing laboratory shall inspect the materials in the field, perform testing, and report findings to ENGINEER and CONTRACTOR. When materials furnished or the Work performed does not comply with the Contract Documents, technician will direct attention of ENGINEER and CONTRACTOR to such failure.
      b. Technician will not act as foreman or perform other duties for CONTRACTOR. Work will be checked as it progresses, but failure to detect defective Work or non-complying materials shall not in any way prevent later rejection when defect is discovered, nor shall it obligate ENGINEER for Substantial Completion or final acceptance. Technicians are not authorized to revoke, alter, relax, enlarge, or release requirements of the Contract Documents, or to approve or accept any portion of the Work.
   4. Responsibilities and Duties of CONTRACTOR:
      a. Use of testing laboratory shall in no way relieve CONTRACTOR of the responsibility to provide materials and Work in full compliance with the Contract Documents.
      b. To facilitate testing laboratory, CONTRACTOR shall advise testing laboratory at least two days in advance of filling operations to allow for completion of field quality control testing and for assignment of personnel.
      c. It shall be CONTRACTOR's responsibility to accomplish the specified compaction for fill and other earthwork. CONTRACTOR shall control construction operations by confirmation tests to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the Contract Documents relative to compaction, control.
      d. CONTRACTOR shall demonstrate adequacy of compaction equipment and procedures before exceeding one or more of the following quantities of earthwork. Each test location shall include tests for each layer, type, or class of fill to finish grade.
         1) 200 linear feet of trench fill.
         2) 10 cubic yards of select fill.

3) 100 cubic yards of general fill.
4) 50 cubic yards of subbase material.

5. Testing laboratory will inspect and indicate acceptable subgrades and fill layers before construction work is performed thereon. Testing of subgrades and fill layers shall be taken as follows:
   a. Trenches for Structures, and Underground Facilities (including buried ductbanks):
      1) In Open Fields: Two locations every 1,000 linear feet.
      2 Along Dirt or Gravel Roads or Off Traveled Right-of-Way: Two locations every 500 linear feet.
      3) Crossing Paved Roads: Two locations along each crossing.
      4) Under Pavement Cuts or Within Two Feet of Pavement Edges: One location every 400 linear feet.
   b. Footing Subgrade: For each stratum of soil on which footings will be placed, perform not less than one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to ENGINEER.
   c. For Select Fill: On 30-foot intervals on all sides of the structure for every compacted lift, but not less than one per lift on each side of the structure for structures less than 60 feet long on a side.
   d. For General Fill: One per 1,000 square feet on every compacted lift.
   e. Subbase Material: One per 1,000 square feet on every compacted lift.
6. Periodic compliance tests will be made by ENGINEER to verify that compaction is complying with the requirements specified, at no cost to CONTRACTOR. CONTRACTOR shall remove the overburden above the level at which ENGINEER wishes to test and shall fill and re-compact the excavation after testing is complete.
7. If testing laboratory reports or inspections indicate subgrade, fills, or bedding compaction below specified density, CONTRACTOR shall remove unacceptable materials as necessary and replace with specified materials and provide additional compaction at CONTRACTOR’s expense until subgrades, bedding, and fill are acceptable. Costs for retesting of subgrade, fills, or bedding materials that did not originally comply with specified density shall be paid by CONTRACTOR.

+ + END OF SECTION + +

SECTION 31 23 16.26

ROCK REMOVAL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to perform rock removal required for the Work, including disposing of excavated rock material.
   2. Obtain permits required by authorities having jurisdiction for rock removal Work, including transporting, storing, and disposal.
   3. No blasting shall be allowed.
   4. Perform rock removal Work in compliance with Laws and Regulations applicable permits, and requirements of authorities having jurisdiction.
   5. **Ten (10) cubic yards of rock removal and disposal is included in this Contract for installation of the permanent force main bypass.**

B. Coordination:
   1. Review procedures under this and other Sections and coordinate the Work that must be performed with or before rock removal.

C. Related Sections:
   1. Section 31 20 00, Earth Moving .

D. Measurement: Limits of rock removal shall be as follows:
   1. Trenches: Limit for trenches shall be bounded by the following:
      a. Width of trenches shall be the outside diameter or outside edge (as applicable) of the Underground Facility plus two feet, exclusive of pipe bells, branches, hubs, spurs, or cradles. Sides of trench shall be considered vertical.
      b. Depth of trench shall be six inches below the outside of the Underground Facility in the trench unless indicated otherwise on the Drawings.
      c. Length shall be equal to installed length of the Underground Facility, measured horizontally.
   4. No payment will be made for additional quantity outside the limits described in this Section.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. United States Bureau of Mines (USBM), Report of Investigations (RI) 8507.

1.3 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Rock removal" is removal of igneous, metamorphic, or sedimentary rock or stone; boulders over two cubic yards in volume in open areas and boulders over one cubic yard in volume in trenches; and mass concrete; that cannot be removed using rippers or other mechanical methods and therefore requires drilling and blasting or use of large excavator-mounted pneumatic breakers. The following material will not be measured nor allowed for payment as rock removal:
      a. Soft, weathered or disintegrated rock that can be removed by normal excavating equipment, including bulldozers with rippers and large trackhoes with rock teeth or rock buckets.
      b. Loose or previously blasted rock.
      c. Broken stone in rock fills.
      d. Rock or stone that falls into the excavation from outside limits of excavation shown or indicated in the Contract Documents.
      e. Boulders that can be removed without drilling, blasting, or pneumatic breakers.
      f. Pavements, sidewalks, and gutters of concrete, asphalt, or masonry.
   2. "Trenches" means excavations having vertical sides whose depth exceeds its width, made for Underground Facilities and drainage beds.

1.4 NOT USED

1.5 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Test and Evaluation Reports:
      a. Rock surface survey information, in accordance with Article 3.1 of this Section.
      b. Work Plan describing equipment to be used in removal of rock.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Top-of-Rock Survey:
   1. Prior to and rock removal, CONTRACTOR shall survey and measure the elevation of the top of rock to determine the in-place quantity of rock to be excavated.

2. Uncover rock to be excavated in sections or areas acceptable to ENGINEER for surveying.
3. Conform to Section 01 71 23, Field Engineering.
4. Submit to ENGINEER field notes, site plan showing rock elevations measured, cross-sections of rock surface when necessary or required by ENGINEER, and detailed estimation of quantity of rock to be excavated.

3.2 NOT USED

3.3 ROCK REMOVAL

A. Perform rock removal in accordance with Laws and Regulations relative to rock removal.

B. Perform rock removal adjacent to Underground Facilities and above-ground utilities and life-safety facilities with utmost care, after properly notifying and coordinating with utility owners, life-safety facility owners, and authorities having jurisdiction.

C. CONTRACTOR shall be fully responsible for injury and damage caused rock removal activites, and shall repair or replace all injury and damage immediately, as accepted by ENGINEER at no additional cost to OWNER.

D. Removal by Methods Other than Blasting:
   1. Where conditions of hazard exist, or clearances with existing facilities, piping, or structures are very small, or where the potential for damage to persons or property is strong, perform rock removal by means other than blasting.
   2. Blasting is not allowed in the following areas:
      a. East Providence Water Pollution Control Facility.

E. Removal and Disposal of Rock:
   1. Remove blasted or broken rock from excavations with suitable equipment in accordance with Section 31 20 00, Earth Moving .
   2. Do not use excavated rock as backfill. Dispose of excavated rock off the Site at CONTRACTOR's expense in compliance with Laws and Regulations.

3.4 NOT USED

3.5 UNAUTHORIZED ROCK REMOVAL

A. Rock removal outside the limits shown or indicated in the Contract Documents or that is not approved by ENGINEER, including removal, disposal, and backfill, will be at CONTRACTOR's expense.

B. Fill unauthorized excavation below pipe or foundation with compacted select backfill as directed by ENGINEER in writing, at no additional cost to OWNER. Backfill other unauthorized excavation as specified in Section 31 20 00, Earth Moving.

+ + END OF SECTION + +

SECTION 33 05 05

BURIED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to install and test all buried piping, fittings, and specials. The Work includes the following:
      a. All types and sizes of buried piping, except where buried piping installations are specified under other Sections.
      b. Unless otherwise shown or specified, this Section includes all buried piping
      c. Work on or affecting existing buried piping.
      d. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, cathodic protection, and other Work required for a complete, buried piping installation.
      e. Supports, restraints, and thrust blocks.
      f. Field quality control, including testing.
      g. Cleaning and disinfecting.
      h. Incorporation of valves, meters, and special items shown or specified into piping systems in accordance with the Contract Documents and as required.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.
   2. Coordinate with appropriate piping Sections of Division 40, Process Integration.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 31 20 00, Earth Moving
   3. Section 31 23 16, Rock Removal
   4. Section 40 05 19, Ductile Iron Process Pipe
   5. Section 40 05 53, Process Valves

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASME B31.3, Process Piping.

2. American Society for Non-Destructive Testing (ASNT), ASNT-TC-1A, Recommended Practice, Personnel Qualification, and Certification in Non-destructive Testing.
3. ASTM B32, Specification for Solder Metal.
4. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
6. AWWA M41, Ductile-Iron Pipe and Fittings.
7. ASCE 37, Design and Construction of Sanitary and Storm Sewers.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with requirements and recommendations of authorities having jurisdiction over the Work, including.
      a. Rhode Island Department of Environmental Management.
   2. Obtain required permits for Work in roads, rights-of-way, railroads, and other areas of the Work.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Laying schedules for concrete pipe and piping with restrained joints.
      b. Details of piping, specials, joints, harnessing and thrust blocks, and connections to piping, structures, equipment, and appurtenances.
   2. Product Data:
      a. Manufacturer's literature and specifications, as applicable, for products specified in this Section.
   3. Testing Procedures:
      a. Submit proposed testing procedures, methods, apparatus, and sequencing. Obtain ENGINEER's approval prior to commencing testing.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.
   2. Field Quality Control Submittals:
      a. Results of each specified field quality control test.

C. Closeout Submittals: Submit the following:
   1. Record Documentation:
      a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to buried piping Work. Submittal shall show actual location of all piping Work and appurtenances at same scale as the Drawings.

b. Show piping with elevations referenced to Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping provide offset dimensions as required to document piping location.
c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.
d. Conform to Section 01 78 39, Project Record Documents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
2. Upon delivery inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

B. Storage:
1. Store materials to allow convenient access for inspection and identification. Store material off ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.
2. Pipe and fittings other than PVC and CPVC may be stored outdoors without cover. Cover PVC and CPVC pipe and fittings stored outdoors.

C. Handling:
1. Handle pipe, fittings, specials, and accessories carefully in accordance with pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free from dirt and foreign matter.
4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of cause of damage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Piping materials are specified in the Buried Piping Schedule at end of this Section. Piping materials shall conform to Specifications for each type of pipe and piping appurtenances in applicable Sections of Division 40, Process Integration.

B. General:
1. Pipe Markings:
a. Factory-mark each length of pipe and each fitting with designation conforming to those on approved laying schedules.
b. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.

2.2 BURIED PIPING IDENTIFICATION

A. Polyethylene Underground Warning Tape for Metallic Pipelines:
   1. Tracer tape shall be of inert, acid- and alkali-resistant, polyethylene, four mils thick, six inches wide, suitable for direct burial. Tape shall be capable of stretching to twice its original length.
   2. Message shall read, "CAUTION SANITARY SEWER PIPE BURIED BELOW", with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet. Tape shall be color green.
   3. Manufacturer: Provide products of one of the following:
      a. Brady Corporation
      b. Seton Identification Products
      c. Marking Services, Inc.
      d. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Install piping as shown, specified, and as recommended by pipe and fittings manufacturer.
   2. In event of conflict between manufacturer's recommendations and the Contract Documents, request interpretation from ENGINEER before proceeding.
   3. ENGINEER will observe excavations and bedding prior to laying pipe by CONTRACTOR. Notify ENGINEER in advance of excavating, bedding, pipe laying, and backfilling operations.
   4. Minimum cover over buried piping shall be 5 feet, unless otherwise shown or approved by ENGINEER.
   5. Earthwork is specified in Section 31 20 00, Earth Moving.
   6. Excavation in excess of that required or shown, and that is not authorized by ENGINEER shall be filled at CONTRACTOR's expense with granular material furnished, placed, and compacted in accordance with Section 31 20 00, Earth Moving.
   7. Comply with NFPA 24 for "Outside Protection", where applicable to water piping systems used for fire protection.

B. Separation of Sewers and Potable Water Piping:
   1. Horizontal Separation:
      a. Where possible, existing and proposed potable water mains and service lines, and sanitary, combined, and storm sewers shall be separated horizontally by clear distance of at least ten feet.
      b. If local conditions preclude the specified clear horizontal separation, installation will be allowed if potable water main is in separate trench or on undistributed earth shelf on one side of sewer and with bottom of potable water main at least 18 inches above top of sewer.

c. Exception:
1) Where it is not possible to provide minimum horizontal separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe complying with public water supply design standards of authority having jurisdiction. Hydrostatically test water main and sewer as specified in this Section prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.

2. Vertical Separation:
a. Provide minimum vertical distance of 18 inches between outside of potable water main and outside of sewer when sewer crosses over potable water main.
b. Center a section of potable water main pipe at least 17.5 feet long over sewer so that sewer joints are equidistant from potable water main joints.
c. Provide adequate structural support where potable water main crosses under sewer. At minimum, provide compacted select backfill for ten feet on each side of crossing.
d. Exceptions:
1) Where it is not possible to provide minimum vertical separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe. Hydrostatically test water main and sewer as specified in this Section, prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
2) Encase either potable water main or sewer in watertight carrier pipe extending ten feet on each side of crossing, measured perpendicular to potable water main.

C. Plugs:
1. Temporarily plug installed pipe at end of each day of work or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.
2. Install standard plugs in bells at dead ends, tees, and crosses. Cap spigot and plain ends.
3. Fully secure and block plugs, caps, and bulkheads installed for testing to withstand specified test pressure.
4. Where plugging is required for phasing of the Work or subsequent connection of piping, install watertight, permanent type plugs, caps, or bulkhead acceptable to ENGINEER.

D. Bedding Pipe: Bed pipe as specified and in accordance with details on the Drawings.
1. Trench excavation and backfill, and bedding materials shall conform to Section 31 20 00, Earth Moving, as applicable.
2. Where ENGINEER deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with 31 20 00, Earth Moving. Payment for additional excavation and providing granular material will be made under the unit price payment items in the Contract.

3. Where pipe is installed in rock excavation, provide minimum of three inches of granular bedding material underneath pipe smaller than four-inch nominal diameter, and minimum of six inches of granular bedding material underneath pipes four-inch nominal diameter and larger.
4. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.
5. Carefully and thoroughly compact pipe bedding with hand held pneumatic compactors.
6. Do not lay pipe until ENGINEER approves bedding condition.
7. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.

E. Laying Pipe:
1. Conform to manufacturer's instructions and requirements of standards and manuals listed below, as applicable:
   a. Ductile Iron Pipe: ANSI/AWWA C600, ANSI/AWWA C105, AWWA M41.
   b. Sanitary and Storm Sewers: ASCE 37.
2. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by ENGINEER. Remove and reinstall pipes that are not installed correctly.
3. Slope piping uniformly between elevations shown.
4. Keep groundwater level in trench at least 12 inches below bottom of pipe before laying pipe. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete. Keep clean and protect interiors of pipe, fittings, valves, and appurtenances.
5. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by ENGINEER.
6. Place bell and spigot-type pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
7. Place concrete pipe containing elliptical reinforcement with minor axis of reinforcement in vertical position.
8. Excavate around joints in bedding and lay pipe so that pipe barrel bears uniformly on trench bottom.
9. Deflections at joints shall not exceed 75 percent of amount allowed by pipe manufacturer, unless otherwise approved by ENGINEER.
10. Carefully examine pipe, fittings, valves, and specials for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.
11. Inspect interior of all pipe, fittings, valves, and specials and completely remove all dirt, gravel, sand, debris, and other foreign material from pipe interior and joint recesses before pipe and appurtenances are moved into excavation. Bell and spigot-type mating surfaces shall be thoroughly wire brushed, and wiped clean and dry immediately before pipe is laid.
12. Field cut pipe, where required, with machine specially designed for cutting the type of pipe being installed. Make cuts carefully, without damage to pipe, coating or lining, and with smooth end at right angles to axis of pipe. Cut ends

on push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.

13. Do not place blocking under pipe, unless specifically approved by ENGINEER for special conditions.
14. Touch up protective coatings in manner satisfactory to ENGINEER prior to backfilling.
15. Notify ENGINEER in advance of backfilling operations.
16. On steep slopes, take measures acceptable to ENGINEER to prevent movement of pipe during installation.
17. Thrust Restraint: Where required, provide thrust restraint conforming to Article 3.3 of this Section.
18. Exercise care to avoid flotation when installing pipe in cast-in-place concrete, and in locations with high groundwater.

F. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:
   a. Immediately before making joint, wipe clean the socket, plain end, and adjacent areas. Taper cut ends and file off sharp edges to provide smooth surface.
   b. Lubricate plain ends and gasket with soapy water or manufacturer's recommended pipe lubricant, in accordance with ANSI/AWWA C111, just prior to slipping gasket onto plain end of the joint assembly.
   c. Place gland on plain end with lip extension toward the plain end, followed by gasket with narrow edge of gasket toward plain end.
   d. Insert plain end of pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.
   e. Push gland toward socket and center gland around pipe with gland lip against gasket.
   f. Insert bolts and hand-tighten nuts.
   g. If deflection is required, make deflection after joint assembly and prior to tightening bolts. Alternately tighten bolts approximately 180 degrees apart to seat gasket evenly. Bolt torque shall be as follows:

Pipe Diameter (inches)	**Bolt Diameter (inches)**	**Range of Torque (ft-lbs)**
3	5/8	45 to 60
4 to 24	3/4	75 to 90
30 to 36	1	100 to 120
42 to 48	1.25	120 to 150

   h. Bolts and nuts, except those of stainless steel, shall be coated with two coats, minimum dry film thickness of eight mils each, of high build solids epoxy or bituminous coating manufactured by Tnemec, or equal.
   i. Restrained mechanical joints shall be in accordance with Section 40 05 19, Ductile Iron Process Pipe.

G. Backfilling:

1. Conform to applicable requirements of Section 31 20 00, Earth Moving.

2. Place backfill as Work progresses. Backfill by hand and use power tampers until pipe is covered by at least one foot of backfill.

H. Connections to Valves and Hydrants:
   1. Install valves as shown and indicated in the Contract Documents.
   2. Provide suitable adapters when valves and piping have different joint types.
   3. Provide thrust restraint at all valves located at pipeline terminations.

I. Transitions from One Type of Pipe to Another:
   1. Provide necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

J. Closures:
   1. Provide closure pieces shown or required to complete the Work.

3.2 TRACER TAPE INSTALLATION

A. Polyethylene Underground Warning Tape for Metallic Pipelines:
   1. Provide polyethylene tracer tape for buried metallic piping, which includes pipe that is steel, ductile iron, cast iron, concrete, copper, and corrugated metal.
   2. Provide tracer tape 12 to 18 inches below finished grade, above and parallel to buried pipe.
   3. For pipelines buried eight feet or greater below finished grade, provide second line of magnetic tracer tape 2.5 feet above crown of buried pipe, aligned along pipe centerline.
   4. Tape shall be spread flat with message side up before backfilling.

3.3 THRUST RESTRAINT

A. Provide thrust restraint on pressure piping systems where shown or indicated in the Contract Documents.

B. Thrust restraint may be accomplished by using restrained pipe joints and concrete thrust blocks. Thrust restraints shall be designed for axial thrust exerted by test pressure specified in the Buried Piping Schedule at the end of this Section.

C. Place concrete thrust blocks against undisturbed soil. Where undisturbed soil does not exist, or for projects where the Site consists of backfill material, thrust restraint shall be provided by restrained pipe joints.

D. Restrained Pipe Joints:
   1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.
      a. Ductile Iron, Mechanical Joints: Restrain with proprietary restrained joint system as specified in Section 40 05 19, Ductile Iron Process Pipe; lugs and tie rods; or other joint restraint systems approved by ENGINEER.

E. Concrete Thrust Blocks:
   1. Provide concrete thrust blocks on pressure piping at changes in alignment of 15 degrees or more, at tees, plugs and caps, and where shown or indicated in the Contract Documents. Construct thrust blocks of Class B concrete, conforming to 03 00 05, Concrete.
   2. Install thrust blocks against undisturbed soil. Place concrete so that pipe and fitting joints are accessible for repair.
   3. Concrete thrust block size shall be as shown on the Drawings or as approved by ENGINEER.

3.4 WORK AFFECTING EXISTING PIPING

A. Location of Existing Underground Facilities:
   1. Locations of existing Underground Facilities shown on the Drawings should be considered approximate.
   2. Determine the true location of existing Underground Facilities to which connections are to be made, crossed, and that could be disturbed, and determine location of Underground Facilities that could be disturbed during excavation and backfilling operations, or that may be affected by the Work.

B. Taking Existing Pipelines and Underground Facilities Out of Service:
   1. Conform to Section 01 14 16, Coordination with Owner's Operations.
   2. Do not take pipelines or Underground Facilities out of service unless specifically listed in Section 01 14 16, Coordination with Owner's Operations, or approved by ENGINEER.
   3. Notify ENGINEER in writing prior to taking pipeline or Underground Facilities out of service. Shutdown notification shall be provided in advance of the shutdown in accordance with the General Conditions and Section 01 14 16, Coordination with Owner's Operations.

C. Work on Existing Pipelines or Underground Facilities:
   1. Cut or tap piping or Underground Facilities as shown or required with machines specifically designed for cutting or tapping pipelines or Underground Facilities, as applicable.
   2. Install temporary plugs to prevent entry of mud, dirt, water, and debris into pipe.
   3. Provide necessary adapters, sleeves, fittings, pipe, and appurtenances required to complete the Work.
   4. Conform to applicable requirements of Section 01 14 16, Coordination with Owner's Operations.

3.5 FIELD QUALITY CONTROL

A. General:
   1. Test all piping, except as exempted in the Buried Piping Schedule in this Section.

2. When authorities having jurisdiction are to witness tests, notify ENGINEER and authorities having jurisdiction in writing at least 48 hours in advance of testing.
3. Conduct all tests in presence of ENGINEER.
4. Remove or protect pipeline-mounted devices that could be damaged by testing.
5. Provide all apparatus and services required for testing, including:
    a. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems required to maintain OWNER's operations.
    b. Temporary bulkheads, bracing, blocking, and thrust restraints.
6. Provide air if an air test is required, power if pumping is required, and gases if gases are required.
7. Unless otherwise specified, OWNER will provide fluid required for hydrostatic testing. CONTRACTOR shall provide means to convey fluid for hydrostatic testing into piping being tested. CONTRACTOR shall provide fluid for other types of testing required.
8. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.
9. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by CONTRACTOR and that fails the test shall be repaired upon authorization of OWNER. Unless otherwise included in the Work, repair of existing piping or Underground Facilities will be paid as extra Work.

B. Test Schedule:
1. Refer to the Buried Piping Schedule in this Section for type of test required and required test pressure.
2. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.
3. For piping not listed in Buried Piping Schedule in this Section:
    a. Hydrostatically test pipe that will convey liquid at a pressure greater than five psig. Provide process air pipe test for pipe that will convey air or gas under pressure or vacuum, except chlorine gas, which requires separate test.
    b. Use exfiltration testing, low-pressure air testing, or vacuum testing for other piping.
    c. Disinfect for bacteriological testing piping that conveys potable water.
4. Test Pressure:
    a. Use test pressures listed in Buried Piping Schedule in this Section.
    b. If test pressure is not listed in Buried Piping Schedule, or if test is required for piping not listed in the Buried Piping Schedule, test pressure will be determined by ENGINEER based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.

C. Hydrostatic Testing:
1. Preparation for Testing:

a. For thermoplastic pipe and fiberglass pipe, follow procedures described in Section 7 of ANSI/AWWA Standard C605.
b. For HDPE pipe, follow procedures described in ASTM F2164. Test duration, including time to pressurize, time for initial expansion, time at test pressure, and time to depressurize, shall not exceed eight hours. If re-testing of a test section or pipeline is required, at least eight hours shall elapse between tests.
c. For steel pipe, follow procedures described in ANSI/AWWA Manual M11. Wetting period is not required for pipe that is not cement-lined.
d. For other piping follow procedures described in ANSI/AWWA Manual M9, except that minimum wetting period required immediately prior to testing for asbestos cement pipe shall be 24 hours rather than the 48 hours prescribed for concrete pipe. Wetting period is not required for pipe that is not cement mortar-lined.
e. Prior to testing, ensure that adequate thrust protection is in place and joints are properly installed.

2. Test Procedure:
a. Fill pipeline slowly to minimize air entrapment and surge pressures. Fill rate shall not exceed one foot of pipe length per second in pipe being tested.
b. Expel air from pipe as required. Obtain approval of ENGINEER prior to tapping pipe for expelling air.
c. Examine exposed joints and valves, and make repairs to eliminate visible leakage.
d. After specified wetting period, add fluid as required to pressurize line to required test pressure. Maintain test pressure for a stabilization period of ten minutes before beginning test.
e. HDPE Pipe: After filling pipeline, gradually pressurize pipe to test pressure and maintain required test pressure for three hours for pipe to expand. During expansion, add fluid to maintain required test pressure. Begin timed test period after expansion period and other requirements are met.
f. Timed test period shall not begin until after pipe has been filled, exposed to required wetting period, air has been expelled, and pressure stabilized.
g. Timed Test Period: After stabilization period, maintain test pressure for at least two hours. During timed testing period, add fluid as required to maintain pressure within five psig of required test pressure. For HDPE pipe, after three hour expansion phase, reduce test pressure by ten psig and do not add liquid. Test pressure shall then remain steady for one hour, indicating no leakage.
h. Pump from test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at 15 minute intervals for duration of test.

3. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of test pressure during timed test period. Allowable leakage rates for piping are:
a. No Leakage: Pipe with flanged, welded, fused, threaded, soldered, or brazed joints.

b. Rates based on formula or table in ANSI/AWWA Manual M41:
   1) Metal and fiberglass pipe joined with rubber gaskets as sealing members, including the following joint types:
      a) Bell and spigot and push-on joints.
      b) Mechanical joints.
      c) Bolted sleeve type couplings.
      d) Grooved and shouldered couplings.
c. Rates based on make-up allowance in ANSI/AWWA Manual M9:
   1) Prestressed concrete cylinder pipe and other types of concrete pipe joined with O-ring rubber gasket sealing members.
d. Rates based on formula or table in ANSI/AWWA C605:
   1) Plastic pipe joined with O-ring gasket sealing members.
e. Rates based on formula or table in ANSI/AWWA C603:
   1) Asbestos-cement pipe.

3.6 CLEANING AND DISINFECTION

A. Cleaning, General: Clean pipe systems as follows:
   1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in manner approved by ENGINEER, prior to placing in service.
   2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.
   3. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with five percent sodium hypochlorite solution.

3.7 SCHEDULES

A. Schedules listed below, following the “End of Section” designation, are part of this Specification section.
   1. Table 33 05 05-A, Buried Piping Schedule.

+ + END OF SECTION + +

TABLE 33 05 05-A, BURIED PIPING SCHEDULE

Service	Diameter (inch)	Material	Interior Lining	Exterior Coating	Pressure Class/ Thickness	Joint	Test	Remarks
Force Main Bypass (Wastewater, WW)	24	DI	CL	AC	52	RMJ	HYD (50)	

The following abbreviations are used in the Buried Piping Schedule.

A. Service Abbreviations

Service	Abbrev		Service	Abbrev.
Sanitary Sewer	SAN		Wastewater	WW
Storm Sewer	ST		Overflow	OF
Combined Sewer	CS		Centrate	CEN
Sanitary Force Main	SFM		Filtrate	FILT
Raw Water	RW		Scum	SCUM
Potable Water	PW		Primary Sludge	PS
City Water	CW		Return Activated Sludge	RAS
Non-Potable Water	NPW		Waste Activate Sludge	WAS
Plant Effluent Water	PEW		Thickened Sludge	TS
Spray Water	SPW		Mixed Sludge	MS
Backwash Water	BW		Digested Sludge	DS
Hot Water Supply	HWS		Chlorine Solution	CLS
Hot Water Return	HWR		Sodium Hydroxide	NAOH
Influent	INF		Sodium Hypochlorite	NAOCL
Effluent	EFF		Polymer Solution	POLYS
Drain	DR		Alum	AL
Process Air	PA		Hydraulic Fluid	HF
Instrument Air	IA		Fuel Oil	FO
Digester Gas	DIG		Lube Oil	LO
Chlorine Gas	CLG			

B. Material Abbreviations

Material	Abbrev		Material	Abbrev.
Ductile Iron	DI		Polyvinyl Chloride	PVC
Cast Iron	CI		Chlorinated Polyvinyl Chloride	CPVC
Carbon Steel	CS		Polyethylene	PE
Stainless Steel	SS		High Density Polyethylene	HDPE
Copper	C		Fiberglass Reinforced Plastic	FRP
Corrugated Metal Pipe	CMP		Acrylonitrile Butadiene Styrene	ABS
Reinforced Concrete Pipe	RCP		Vitrified Clay	VC
Prestressed Concrete Cylinder Pipe	PCCP			
Non-Prestressed Concrete Cylinder Pipe	CCP			
Steel Cylinder Pipe	SCP			

C. Lining/Coating Abbreviations

Lining	Abbrev		Coating	Abbrev.
Cement Mortar Lined	CL		Asphaltic Coated	AC
Glass Lined	GL		Polyethylene Wrapped	PEW
Ceramic Epoxy	CE		Painted	P
Fusion Bonded Epoxy Lined	FBEL		Fusion Bonded Epoxy Coated	FBEC
Plastic Lined	PL		Insulated	I
			Galvanized	Galv

D. Joint Abbreviations

Joint Type	Abbrev		Joint Type	Abbrev.
Bell and Spigot	BS		Butt Weld	BW
Restrained Bell and Spigot	RBS		Lap Weld	LW
Push-on Joint	POJ		Butt Fusion Weld	BFW
Restrained Push-on Joint	RPOJ		Solvent Weld	SW
Mechanical Joint	MJ		Sleeve-type Flexible Coupling	SLFC
Restrained Mech. Joint	RMJ		Split Flexible Coupling	SPFC
Soldered	Sd		Plasticized PVC Coupling	PPVC
Brazed	Bz		Grooved or Shouldered End Coupling	GSEC
Threaded	Thd		Flanged	Flg
Compression Sleeve Coupling	CSC		Compression Flange Adapter	CFA

E. Test Abbreviations

Test	Abbrev		Test	Abbrev.
Hydrostatic Test (test pressure in psig)	HYD ( )		Process Air Pipe Test (test pressure in psig)	PA ( )
Exfiltration	EX		Chlorine Pipe Test	CL
Low-pressure Air Sewer Test	AIR		Disinfection and Bacteriological Testing	DBT
Vacuum Test	VAC		Examination of Welds	EW
Vertical Deflection	VD		No Test Required	NR
Televised Inspection	TV			

SECTION 40 05 19

DUCTILE IRON PROCESS PIPE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish ductile iron pipe and fittings.
   2. Extent of piping is shown on the Drawings. Piping schedules in Section 33 05 05, Buried Piping Installation, specify pipe service, diameter, material, lining, coating, pressure rating, joint type, and testing required.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before ductile iron pipe Work.

C. Related Sections:
   1. Section 33 05 05, Buried Piping Installation.
   2. Section 40 05 53, Process Valves

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ANSI B18.2.1, Square and Hex Bolts and Screws Inch Series.
   2. ANSI B18.2.2, Square and Hex Nuts. (Inch Series).
   3. ASTM A193, Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   4. ASTM A194, Specification for Carbon Steel and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both.
   5. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
   6. ASTM A354, Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.
   7. ASTM A563, Specification for Carbon and Alloy Steel Nuts.
   8. ASTM G14, Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).
   9. ASTM G62, Test Methods for Holiday Detection in Pipeline Coatings.
   10. ASTM G95, Test Methods for Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method).
   11. ANSI/AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.
   12. ANSI/AWWA C110, Ductile Iron and Gray Iron Fittings for Water.
   13. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
   14. ANSI/AWWA C115, Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron

Threaded Flanges.

15. ANSI/AWWA C116, Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings for Water Service.
16. ANSI/AWWA C151, Ductile Iron Pipe, Centrifugally Cast, for Water.
17. ANSI/AWWA C153, Ductile Iron Compact Fittings, 3 inch through 24 inch and 54 inch through 64 inch for Water Service.
18. ANSI/AWWA C606, Grooved and Shouldered Type Joints.
19. European Standard (EN), EN 598: Ductile Iron Pipe, Fittings, Accessories and Their Joints for Sewerage Applications.
20. MSS-SP 60, Connecting Flange Joint Between Tapping Sleeves and Tapping Valves.
21. NACE RP0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.
22. NAPF 500-03, Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
23. NSF/ANSI 61, Drinking Water System Components - Health Effects.
24. SSPC PA 2, Measurement of Dry Coating Thickness with Magnetic Gages.
25. SSPC Painting Manual, Volume 1, Para. XIV.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Manufacturer shall have a minimum of five years successful experience producing ductile iron pipe and fittings and shall be able to show evidence of at least five installations in satisfactory operation in the United States that are similar applications to the specified service.
      b. Lining and coating products shall be manufactured by a firm with a minimum of five years successful experience in protecting pipelines exposed to the specified service conditions , and shall be able to show evidence of at least five installations in satisfactory operation in the United States that are similar applications to the specified service.
      c. When not applied by the manufacturer, lining and coating Subcontractor shall have a minimum of five years successful experience in the application of the specified linings and coatings for similar applications for the specified service, and shall be able to show evidence of at least five installations in satisfactory operation in the United States.

B. Supply and Compatibility:
   1. Unless otherwise approved, obtain all pipe, fittings, and appurtenances included in this Section from a single ductile iron pipe manufacturer.
   2. Ductile iron pipe manufacturer shall review and approve or prepare all Shop Drawings and other submittals for pipe, fittings, and appurtenances furnished under this Section.
   3. Pipe, fittings, and appurtenances shall be suitable for the specified service and shall be integrated into overall piping system by ductile iron pipe manufacturer.

4. Ductile iron pipe manufacturer shall be responsible for all products and all factory-applied linings and coatings, whether installed at pipe manufacturer's facility or at manufacturer's Supplier's facility.

C. Regulatory Requirements:
   1. Pipe and fittings, including linings and coatings, that will convey potable water or water that will be treated to become potable, shall be certified by an accredited organization in accordance with NSF/ANSI 61 as being suitable for contact with potable water, and shall comply with requirements of authorities having jurisdiction at Site.

1.4 SUBMITTALS

A. Action Submittals: Submit the following with Shop Drawings required under Section 33 05 05, Buried Piping Installation:
   1. Shop Drawings:
      a. Detailed drawings and data for pipe, fittings, gaskets, appurtenances, linings, and coatings.
   2. Product Data:
      a. Surface preparation and application reports and procedures as required for lining and coating of pipe and fittings. Ductile iron pipe and fitting manufacturer and manufacturer and applicator of lining and coating, as specified, shall mutually determine recommended surface preparation and application methods, and provide written verification of mutually selected method in the submittals.
   3. Samples:
      a. Submit Sample of pipe and fitting with each type of lining, for use at the Site to verify continuity, surface gloss, and color, as applicable, via visual inspection.
   4. Test Procedures: For linings and coatings in pipe and fittings.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Submit certificate signed by manufacturer of each product that product conforms to applicable referenced standards and the Contract Documents.
   2. Source Quality Control Submittals:
      a. Submit results of specified shop tests for pipe, fittings, linings, and coatings.
      b. Lining and coating test coupons.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 33 05 05, Buried Piping Installation.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General:
   1. Piping systems shall be suitable for their intended use.
   2. Joints shall be as specified in Section 33 05 05, Buried Piping Installation. If not specified, provide flanged joints for exposed piping and restrained mechanical joints for buried piping. Provide couplings on pipe with plain or grooved ends where shown or where approved by ENGINEER.

B. Ductile Iron Pipe, Joints, and Fittings:
   1. Non-Flanged Pipe: Conform to ANSI/AWWA C151 for material, pressure, dimensions, tolerances, tests, markings, and other requirements.
      a. Pressure Class: As specified in piping schedules in Section 33 05 05, Buried Piping Installation
      b. Special Thickness Class: As specified in piping schedules in Section 33 05 05, Buried Piping Installation.
   2. Pipe Joints:
      a. Mechanical Joints: Comply with ANSI/AWWA C111 and ANSI/AWWA C151, capable of meeting pressure rating or special thickness class, and test pressure specified in piping schedules in Section 33 05 05, Buried Piping Installation.
         1) Glands: Ductile iron.
         2) Gaskets: Plain tip.
         3) Bolts and Nuts: High strength, low alloy steel.
         4) Manufacturers: Provide products of one of the following:
            a) Clow Water Systems Company
            b) Atlantic States Cast Iron Pipe Company
            c) Canada Pipe Company, Ltd.
            d) McWane Cast Iron Pipe Company
            e) Pacific States Cast Iron Pipe Company
            f) Griffin Pipe Products Co.
            g) American Cast Iron Pipe Co.
            h) U.S. Pipe and Foundry Co.
            i) Or equal.
      b. Restrained Joints: Field cuts of restrained pipe are not allowed without approval of ENGINEER.
         1) Products and Manufacturers: Provide restrained joints for mechanical joint piping by one of the following:
            a) Megalug, Series 1100, by EBBA Iron Sales, Inc.
            b) MJ Coupled Joint, by American Cast Iron Pipe Co.
            c) MJ Field Lok, by U.S. Pipe and Foundry Co.
            d) Or equal.
         2) Products and Manufacturers: Provide restrained joints for push-on joint piping by one of the following:
            a) Super-Lock Joint Pipe, by Clow Water Systems, a division of

McWane, Inc.
b) Lok-Ring Joint, or Flex-Ring Joint, by American Cast-Iron Pipe Company.
c) TR Flex Joint, by U.S. Pipe and Foundry Company.
d) Snap-Lok, by Griffin Pipe Products Company.
e) Or equal.

3. Mechanical Joint Fittings: Comply with ANSI/AWWA C110 and ANSI/AWWA C111.
   a. Material: Ductile iron.
   b. Glands: Ductile iron.
   c. Pressure rating, gaskets, bolts, and nuts shall be as specified for mechanical joints. Pressure rating of fittings shall meet, but not exceed, specified pressure rating or special thickness class of connected pipe.

C. Cement-mortar Lining:
   1. Where specified in piping schedules included with Section 33 05 05, Buried Piping Installation, pipe and fittings shall be lined with bituminous seal coated cement-mortar lining in accordance with ANSI/AWWA C104.

2.2 EXTERIOR SURFACE PREPARATION AND COATINGS

A. General Coating Requirements:
   1. Coating types are specified in piping schedules in Section 33 05 05, Buried Piping Installation.

B. Buried Pipe and Fittings:
   1. Asphaltic Coating: Where specified in piping schedule in Section 33 05 05, Buried Piping Installation, coat pipe and fittings with an asphaltic coating approximately one-mil thick, in accordance with ANSI/AWWA C151, ANSI/AWWA C115, ANSI/AWWA C110, and ANSI/AWWA C153, as applicable.

PART 3 – EXECUTION

3.1 INSPECTION

A. Inspect piping to assure that piping is free from defects in material and workmanship. Verify compatibility of pipe, fittings, gaskets, linings, and coatings.

3.2 INSTALLATION AND FIELD QUALITY CONTROL

A. For buried piping installation and testing, refer to Section 33 05 05, Buried Piping Installation.

+ + END OF SECTION + +

SECTION 40 05 53

PROCESS VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install process valves, four-inch diameter and larger, and appurtenances, complete and operational.
   2. CONTRACTOR shall provide a force main bypass to the existing Watchemoket Pump Station sanitary force main. The existing force main contains pressurized wastewater flow from Watchemoket Pump Station and Boyden Boulevard Pump Station. The Watchemoket Pump Station has a design capacity of 10 million gallons per day (MGD). The Boyden Boulevard Pump Station has a design capacity of 5 MGD. The Watchemoket Pump Station force main shall remain active at all times.
   3. Contractor shall provide a force main bypass consisting of existing force main isolation valve, branch line and bypass valve as specified herein and as indicated on the Contract Drawings.
   4. The existing Watchemoket Pump Station force main is 24-inches in diameter, installed in 2012 and is ductile iron.
   5. The Contractor shall perform a test pit to fully expose the existing force main to obtain accurate outer diameter measurements to be included in the submittal for all tapping sleeves.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before process valves Work.

C. Related Sections:
   1. Section 01 14 16, Coordination with Owner's Operations
   2. Section 01 51 41, Temporary Pumping at Facilities
   3. Section 31 20 00, Earth Moving
   4. Section 31 23 16, Rock Removal
   5. Section 33 05 05, Buried Piping Installation.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American Bearing Manufacturers Association (ABMA).
   2. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.

3. ANSI B16.34, Valves-Flanged, Threaded and Welding end. (ASME B16.34).
4. API STD 598, Valve Inspection and Testing.
5. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
6. ASTM A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
7. ASTM A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service, or Both.
8. ASTM A240/A240M, Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
9. ASTM A276, Specification for Stainless Steel Bars and Shapes.
10. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
11. ASTM A351/A351M, Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts.
12. ASTM A380, Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment and Systems.
13. ASTM A536, Specification for Ductile Iron Castings.
14. ASTM A564/A564M, Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.
15. ASTM A743/A743 M, Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
16. ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
17. ASTM B98/B98M, Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
18. ASTM B138/B138M, Specification for Manganese Bronze Rod, Bar and Shapes.
19. ASTM B265, Specification for Titanium and Titanium Alloy Strip, Sheet and Plate.
20. ASTM B584, Specification for Copper Alloy Sand Castings for General Applications.
21. ASTM D429, Test Methods for Rubber Property - Adhesion to Rigid Substrates.
22. AWWA C500, Metal-Seated Gate Valves for Water Supply Service.
23. AWWA C501, Cast-Iron Sluice Gates.
24. AWWA C509, Resilient-Seated Gate Valves for Water Supply Service.
25. AWWA C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
26. FS TT-C-494, Coating Compound, Bituminous, Solvent Type, Acid-Resistant.
27. Manufacturers Standardization Society Standard Practice 113, Connecting Joints between Tapping Machines and Tapping Valves.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Manufacturer shall have minimum of five years of experience producing substantially similar materials and equipment to that required and be able to provide evidence of at least five installations in satisfactory operation for at least five years.

B. Installers Qualifications
   1. Installer shall have minimum of five years of experience installing wet taps and valve insertions on live pressurized piping of similar size to this Scope. The installer shall be a pressure tapping firm whose normal course of business is the installation of wet taps and valve insertions on live pressure piping. Installer shall provide evidence of at least five successful installations.

C. Component Supply and Compatibility:
   1. Obtain each type of equipment and appurtenances included in this Section, regardless of the component manufacturer, from a single manufacturer of the type of process valve. For each type of valve, do not furnish valves of more than one manufacturer.
   2. Supplier of each type of equipment specified shall review and approve or prepare all Shop Drawings and other submittals for all components associated with the type of process valve Supplier is furnishing.
   3. Components shall be suitable for use in the specified service conditions. Components shall be integrated into the overall assembly by the process valve manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Installation drawings showing orientation of valve in both plan and elevation view. Drawings shall clearly identify valve and its appurtenances, including controls, actuators, valve stems, and other components. Show dimensions of valves and appurtenances in relation to piping and structural and architectural components, where applicable.
   2. Product Data:
      a. Product data sheets.
      b. Complete catalog information, including dimensions, weight, specifications, and identification of materials of construction of all parts.
      c. Corrosion resistance information to confirm suitability of valve materials for the application. Furnish information on chemical resistance of elastomers from elastomer manufacturer.
      d. Cv values and hydraulic headloss curves.

3. Testing Plans:
    a. Submit plan for shop testing of each valve for which shop testing is specified, including testing plan's and test facility's limitations proposed.

B. Informational Submittals: Submit the following:
1. Certificates:
    a. Certificates of compliance with referenced standards, where applicable.
2. Manufacturer Instructions:
    a. Submit manufacturer's instructions for handling, storing, and installing valves and appurtenances. Provide templates and setting drawings for valves and appurtenances that require anchor bolts or similar anchorages.
4. Source Quality Control Submittals:
    a. Submit copies of shop test results and inspection data, certified by manufacturer.
5. Field Quality Control Submittals:
    a. Submit results of field tests required.
6. Supplier's Reports:
    a. When requested by ENGINEER, submit written report of results of each visit to Site by Supplier's serviceman, including purpose and time of visit, tasks performed and results obtained.
7. Qualifications Statements:
    a. Submit manufacturer's qualifications demonstrating compliance with the Specifications, including list of existing installations with contact names and telephone number(s) for each.
    b. Submit installers qualifications in compliance with the Specifications.

C. Closeout Submittals: Submit the following:
1. Operations and Maintenance Data:
    a. Furnish operation and maintenance manuals.
    b. Furnish in operations and maintenance manuals complete nameplate data for each valve.

D. Maintenance Material Submittals: Submit the following:
1. Spare Parts, Extra Stock Materials, and Tools:
    a. Spare Parts and Extra Stock Materials: Furnish as specified for each valve type.
    b. Tools: Furnish two sets of special tools (excluding metric tools, if applicable) for each size and type of valve furnished.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage products that are to be embedded in concrete in ample time to prevent delaying the Work.
2. Inspect boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to materials and equipment. Promptly remedy loss and damage to new condition in accordance with manufacturer's instructions.

B. Storage and Protection:
1. Keep products off ground using pallets, platforms, or other supports. Store equipment in covered storage and prevent condensation and damage by extreme temperatures. Store in accordance with manufacturer's recommendations. Protect steel, packaged materials, and electronics from corrosion and deterioration.
2. Conform to Section 01 66 00, Product Storage and Handling Requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Valves, General:
1. Provide each valve with manufacturer's name and rated pressure cast in raised letters on valve body.
2. Provide valves with brass or Type 316 stainless steel nameplate attached with Type 316 stainless steel screws. Nameplates shall have engraved letters displaying the following minimum information:
   a. Valve size.
   b. Pressure and temperature ratings.
   c. Application (other than water and wastewater).
   d. Date of manufacture.
   e. Manufacturer's name.
3. Provide valves to turn clockwise to open, unless otherwise specified.
4. Provide valves with permanent markings for direction to open.
5. Manually operated valves, with or without extension stems, shall require not more than 40-pound pull on manual operator to open or close valve against specified criteria. Gear actuator and valve components shall be able to withstand minimum pull of 200 pounds on manual operator and input torque of 300-foot pounds to actuator nut. Manual operators include handwheel, chainwheel, crank, lever, and T-handle wrench.

B. Valve Materials:
1. Valve materials shall be suitable for the associated valve's service or application, as shown.
2. Protect wetted parts from galvanic corrosion caused by contact of different metals.

3. Wetted components and wetted surfaces of valves used with potable water or water that will be treated to become potable shall conform to ANSI/NSF 61.
4. Clean and descale fabricated stainless steel items in accordance with ASTM A380 and the following:
    a. Passivate all stainless steel welded fabricated items after manufacture by immersing in pickling solution of six percent nitric acid and three percent hydrofluoric acid. Temperature and detention time shall be sufficient for removing oxidation and ferrous contamination without etching surface. Perform complete neutralizing operation by immersing in trisodium phosphate rinse followed by clean water wash.
    b. Scrub welds with same pickling solution or pickling paste and clean with stainless steel wire brushes or by grinding with non-metallic abrasive tools to remove weld discoloration, and then neutralize and wash clean.

C. Valve Joints:
1. Exposed Valves: Unless otherwise specified, provide with flanged ends conforming to ANSI B16.1. Pressure class of flanges shall be equal to or greater than specified pressure rating of the associated valve.
2. Buried Valves: Unless otherwise specified, provide with mechanical or push-on joints, restrained or unrestrained, as required by piping with which valve is installed.
3. For stainless steel bolting, except where nitrided nuts are required, use graphite-free anti-seize compound to prevent galling. Strength of joint shall not be affected by using anti-seize compound.

2.2 INSERTION VALVES

A. Manufacturer: Provide insertion valves of one of the following:
1. EZ Valves by Advanced Valve Technologies, LLC.
2. Insta-Valve by Hydra-Stop.
2. Or equal.

B. General:
1. Provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish and install insertion valves of sizes as shown.
2. Minimum Working Pressure: 150 psi.
3. Materials of Construction:
    a. Valve shall meet AWWA C-509 and ANSI/NSF 61 for material specifications.

C. Interior Coating:
1. Valves shall be coated inside. Steel, cast-iron and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

2.3 TAPPING SLEEVES AND VALVES

A. Product and Manufacturer: Provide tapping sleeves and tapping valves as manufactured by one of the following:
   1. Mueller Company (series T2361 for Tapping Valve, Series H-615 for MJ CI, DI Tapping Sleeve).
   2. Or equal.

B. General:
   1. Tapping sleeves shall be of heavy cast iron construction built in two halves for assembly around the main. The manufacturer shall designate the specific sleeve model or style for the type of existing pipe being tapped. Sleeves shall be furnished with gaskets and bolts for forming a water-tight joint for the full length of the sleeve. Bolts shall be closely spaced to insure uniform gasket pressure. Sleeve outlets shall have female grooved flanges to insure centering with the resilient seat tapping valve.
      a. Sleeve: AWWA C110
      b. Joints: AWWA C111
         1) Existing pipe: mechanical
         2) Outlet: flange
      c. Gaskets: As specified for pipe.
      d. Belts and nuts: As specified for pipe.
      e. Test Plug: ¾-inch NPT
   2. Tapping Valves:
      a. End compatible with tapping sleeve.
      b. As specified for gate valves.
   3. Pressure rating:
      a. Sleeve: Equal to or greater than working pressure of pipe being tapped.
      b. Valve: Equal to or greater than test pressure of pipe being installed.

C. Interior Coating:
   1. Valves shall be coated inside. Steel, cast-iron and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

2.4 RESILIENT-SEATED GATE VALVES

A. Manufacturers: Provide products of one of the following:
   1. American
   2. Mueller
   3. Or equal.

B. General:
   1. Provide valves conforming to AWWA C515 and as specified in this Section.
   2. Size: 24-inch.
   3. Type:

a. Provide non-rising stem (NRS) valves for buried service.
b. Provide position indicators for NRS valves used in exposed service.

4. Minimum Rated Working Pressure:
   a. Valves 24-inch Diameter: 150 psig.
5. Maximum Fluid Temperature: 150 degrees F.
6. Provide valves with fully encapsulated resilient wedges, unless otherwise specified.

C. Materials of Construction: Shall conform to AWWA C515 and shall be as follows:
1. Valve Body, Bonnet, and Stuffing Box: ductile-iron, ASTM A536.
2. Wedge: Ductile-iron, symmetrically and fully encapsulated with molded rubber having minimum 1/8-inch thickness.
3. Stem: Manganese bronze.
4. Rubber Items: Buna-N or other synthetic rubber suitable for the application.
5. Internal and external bolting and other hardware including pins, set screws, plug, studs, bolts, nuts, and washers shall be Type 316 stainless steel.

D. Interior Coating:
1. Valves shall be coated inside. Steel, cast-iron and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

E. Testing:
1. Test valves in valve manufacturer's shop in accordance with AWWA C509.

F. Gear Actuators for Manually-operated Valves:
1. Provide valves with gear actuators conforming to AWWA C500.
2. Size gear actuators for the following maximum differential pressures:
   a. Valve Size and Location: 24-inch, force main bypass.
   b. Maximum Differential Pressure Across Closed Valve: 25 psi.

2.5 APPURTENANCES FOR BURIED METALLIC VALVES

A. Wrench Nuts:
1. Provide wrench nuts on buried valves of nominal two-inch size, in accordance with AWWA C500.
2. Arrow indicating direction of opening the valve shall be cast on the nut along with the word "OPEN".
3. Material: Ductile iron or cast-iron.
4. Secure nut to stem by mechanical means.

B. Extension Stems for Non-Rising Stem Gate Valves and Quarter-turn Buried Valves:
1. Extension stem shall be provided for each buried valve and shall be at least as large as valve stem it operates.
2. Provide extension stems to bring operating nut to six inches below valve box cover.

3. Provide intermediate stem guide for extensions more than 7 feet long.
4. Operating nuts about 2 inches square shall be included with each extension stem.
5. Provide operating key or wrench of suitable length and size for each valve that is not readily accessible to direct operation.
6. Materials of Stems and Stem Couplings: Type 316 stainless steel.
7. Maximum Slenderness Ratio (L/R): 100
8. Provide top nut and bottom coupling of ductile iron or cast-iron with pins and set screws of Type 316 stainless steel.

C. Valve Boxes:
1. Valve boxes shall be as indicated and as required.
2. Type: Heavy-duty, suitable for highway loading, two-piece telescopic, and adjustable. Lower section shall enclose valve operating nut and stuffing box and rest on valve bonnet.
3. Inside diameter shall be at least 4½ inches.
4. Material: Cast-iron or ductile iron.
5. Cover shall be heavy duty cast-iron with service cast in.
6. Manufacturer: Provide valve boxes as manufactured by Mueller, or equal.
7. Valve boxes located in paved areas shall be H-20 load rated capacity.
8. Coating: two shop coats of asphalt varnish conforming to FS TT-C 494.
9. Marking: As required for service.

2.5 TOOLS, LUBRICANTS, AND SPARE PARTS

A. Provide the following T-handle operating wrenches for buried valves:
1. Length of T-Handle Operating Wrench: Not less than six feet.
2. Quantity: Two.

B. Lubricants: For valves, actuators, and appurtenances requiring lubricants, provide suitable lubricants for initial operation and for first year of use following Substantial Completion. Lubricants for equipment associated with conveying potable water or water that will be treated to become potable shall be food-grade and ANSI/NSF 61-listed.

2.6 PAINTING OF BURIED VALVES

A. Exterior steel, cast-iron, and ductile iron surfaces, except machined or bearing surfaces of buried valves, shall be painted in valve manufacturer’s shop with two coats of asphalt varnish conforming to FS TT-C 494.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:
   1. Install valves and appurtenances in accordance with:
      a. Supplier's instructions and the Contract Documents.
      b. Requirements of applicable AWWA standards.
      c. Applicable requirements of Section 33 05 05, Buried Piping Installation.
   2. Install valves plumb and level. Install all valves to be free from distortion and strain caused by misaligned piping, equipment, and other causes.

C. Buried Valves:
   1. Install valve boxes plumb and centered, with soil carefully tamped to a lateral distance of four feet on all sides of box, or to undisturbed trench face if less than four feet.
   2. All joints shall be restrained.

3.3 INSTALLATION OF WET TAP CONNECTIONS

A. Wet tap connections shall be made as shown and specified.

B. Wet tap connections shall be made while the existing force main is in service. An approved tapping machine shall be used for drilling and cutting into the force main and removing the cut out piece. CONTRACTOR shall guarantee to make the connections without suspension of service and in default of so doing, all costs to the OWNER in making the shutoff will be charged to the CONTRACTOR, at the discretion of the OWNER.

C. Separate the sleeve from other fittings, joints and taps by at least 24 inches unless otherwise allowed or recommended by the manufacturer of the sleeve.

D. Check diameter and material of existing pipe to verify that the correct sleeve is being used.

E. Install tapping sleeve and valve in accordance with the manufacturer's instructions.
   1. Support valve as shown.
   2. Pressure test to the working pressure of pipe before tapping.

3. Spray the following surfaces with household bleach until wet when tapping a potable water main.
    a. Interior of tapping sleeve branch
    b. Interior of the tapping valve including both sides of gate.
    c. Pilot drill bit and shell cutter of tapping machine.
4. Install thrust restraint as shown.

F. After the opening has been made, the drill, cut out portion of the pipe wall and the cutter shall be withdrawn past the tapping valve disc and the valve closed. Any temporary extension pipe used in making the connection shall be removed and the tapping valve left ready for installation of the branch line pipe.

3.4 INSTALLATION OF INSERTION VALVES

A. Preliminary Work to be performed by CONTRACTOR:
1. Dig test pits in the area shown to uncover the existing force main where the valve is to be installed.
2. Inspect force main to verify quality of pipe, outside diameter, and wall thicknesses to ensure correct fit of pipe saddle and also determine make, age and cross sectional dimensions.
3. Backfill excavation.
4. Prior to commencing actual Work, CONTRACTOR shall submit a plan delineating all the Work to be performed, to include but not limited to confirmation of existing pipe dimensional requirements and procedure for installation. No further Work shall commence until plan is approved by ENGINEER.

B. Actual Installation to be performed by CONTRACTOR:
1. Perform complete excavation to uncover required length of force main.
2. Maintain dry conditions in trench.
3. Assemble split fittings around the force main and install saddles as per manufacturer’s recommendations.
4. Perform pressure test and leakage test as required.
5. Install concrete encasement of split fittings if shown or required to supply pipe support and allow to cure.
6. Perform installation as per manufacturer’s recommendations.
7. Responsible to provide thrust restraint so when force main is cut, pipe will not move.
8. Installation of new inserted gate valve shall not take more than 4 hours to be installed. CONTRACTOR shall realize that time is of the essence.
9. Backfill and return site to its original condition.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
1. Adjust all parts and components as required to provide correct operation of valves.

2. Conduct functional field test on each valve in presence of ENGINEER to demonstrate that each valve operates correctly.

+ + END OF SECTION + +

SECTION 43 26 21

ALUMINUM HAND PULL GATES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install aluminum hand pull gates and appurtenances complete and operational.
   2. Included are aluminum hand pull gates, anchorage systems, and all appurtenances.
   3. Extent of the equipment is shown on the Aluminum Hand Pull Gate Schedule located at the end of this Section.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before the aluminum hand pull gates Work.

C. Related Sections:
   1. Section 03 60 00, Grouting.
   2. Section 05 05 33, Anchor Systems.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American Society for Testing and Materials, (ASTM).
      a. ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
      b. ASTM B 308/B 308M, Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Manufacturer shall have a minimum of five years experience producing substantially similar equipment and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.

B. Component Supply and Compatibility:
   1. Obtain all equipment included in this Section regardless of the component manufacturer from a single aluminum hand pull gates manufacturer.

2. The aluminum hand pull gates equipment manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the aluminum hand pull gates equipment manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Fabrication, assembly and installation diagrams.
      b. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
   2. Product Data:
      a. Manufacturer's literature, illustrations, specifications and engineering data.

B. Informational Submittals: Submit the following:
   1. Shop Test Results:
      a. Submit results of the required shop tests.
   2. Field Test Results:
      a. Submit a written report giving the results of the required field tests.

C. Closeout Submittals: Submit the following:
   1. Operation and Maintenance Manuals:
      a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete in ample time to prevent delay of that Work.

B. Storage and Protection:
   1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Acceptance at Site:
   1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 EQUIPMENT DESCRIPTION

A. General: Design equipment to be suitable for the process and service conditions described below and in the Aluminum Hand Pull Gate Schedule, located at the end of this Section.
   1. Design hand pull gates to safely withstand conditions listed in gate schedule.
   2. Gates shall be substantially watertight with leakage less than 0.5 gpm per foot of seating perimeter at design head.
   3. Bolts, studs, cap screws, and adjusting screws shall be of ample section to withstand the force created by operation of the gate under a full head of water.
   4. An extruded metal section shall be mounted on the face of the rectangular channel and acts as a guide for the gate slide.
   5. Hand pull holes shall be provided with protective UHMW layer to protect hands from sharp edges.
   6. A minimum of two hand pull holes per aluminum hand pull gate is required. Hand pull holes edges shall be rounded for comfortable grip.
   5. The gate consists of an aluminum plate reinforced with hand-holes for manual opening of the gate.
   6. The hand-pull gates shall divert wastewater in rectangular channels.

2.2 MANUFACTURERS

A. Manufacturers: Provide equipment of one of the following:
   1. Hydro Gate
   2. Or equal.

2.3 FABRICATION

A. Materials of Construction:
   1. The side guides, slide plate and reinforcing for hand-pull gates shall be manufactured from aluminum meeting the requirements of ATMS Specification B209 Alloy or B308 Alloy 6061. All metal for gate parts shall have a minimum thickness of 1/4-inch.
   2. Bolts and nuts shall have hexagon heads.
   3. Gasket material and installation shall conform to manufacturer's recommendations.
   4. Seals shall be Neoprene, ASTM D2000 grade 1 BE625.
   5. Guides shall be Ultra High Molecular Weight (UHMW) Polymer, ASTM D40200

B. Disc:
   1. Fabricate the hand pull gate or disc of aluminum plate reinforced with structural shapes attached by welding.
   2. Provide reinforcing to limit deflection under full head to not more than 1/360 of the span.

C. Disc Guides:
   1. Guides shall be of aluminum incorporating a sandwich type construction using plates and structural angles.
   2. Provide reinforcing to limit deflection under full head to not more than L/360 of the span.
   3. The frame shall be special extruded aluminum shape with securely attached UHMWPE liners with lip sealing action at sides of opening. The frame design shall be suitable for embedment in concrete or for anchor bolt mounting on a grout pad.
   4. The frame lower member shall contain a securely retained neoprene T section seal for complete closure against the lower edge of the slide.

D. Seals:
   1. Side and bottom seals shall be UHMW pinch-type seating face.

E. Gate Liners:
   1. Liners shall be UHMW polymer of special molded shape to prevent metal to metal contact. They shall be securely fastened in the frame groove and shall have lip action sealing.

2.4 APPURTENANCES

A. Storage:
   1. Provide and mount aluminum wall mounting brackets and anchoring to neatly store the aluminum hand pull gates when not in use.
   2. Aluminum hand pull gates shall be stored in the headworks.
   3. A minimum of two brackets per aluminum hand pull gate is required.

2.5 SURFACE PREPARATION AND PAINTING

A. Aluminum hand pull gates shall not be painted.

2.6 ANCHOR BOLTS

A. Furnish anchor bolts and nuts of ample size and strength for the purpose intended, sized by the equipment manufacturer. Anchor bolt materials shall be of 316 stainless steel and shall conform to the requirements of Section 05 05 33, Anchor Systems.

PART 3 - EXECUTION

3.1 INSPECTION

A. CONTRACTOR shall inspect and verify that structures or surfaces on which equipment will be installed have no defects, which will adversely affect installation. Inspect all equipment prior to installation. Promptly report defects, which may affect the Work to ENGINEER.

3.2 INSTALLATION

A. Install in a manner and to the tolerances recommended by the equipment manufacturer.

B. Brace guides and frames during placement of concrete.

C. Set anchor bolts in accordance with approved manufacturer's drawings.

3.3 FIELD TEST

A. Perform operating tests to demonstrate that the equipment operates in the manner intended.

B. Make adjustments required to place equipment in proper operating condition.

C. Leakage Tests:
   1. Maximum permissible leakage shall be in accordance with Paragraph 2.1.A.2., above. Reduce leakage to the specified maximum by adjusting or replacing the hand pull gate.

D. Submit report of test results.

3.5 FIELD QUALITY CONTROL

A. All equipment will be tested by CONTRACTOR at the Site following installation of the equipment and controls. Should the tests indicate any malfunction, CONTRACTOR shall make any necessary repairs and adjustments. Such tests and adjustments shall be repeated until, in the opinion of the ENGINEER, the installation is complete and the equipment is functioning properly and accurately, and is ready for permanent operation.

3.6 ALUMINUM HAND PULL GATE SCHEDULE

A. Conform to type, size, operation and other data specified, unless otherwise approved by ENGINEER.

ALUMINUM HAND PULL GATE SCHEDULE				
1. Designation	HP-1	HP-2	HP-3	HP-4
2. Location:	Main Channel – Screen Inlet	Main Channel – Screen Outlet	Bypass Channel – Grinder Inlet	Bypass Channel – Grinder Outlet
3. Size (in.) (W*x H):	2’- 3”x 6’- 0”	2’- 3”x 6’- 0”	2’- 3”x 6’- 0”	2’- 3”x 6’- 0”
4. Type:	Surface Mount	Surface Mount	Surface Mount	Surface Mount
5. Invert Elev.:	22.03	22.03	22.03	22.03
6. Operating Floor Elev.:	28.50	28.50	28.50	28.50
7. Fluid:	Wastewater	Wastewater	Wastewater	Wastewater

*Approximate Channel Width identified. Field Measurements required. Actual gate width may vary by 15% without additional compensation due to actual installation location and frame mounting.

+ + END OF SECTION + +

SECTION 43 26 23

STAINLESS STEEL SLIDE GATES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install stainless steel slide gates and appurtenances complete and operational.
   2. Included are stainless steel slide gates, anchorage systems and all appurtenances.
   3. Extent of the equipment is shown on the Stainless Steel Slide Gate Schedule located at the end of this Section.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before the stainless steel slide gates Work.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 03 60 00, Grouting.
   3. Section 05 05 33, Anchor Systems.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American Society for Testing and Materials, (ASTM).
      a. ASTM A 276, Specification for Stainless Steel Bars and Shapes.
      b. ASTM B 584, Specification for Copper Alloy Sand Castings for General Applications
   2. National Electrical Code, (NEC).
   3. National Electrical Manufacturers' Association, (NEMA).

1.3 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
   1. Manufacturer shall have a minimum of five years of experience of producing substantially similar equipment and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.
   2. Stainless steel slide gates shall be the product of one manufacturer.

B. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single stainless steel slide gate manufacturer.
2. The stainless steel slide gate equipment manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
3. All components shall be specifically designed for the specified service and shall be integrated into the overall assembly by the stainless steel slide gate equipment manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Fabrication, assembly and installation diagrams.
      b. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
      c. Wiring diagrams for electric motor operators.
   2. Product Data:
      a. Manufacturer's literature, illustrations, specifications and engineering data.
      b. Deviations from the Contract Documents.
      c. Lubricant Specification: Furnish a lubricant specification for the type and grade necessary to meet the requirements of the equipment.

B. Informational Submittals: Submit the following:
   1. Support Design Information:
      a. Submit for record purposes only the weight of each slide gate and expected opening and closing thrust loads on the supporting structure.
   2. Shop Test Results:
      a. Submit results of required shop tests.
   3. Field Test Results:
      a. Submit a written report giving the results of the field tests required.

C. Closeout Submittals:
   1. Operation and Maintenance Manuals:
      a. Submit complete Installation, Operation and Maintenance Manuals including, test reports, maintenance data and schedules, description of operation and spare parts information.
      b. Furnish Operation and Maintenance Manuals.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete in ample time to prevent delay of that Work.
   2. Handle all stainless steel slide gates and appurtenances properly, in accordance with manufacturer's recommendations. Stainless steel slide gates, which are

distorted or otherwise damaged, will not be acceptable. Protect all bolt threads and ends from damage.

B. Storage and Protection:
   1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
   2. Store all mechanical equipment in covered storage off the ground and prevent condensation.

C. Acceptance at Site:
   1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SERVICE CONDITIONS

A. General:
   1. Design stainless steel slide gates to safely withstand conditions listed in Stainless Steel Slide Gate Schedule, located at the end of the Section.
   2. Stainless steel slide gates shall be substantially watertight with leakage less than 0.5 gpm per foot of seating perimeter at design head.
   3. Manual operators shall turn right to open, unless otherwise specified. Operators shall indicate the direction of operation.
   4. Bolts, studs, cap screws, and adjusting screws shall be of ample section to withstand the force created by operation of the gate under a full head of water.
   5. Downward opening stainless steel slide gates shall be capable of being lowered to an elevation below the invert of the channel or opening.
   6. Stainless steel slide gates shall open to not less than 6-inches above the maximum water level in the channel in which they are installed.

2.2 MANUFACTURERS

A. Manufacturers: Provide equipment of one of the following:
   1. Hydro Gate.
   2. Waterman .
   3. Or equal.

2.3 FABRICATION

A. Materials of Construction:
   1. Stainless Steel: For frame, slide, rail and yoke, ASTM A 276, Type 316L stainless steel. All metal for stainless steel slide gate parts shall have a minimum thickness of 1/4-inch.

2. Bronze Casting: For operating nut, thrust nut and lift nut, ASTM B 584 Alloy 865.
3. All bolts, studs, cap screws and adjusting screws shall be of Type 316 stainless steel.
4. Bolts and nuts shall have hexagon heads.
5. Gasket material and installation shall conform to manufacturer's recommendations.

B. Disc:
1. Fabricate the slide or disc of ASTM A 276, Type 316 stainless steel plate reinforced with structural shapes attached by welding.
2. Provide reinforcing to limit deflection under full head to not more than 1/360 of the span.
3. Extend reinforcing ribs into the guides overlapping the seating surface of the guide.
4. Weld stem mounting guides to the disc.

C. Disc Guides:
1. Guides shall be of Type 316 stainless steel incorporating a sandwich type construction using plates and structural angles.
2. Guides shall be designed for maximum rigidity as columns to take the thrust developed during the stainless steel slide gate operation under maximum head.
3. Guides shall extend beneath the opening a sufficient amount to support the disc in the fully open or closed position.

D. Stem:
1. Operating stems shall be of Type 316 stainless steel and designed as specified below.
2. Design stem to transmit in compression at least 2-1/2 times the rated output of the operating mechanism with an 80-pound effort on the crank or handwheel. Determine the critical buckling load using the Euler column formula, using C = 2. Where hydraulic cylinder lifts are used, the stem design force shall not be less than 1.25 times the output thrust of the hydraulic cylinder with a pressure equal to the maximum working pressure of the hydraulic fluid supply. Where electric motor driven lifts are used, the stem design force shall not be less than 1.25 times the output thrust of the unit in the stalled motor condition.
3. Stems shall have a slenderness ratio (L/R) less than 200.
4. Threaded portion of the stem shall have machined cut threads of the Acme type. Join stems of more than one section by stainless steel couplings threaded and keyed, or bored and pinned to the stems. All threaded and keyed couplings of the same size shall be interchangeable. Couplings shall be designed to be of greater strength than the stems.
5. Connect the stem to the disc by means of a bolted connection.
6. Provide non-rising stems.

E. Yoke (For Self Contained Type Gates):
1. Furnish tops of the extended guides with a yoke for mounting of the lifting device.

2. Construct the yoke of structural shapes of sufficient strength to take the full thrust created by operating the gate under the maximum specified head.
3. Attach the yoke to the framework by bolting or welding to permit removal of the gate slide and stem.

F. Lower Seals:
1. Mount a specially shaped resilient neoprene seal on the bottom of the disc to provide flush-bottom closure for stainless steel slide gates. As an alternate, a poured urethane seal shall be mounted in the invert of the frame to form a flush bottom seal.
2. Shape of the seal shall produce a seating surface having a minimum width of 3/4-inch, and the seal will extend beyond the seating surface of the frame.
3. Vertical face of the seal shall be in contact with the seating surface of the guide to provide a proper seal at the corners.

G. Side and Upper Seals:
1. Side and upper seals shall be fabricated from ultra high molecular weight (UHMW) polyethylene or UHMW polymer. UHMW bearing strips shall be mechanically retained to lock seat in place.

2.4 APPURTENANCES

A. Stem Guides:
1. Stem guides shall be fabricated from Type 316 stainless steel and shall be equipped with UHMW polyethylene or UHMW polymer.
2. Guides shall be adjustable in two directions and shall be spaced so that stems have a maximum unsupported length of 84-inches.
3. Anchor bolts for stem guides shall be Type 316 stainless steel.

B. Anchor Bolts:
1. Provide Type 316 stainless steel anchor bolts as required for stem guides, floorstands, and all equipment or appurtenances, which must be secured to concrete walls or floors. Anchor bolts shall be of ample size and strength for the purpose intended, and shall be furnished by the manufacturer. Anchor bolts shall be hooked, and provided for direct embedment during placement of concrete.

C. Manual Operators:
1. Manual operation shall be by handwheel as specified.
2. Handwheel-operated type shall be without gear reduction and crank-operated type will have either a single or double gear reduction, as required. Each type shall be provided with a threaded cast manganese bronze lift nut to engage the operating stem.
3. Provide anti-friction bearings to properly support both opening and closing thrusts.
4. Stands shall operate the gates under the specified operating head with not greater than a 40-pound pull on the crank or handwheel.

5. All components shall be totally enclosed in a cast-iron weather-proof housing. Provide positive mechanical seals to exclude moisture and dirt and prevent leakage of lubricant out of the unit.
6. Provide lubricating fittings for all gears and bearings.
7. Stands shall include a cast-iron pedestal designed to position the input shaft approximately 36-inches above the operating floor. An arrow with the word "OPEN" shall be permanently attached or cast on the floorstand indicating the direction of rotation to open the stainless steel slide gate.
8. Removable cranks shall be cast-iron with a revolving brass grip. Removable handwheel shall be fabricated steel designed for rough treatment and minimum weight.
9. For self-contained type stainless steel slide gates, the distance between handwheel or crank operator and the operating floor shall be 36-inches minimum and 48-inches maximum.
10. Crank-operated gates shall be provided with nut-operator drives as noted on Stainless Steel Slide Gate Schedule.
11. Operators shall be furnished with a limit switch to indicate fully closed position, where shown.
12. Provide mechanical stops adjustable ±five degrees at each end of travel.

E. Identification: Identify each stainless steel slide gate with a stainless steel nameplate stamped with the approved designation as shown in the Stainless Steel Slide Gate Schedule, located at the end of this Section. Nameplate shall be permanently fastened to the gate at the factory.

2.5 SURFACE PREPARATION AND PAINTING

A. Stainless steel gates and accessories shall not be painted.

2.6 SOURCE QUALITY CONTROL

A. Shop Tests:
   1. Test each stainless steel slide gate fully assembled in the vertical position for proper seating.
   2. Fully open and close gate disc in its guide system to ensure that it operates freely.
   3. Operate and test floor stands, bench stands and motor operators to ensure proper assembly and operation.

2.7 SLIDE GATE SCHEDULE

A. The Stainless Steel Slide Gate Schedule is located at the end of this Section. Conform to type, size, operation and other data specified, unless otherwise approved by ENGINEER.

B. Provide all stainless steel slide gates as shown and listed in the schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install stainless steel slide gate equipment in accordance with manufacturer's instructions and recommendations.

B. Brace guides and frames during placement of concrete.

C. Set anchor bolts in accordance with approved Shop Drawings and manufacturer's recommendations.

D. Provide minimum of 1-inch of non-shrink grout below all floorstands.

E. Adjust all parts and components as required to provide correct operation.

3.2 START-UP AND FIELD TESTS

A. After CONTRACTOR and ENGINEER have mutually agreed that the equipment installation is complete and ready for continuous operation, CONTRACTOR and a qualified field service representative of the manufacturer shall conduct a functional field test and a leakage test of each stainless steel slide gate in the presence of ENGINEER to demonstrate that each stainless steel slide gate furnished will function correctly and that maximum permissible leakage is not exceeded.

1. Functional Tests:
    a. Each stainless steel slide gate with appurtenances shall be field-tested. Tests shall demonstrate to ENGINEER that each part and all parts together function in the manner intended. All necessary testing equipment and manpower shall be provided by CONTRACTOR at their expense. OWNER will furnish all power, and incidental material and labor required for the tests.
2. Leakage Tests:
    a. Maximum permissible leakage shall be in accordance with the requirements of Paragraph 2.1, above. Excess leakage shall be reduced to meet specified requirements by adjusting the gate, or replacement will be required.
3. In the event that the manufacturer is unable to demonstrate to ENGINEER that their equipment meets the requirements of the tests, the deficient equipment will be rejected and CONTRACTOR shall adjust and/or modify and retest the equipment as often as necessary to meet the specified requirements. No separate payments shall be made for adjustments and/or modifications.

3.3 MANUFACTURER'S SERVICES

A. A factory trained representative shall be provided for installation supervision, start-up and test services and operation and maintenance personnel training services. The representative shall make a minimum of 2 visits, minimum 4 hours on-Site for each

visit, to the Site. The first visit shall be for assistance in the installation of equipment. Subsequent visits shall be for checking the completed installation, start-up and training of the system. Manufacturer's representative shall test operate the system in the presence of the ENGINEER and verify that the equipment conforms to the requirements. Representative shall revisit the Site as often as necessary until all trouble is corrected and the installation is entirely satisfactory.

B. All costs, including travel, lodging, meals and incidentals, for additional visits shall be at no additional cost to the OWNER.

STAINLESS STEEL SLIDE GATE SCHEDULE

Gate ID	Location	Type	Opening Size (W x H)	Frame	Mounting	Gate Invert Elevation	Floor Elevation	Design Head (Seating/ Unseating)[1]	Operator
SG-1	Headworks – Bypass Channel	Non-Rising Stem	48-inches x 60-inches	Self-Contained	Surface Mount	22.03 (Channel Invert)	28.50	7-feet/7-feet	Handwheel

Note 1: Design head measured from invert of gate.

+ + END OF SECTION + +