



**IFB #25-25**

**CITY OF FALL RIVER PURCHASING DEPARTMENT**

**Fall River DCM Facility Improvements Project – Phase I**

**February 2025**

**Tighe&Bond**

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**PROJECT:**  
 City of Fall River  
 Fall River DCM Facility Improvements - Phase I  
 Project No. 25-25

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**ADVERTISEMENT TO BID**  
MGL c.30 §39M Over \$50K

The **CITY OF FALL RIVER**, the Awarding Authority, invites sealed bids from Contractors for the Fall River DCM Facility Improvements - Phase I at Fall River DCM Facility in Fall River, Massachusetts, in accordance with the documents prepared by **TIGHE & BOND**.

The Project consists of but not limited to:

Removal and disposal of the existing salt shed, attendant booth, truck scale, and scale house. Removal and disposal of contaminated soils. The construction of new sewer, water, gas, electrical and drainage systems, and gravity block retaining walls, landscaping, and site paving.

The work is estimated to cost **\$7,000,000.00**.

Bids are subject to M.G.L. c.30§39M and to minimum wage rates as required by M.G.L. c.149 §§26 to 27H inclusive.

**THIS PROJECT IS BEING ELECTRONICALLY BID AND HARD COPY BIDS WILL NOT BE ACCEPTED.** Please review the instructions in the bid documents on how to register as an electronic bidder. All Bids shall be submitted online at [www.biddocs.com](http://www.biddocs.com) and received no later than the date and time specified.

General Bids will be received until **06 March 2025 at 2:00PM EST** and publicly opened online, forthwith.

General bids and sub-bids shall be accompanied by a bid deposit that is not less than five (5%) of the greatest possible bid amount (including all alternates), and made payable to the **CITY OF FALL RIVER**. Note: A bid deposit is not required for Projects advertised under \$50,000.

Bid Forms and Contract Documents will be available for review at [www.biddocs.com](http://www.biddocs.com) (may be viewed and downloaded electronically at no cost).

PRE-BID CONFERENCE / SITE VISIT: Scheduled

Date and Time: 02/19/2025 at 10:00AM EST

Address: 10 Lewiston Street, Fall River, MA 02721

Instructions: All questions about the meaning or intent of the Bidding Documents shall be submitted in writing to the Engineer via email at [MPWzorek@tighebond.com](mailto:MPWzorek@tighebond.com). questions must be received by Engineer at least five days prior to the date of Bid opening.

The hard copy Contract Documents may be seen at:

Nashoba Blue Inc.  
433 Main Street  
Hudson, MA 01749  
978-568-1167

END OF SECTION

Section 00 21 13  
INSTRUCTIONS TO BIDDERS  
MGL c.30 §39M Over \$50K

**THIS PROJECT IS BEING ELECTRONICALLY BID AND HARD COPY BIDS WILL NOT BE ACCEPTED. Please review the instructions in the bid documents on how to register as an electronic bidder. The bids are to be prepared and submitted at [biddocs.com](http://biddocs.com) .**

**ARTICLE 1 - BIDDER'S REPRESENTATION**

- 1.1 Each General Bidder or Sub-bidder (hereinafter called the "**Bidder**") by making a bid or sub-bid (hereinafter called "**bid**") represents that:
- .1 The Bidder has read and understands the Contract Documents and the bid is made in accordance therewith.
  - .2 The Bidder has visited the site and is familiar with the local conditions under which the Work must be performed.
- 1.2 Failure to so examine the Contract Documents and site will not relieve any Bidder from any obligation under the bid as submitted.

**ARTICLE 2 - REQUESTS FOR INTERPRETATION**

- 2.1 Bidders shall promptly notify the contact specified in the Advertisement via written request for information (RFI) of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents, the site, and local conditions.
- 2.2 Bidders requiring clarification or interpretation of the Contract Documents shall make a written request for information (RFI) as specified in the Advertisement. The Awarding Authority may answer such requests if received before the bid date and/or within the time specified in the Advertisement. The Awarding Authority has no obligation to respond to the written requests.
- 2.3 Interpretation, correction, or change in the Contract Documents will be made by written Addendum which will become part of the Contract Documents. Neither the Awarding Authority nor the Prime Designer will be held accountable for any oral interpretations, corrections, or changes.
- 2.4 Copies of addenda will be made available for inspection at the locations listed in the Advertisement where Contract Documents are on file or at [biddocs.com](http://biddocs.com). **Hard copies of the addenda will not be forwarded to the plan holders. The bidder is solely responsible for reviewing all addenda posted on the project website.**

## ARTICLE 3 - PREPARATION AND SUBMISSION OF BIDS

### 3.1 Forms and Bid Preparation

Bids shall be submitted electronically on the "**Form for General Bid**" at [biddocs.com](http://biddocs.com), as appropriate and available at no cost.

The forms enclosed in the Project Manual shall not be extracted or used.

- .1 All bidders must create a User Profile account at [biddocs.com](http://biddocs.com), at no cost, to complete and submit a bid. The Awarding Authority, the Prime Designer or BidDocs ONLINE Inc. will not be held accountable if the bidder fails to create a User Profile in a timely manner.
- .2 All entries on the bid form shall be made online. Any documents that are attached to the bid must be in a pdf format.
- .3 Sums shall be expressed in both words and figures in the space indicated on the bid form. The electronic bid forms automatically match the "word" amount to the numeric "figure" amount entered.

### 3.1 Bid Deposits shall be:

- .1 at least five percent (5%) of the greatest possible bid amount, considering all alternates (except for projects bid under MGL c. 149 or MGL c. 3039M under \$50,000);
- .2 made payable to the **Awarding Authority**.
- .3 conditioned upon faithful performance by the principal of the agreements contained in the bid, and
- .4 in the form of:
  - .1 cash,
  - .2 certified check, treasurer's or cashier's check issued by a responsible bank or trust company, or
  - .3 bid bond issued by a surety company licensed to do business in the Commonwealth of Massachusetts.

Note: Both the "bid bond" or "check" bid deposits are to be scanned and uploaded to the system as a pdf file. **IMPORTANT NOTICE:** If the bidder elects to make a bid deposit in the form of "cash" or "check", the Bidder must have the cash or check physically delivered to the Awarding Authority prior to the date and time of the bid opening.

- .5 retained until the execution and delivery of the Awarding Authority / Contractor Agreement if they represent the bid deposit of one of the three (3) lowest responsible and eligible General Bidders or one of the three (3) lowest Sub-bidders in a filed sub-bid trade, or a sub-bidder listed by one of the three (3) lowest General Bidders.

### 3.3 Electronic Submission of General Bids

General Bids, including the bid deposit (if applicable), and required miscellaneous forms noted in the bid documents shall be submitted electronically online at

[biddocs.com](http://biddocs.com) . No hard copy bids will be accepted.

The Bidder will receive an email and/or system notification confirming submission of the bid. Click on the email link to review and print the submitted bid documents. Keep the email as a **receipt** that the bid was submitted. **Note:** The Bidder may modify the bid at any time prior to the bid date and time advertised. The Bidder will receive a new email each time the Bidder re-submits the bid.

- .1 Date and time for receipt of bids is set forth in the Advertisement.
- .2 Timely submission of a bid online shall be the full responsibility of the Bidder.  
Note: The project countdown clock on the website is the official clock that will determine when the bids are due.

### 3.4 Addenda

All modifications to the bid documents will be issued via an addendum. All registered plan holders will be electronically notified when addenda are issued. **Hard copies of the addenda will not be forwarded to the plan holders.** The Bidder is solely responsible for reviewing all addenda posted on the project website. The Bidder must acknowledge all addenda have been reviewed by selecting “yes” or “no” as part of the e-bidding process. If the Bidder selects “no”, the Bidder will automatically be directed to the Addenda icon on the project page.

## ARTICLE 4 - ALTERNATES

- 4.1 Each General Bidder shall acknowledge Alternates in Section C on the Form for General Bid by entering the dollar amount of addition or subtraction necessitated by each Alternate.
- 4.2 In the event an Alternate does not involve a change in the amount of the base bid, the Bidder shall so indicate by entering "**0**" (**numeric figure**) in the “Add” space provided for that Alternate.
- 4.3 General Bidders shall enter on the Form for General Bid a single amount for each Alternate.
- 4.4 The low Bidder will be determined based on the sum of the base bid and the accepted alternates.
- 4.5 Alternates will be considered in numerical sequence as required by Chapter 149, Section 44G of the Massachusetts General Laws.

## ARTICLE 5 - WITHDRAWAL OF BIDS

### 5.1 Before Opening of Bids

Any bid may be withdrawn (retracted) prior to the time designated for receipt of bids upon clicking the tab to "Retract Bid". The Bidder and the Awarding Authority will receive an email confirming that the bidder retracted the bid. Withdrawn bids may be modified and resubmitted up to the time designated for the receipt of bids.

## 5.2 After Opening of Bids

Bidders may withdraw a bid, without penalty, any time up to the time of Award as defined in paragraph 6.1, and upon demonstrating, to the satisfaction of the – Awarding Authority, that a bona fide clerical error was made during the preparation of the bid. Failure to conclusively demonstrate a bona fide clerical error may result in forfeiture of the bid deposit.

5.3 In the event of a general bid withdrawal after opening of bids, the Awarding Authority shall consider the bid from the next lowest eligible and responsible bidder.

## ARTICLE 6 - CONTRACT AWARD

6.1 **Award** means both the determination and selection of the lowest, responsible, and eligible bidder, by the Awarding Authority.

6.2 The Awarding Authority will award the contract to the lowest responsible and eligible bidder within thirty days, Saturdays, Sundays, and legal holidays excluded after the opening of bids in accordance with M.G.L. c.149 §44A.

6.3 The Contract will be awarded to the lowest responsible and eligible Bidder, except in the event of substitution as provided under M.G.L. c.149 §§44E and 44F, in which cases the procedure as required by said sections shall govern the award of the Contract.

6.4 The award of this Contract is subject to the approval of the Awarding Authority. Contracts without approval shall not be considered valid.

6.5 The Awarding Authority reserves the right to waive any informalities in or to reject any or all Bids if it is in the public interest to do so.

6.6 As used herein, the term "lowest responsible and eligible bidder" shall mean the General Bidder whose bid is the lowest of those Bidders demonstrably possessing the skill, ability, and integrity necessary for the faithful performance of the work, and who meets the requirements for Bidders set forth in M.G.L. c.149 §44A-J and is not debarred from bidding under M.G.L. c.149 §44C; and who shall certify that they are able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.



**ARTICLE 7 - FORMS REQUIRED FOR CONTRACT APPROVAL**

**7.1** Upon Award, the General Bidder shall complete the following forms to ensure prompt contract validation. These forms will be provided to the selected General Bidder by the Awarding Authority.

**7.2 Awarding Authority / Contractor Agreement and Form of Corporate Vote.**

**7.3 Form of Contractor's Equal Employment Certification** in accordance with the General Conditions.

**.1 Form of Sub-Contractor's Equal Employment Certification**

**7.4 Form of Performance Bond and Form of Payment Bond** must be submitted by the General Contractor on the Awarding Authority's form, in accordance with the General Conditions. The dates on the bonds must coincide with the contract date, and a current Power-of-Attorney must be attached to each bond. The minimal performance and payment bonds are as follows.

BOND	MGL c. 149		MGL c. 3039M	
	\$25K to \$50K	\$50K to \$150K	\$25K to \$50K	Over \$50K
Performance	None	None	None	None
Payment	50%	50%	50%	50%

**7.5 Insurance Certificates** for the General Contractor is required and must be submitted in accordance with the General Conditions. General Contractors must indicate on Builder's Risk insurance or installation floater if stored materials are covered.

**7.6 Statement of Management on Internal Accounting Controls and a Statement prepared by a CPA** expressing an opinion to the state of Management Controls, as required by M.G.L. c.30 §39R. This applies to the General Contractor only.

**ARTICLE 8 - CONTRACT VALIDATION**

**8.1** The Awarding Authority -Contractor Agreement shall not be valid until signed by the Authorized Signatory of the Awarding Authority.

**8.2** The Notice to Proceed for construction shall not be issued until the Awarding Authority/Contractor Agreement has been validated by the Authorized Signatory of the Awarding Authority.

**8.3** Incomplete or unacceptable submissions of forms required by paragraphs 7.2 - 7.6 will delay the validation of the Awarding Authority/Contractor Agreement by the Awarding Authority.

Generated By BidDocs: 02/12/2025 at 8:17PM EST

END OF SECTION



**OPERATIONAL SERVICES DIVISION**

**SUPPLIER DIVERSITY OFFICE**

Reginald Nunnally  
Executive Director

Charles D. Baker  
Governor

Karyn E. Polito  
Lieutenant Governor

Kristen Lepore  
Secretary

Gary J. Lambert  
Assistant Secretary for  
Operational Services

**SUPPLIER DIVERSITY OFFICE  
CONSTRUCTION REFORM PROGRAM  
MUNICIPALITIES GENERAL GUIDELINES**

The Supplier Diversity Office (SDO) issues the Construction Reform Program guidelines on the [Municipality Guidelines](#) webpage in accordance with the statutory standards set forth in [Chapter 193 of the Acts of 2004](#), which includes a municipal affirmative marketing program for currently certified firms in the Commonwealth of Massachusetts.

**THE BIDDING AND CONTRACT INSTRUCTIONS ON THE [MUNICIPALITY GUIDELINES](#) WEBPAGE MUST BE INCORPORATED INTO CONTRACT DOCUMENTS, AS REQUIRED BY CHAPTER 193 OF THE ACTS OF 2004.**

Municipalities must incorporate Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) goals into both their design and construction procurement for municipal contracts for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by any city or town that includes funding provided by the Commonwealth such as legislative appropriations, grant awards, reimbursements and municipal commitments to use state funds.

Only firms which are **currently** MBE or WBE **certified** by the Supplier Diversity Office (SDO) at the date of contract award will be counted for Construction Reform program purposes. The firm's current SDO state certification letter **shall serve as the sole and exclusive proof of state certification**.

Certification as a Disadvantaged Business Enterprise (DBE), certification as an MBE/WBE by any agency other than SDO, or submission of an application to SDO for certification as an MBE/WBE **shall not confer** MBE or WBE status on a firm for purposes of construction reform program participation credit.

**Affirmative Marketing Participation Goals:**

The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms:

**Design Participation:** Combined MBE/WBE goal of (21.6%)

**Construction Participation:** Combined MBE/WBE goal of (13.0%)

Documentation submitted with your signature means that you swear under the pains and penalties of perjury that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office.<sup>1</sup>

**Questions and Contact Information:**

Separate and individual PDF files are attached for your reference. All questions concerning the Construction Reform Act and the implementation of the new law may be directed to the SDO Director of Construction Reform at **617-502-8851** or by e-mail at [John.B.Fitzpatrick@state.ma.us](mailto:John.B.Fitzpatrick@state.ma.us)

<sup>1</sup> See generally, MG.L. c.12, §§5A-5O, inclusive.

## ATTACHMENT A

### **PROCEDURE FOR PRE-ADVERTISING ADJUSTMENT OF MBE/WBE PARTICIPATION GOALS**

#### **A. Affirmative Marketing Participation Goals:**

The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms.

**Design Participation:** Combined MBE/WBE goal of ( 21.6%)

**Construction Participation:** Combined MBE/WBE goal of ( 13.0%)

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office.<sup>1</sup>

#### **B. Criteria for Adjustment of Goals:**

An Awarding Authority may file a written request for the adjustment of participation goals with the Executive Director of the SDO prior to the advertising of the contract.<sup>2</sup> Factors that may be considered include any or all of the following:

- Actual availability of SDO certified Minority-Owned Business Enterprises (MBE) or Women-Owned Business Enterprises (WBE);
- The geographic location of the project;
- The scope of work of the project including the opportunities for sub-contracting and subdividing the work and other relevant factors; and
- The SDO, at the request of the awarding authority or any perspective bidder may agree to assist in MBE/WBE outreach. The SDO is not required nor obligated to do this. It is a complementary service provided, and one the SDO strongly suggests be taken advantage of.

#### **C. Project Thresholds:**

Participation Goals<sup>3</sup> can be adjusted by the Awarding Authority<sup>3</sup> without filing a formal request with SDO if the total estimated construction or design cost is \$100,000 or less.

#### **D. Supporting Documentation for Design and Construction Projects will include, but are not limited to the following:**

1. Documents to support a reduction/waiver request should include a general description of the project, a copy of the detailed project estimates and the deadline for placement of project advertisement;
2. The reasons that the Awarding Authority or its representative is requesting a reduction/waiver of the MBE/WBE participation goals;
3. Documentation that there may be a lack of eligible MBE/WBEs to perform the design or construction contract work after reviewing the SDO Business Directory;
4. Documentation that all subcontracting opportunities were identified and made available to meet the MBE/WBE participation goals;
5. The Awarding Authority may also submit any other information supporting its request for adjustment of the MBE/WBE participation goals; and
6. All applicable sections of the **Massachusetts False Claims Act** as well as any related civil or criminal penalties as determined by the Massachusetts Attorney General are incorporated by reference into this document.<sup>4</sup>

#### **E. Request for Adjustment of Design and Construction Goals:**

1. Requests by an Awarding Authority for Adjustment of MBE/WBE Participation Goals must be submitted in writing no less than ten (10) working days before the deadline for placement of advertisements for the contract. Applications should be directed to the SDO Director of Construction Reform, One Ashburton Place, Room 1017, Boston, MA 02108 or by e-mail to: [John.B.Fitzpatrick@state.ma.us](mailto:John.B.Fitzpatrick@state.ma.us).
2. Requests for adjustments on Design and Construction Goals must be applied for separately and are not interchangeable. Participation credits for modular projects can be awarded under either the design or construction goals, but not both.
3. The written request for the reduction/waiver must include the reasons for it and all supporting documentation.
4. The SDO will provide a written response prior to the advertising deadline.

<sup>1</sup> See generally, MG.L. c.12, §§5A-5O, inclusive.

<sup>2</sup> In rare instances after advertising and before bidding based on new information you may request an adjustment post-advertisement. Any adjustment granted must be the subject of an Addendum.

<sup>3</sup> For state-assisted building projects.

<sup>4</sup> See generally, MG.L. c.12, §§5A-5O, inclusive.

## ATTACHMENT B

### **PROCEDURES FOR PRE-BID REDUCTION/WAIVER OF MBE/WBE PARTICIPATION GOALS**

#### **A. Affirmative Marketing Participation Goals:**

The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms.

**Design Participation: Combined MBE/WBE goal of ( 21.6%)**  
**Construction Participation: Combined MBE/WBE goal of ( 13.0%)**

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office.<sup>1</sup>

#### **B. Criteria for Adjustment of Goals:**<sup>2</sup>

Potential Bidders may request a written adjustment before bids are submitted. An awarding authority cannot grant an adjustment of goals. Only the SDO has the authority to do this. Written requests must demonstrate that there is no feasible way to meet established contract goals and that a **"Diligent Good Faith Effort"** was made to comply. The request for reduction/waiver will ultimately be decided by the SDO. Factors that may be considered include any or all of the following:

- Actual availability of certified Minority- and/or Women-Owned Business Enterprises (MBE/WBEs);
- The geographic location of the project;
- The scope of work of the project including the opportunities for sub-contracting and subdividing the work;
- Documentation that shows the Bidder attempted in a diligent good faith effort to fulfill contract goals and was unable to do so; and
- Other relevant factors;

Although the SDO is not obligated to do so, the SDO may agree to assist either an awarding authority or any potential bidder with its MBE/WBE outreach. **We strongly encourage you to use this service.**

#### **C. Required Supporting Documentation from Potential Construction Bidders:**

- Using the SDO Reduction/Waiver Request form, the Bidder must prove that notices were sent to certified firms.
- They must break down larger scopes of work into its smallest component parts so that the widest available pool of ready, willing and able certified MBE/WBE firms may participate;
- In the event that an individual scope of work was not made available to ready, willing and able certified firms in certain trade categories,<sup>3</sup> a bidder must explain why in writing. Follow up documentation such as phone logs, or e-mail may be required to determine with certainty whether the firms were interested in performing the work.
- Additional documentation of reasonable efforts on the part of the Bidder to assist a potential MBE/WBE firm may include items such as, but not limited to: (a) bonding, insurance, lines of credit or any other type of assistance; or (b) evidence that the Bidder placed advertisements in appropriate media and trade association publications.
- The Bidder shall also submit any other information reasonably requested by the Awarding Authority.

#### **D. Process for Requesting Waiver/Reduction of Construction Goals:**

Requests from prospective general Bidders to reduce or waive the MBE/WBE participation goals must be written. An awarding authority must receive such requests no later than **ten (10) working days** before the general bids are due. Requests submitted beyond this deadline will not be considered.

<sup>1</sup> See generally, M.G.L. c.12, §§5A-5O, inclusive.

<sup>2</sup> Applies to waivers and reductions.

<sup>3</sup> Other than work performed by filed Sub-Bidders.

**ATTACHMENT C**  
**MODEL BIDDING INSTRUCTIONS**

**A. Affirmative Marketing Participation Goals:**

Each Municipality must enforce the current Affirmative Marketing Goals developed by the Division of Capital Asset Management and Maintenance (DCAMM) and Supplier Diversity Office (SDO) as follows: <sup>1</sup>

**Design Participation:** Combined MBE/WBE goal of (21.6%)

**Construction Participation:** Combined MBE/WBE goal of (13.0%)

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office. <sup>2</sup>

**A. MBE and WBE Participation Requirements:**

1. Compliance with the requirements of this Section is a pre-requisite for receiving a Contract Award. The Contractor must utilize a reasonable representation mix of both MBE and WBE firms whose collective participation either meets or exceeds the overall combined contract goal. Both MBE and WBE firms shall have an opportunity to work on public projects with a combined MBE/WBE goal.
2. Projects with a combined goal must include a reasonable representation of **both** MBE **and** WBE firms to meet or exceed the combined goal. Both categories must be reflected in the participation goals, e.g. bidders who meet the participation goals of one category, such as MBE, must still find WBE representation. Combined contract participation goals must be reported and tracked separately.
3. The MBE and WBE participation goals for this Contract are set forth above. The Awarding Authority reserves the right to accept and review written requests but does not have the authority to reduce or waive the MBE or WBE participation goals established for this contract. Waivers or reductions of MBE/WBE participation are contingent on the following: (a) MBE/WBE availability, (b) geographic location, (c) scope of work, (d) the percentage of work available for subcontracting to MBE/WBEs and/or (e) other relevant factors including documentation by General Bidder showing a **Diligent, Good Faith Effort** to secure commitments from MBE/WBE subcontractors. If these criteria are met, the Awarding Authority may submit the General Bidders request along with all the foregoing documentation to the Executive Director of the Supplier Diversity Office (SDO) for final determination.
4. All contracts shall provide MBE/WBE firms with contracting opportunities. If a bidder fails to make a subcontracting opportunity available to certified MBEs/WBEs, it must explain why in writing. The Bidder shall also demonstrate that, where commercially reasonable, subcontracts were divided into smaller scopes or tasks capable of being performed by MBE/WBEs.
5. A successful bidder must provide notice of: (a) each MBE/WBE solicited, and (b) each MBE/WBE listed in the SDO directory under the applicable trade category that was not solicited and reasons therefore. The Bidder shall also state the date that notices were mailed and provide a copy of the written notice(s) sent.
6. Reasonable follow up efforts include written notices sent to MBE/WBEs with telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted.
7. A statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a bid or proposal may also be provided
8. If MBE/WBEs have difficulty obtaining bonding, insurance or lines of credit to participate in the project, prospective bidders must show reasonable efforts were made to assist MBE/WBEs to obtain bonding, insurance, or lines of credit.
9. Reasonable efforts may also include whether a Bidder placed advertisements in appropriate media and trade association publications announcing the Bidder's interest in obtaining bids or proposals from MBE/WBEs, and/or sent written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the Contract and the work to be subcontracted by the Bidder to MBE/WBEs. The Bidder shall also submit any other information reasonably requested by the Awarding Authority to show that the Bidder has taken all possible reasonable steps to achieve the MBE/WBE participation goals.
10. If **filed Sub-Bids** are solicited for this Contract, requests to reduce or waive the MBE/WBE participation goals must be received by the Awarding Authority no later than ten (10) working days after the list of filed Sub-Bidders is sent by the Awarding Authority to persons who have taken out plans for the Contract. If there are no filed Sub-Bids solicited for this Contract, requests to reduce or waive the MBE/WBE participation goals for this Contract must be received by the Awarding Authority no later than ten (10) working days before the date set for the receipt of general Bids. **The Awarding Authority Will Not Consider Any Request To Reduce Or Waive The MBE/WBE Participation Goals For This Contract That Is Received After These Deadlines.**
11. Within five (5) working days after the opening of general Bids, the low Bidder shall submit the following documents to the Awarding Authority's Affirmative Marketing Construction Officer (AMCO): (a) a completed Schedule for Participation by MBE/WBE ("Schedule for Participation") in the form provided by the Awarding Authority showing MBE/WBE participation in amounts equal to or exceeding the MBE/WBE participation goals for this Contract, (b) a completed Letter of Intent in the form provided by the Awarding Authority for each MBE/WBE listed in the Schedule for Participation, and (c) the most recent SDO

<sup>1</sup> Periodically, goals may be changed or adjusted. Check the [SDO web site](#) for current MBE/WBE participation goals.

<sup>2</sup> See generally, MG.L. c.12, §§5A-5O, inclusive.

certification letter for each MBE/WBE listed in the Schedule of MBE/WBE Participation showing that the MBE/WBE is certified in the area of work for which it is listed on the Letter of Intent.

12. Each Letter of Intent shall describe the work to be performed by the MBE/WBE (the “MBE/WBE Work”) with enough specificity to allow an awarding authority to determine which specific items count for MBE/WBE participation credit. The Awarding Authority reserves the right to reject any Letter of Intent if the price to be paid for the MBE/WBE Work does not bear a reasonable relationship to the value of such work under the Contract.
13. Within five (5) working days after receipt of the Schedule for MBE/WBE Participation, Letters of Intent, and most recent SDO certification letter, the Awarding Authority shall review and either approve or disapprove the apparent low Bidder’s submissions. If the apparent low Bidder has not submitted an appropriate Schedule for MBE/WBE Participation and appropriate Letters of Intent and SDO most recent certification letter establishing that the MBE/WBE participation goal for the project will be met, the apparent low Bidder will be considered ineligible for Award of the Contract and the Awarding Authority will Award the Contract to the second lowest eligible and responsible Bidder, subject to said Bidder’s compliance with these conditions. If funds are insufficient to award to the second lowest Bidder, the project may have to be re-bid.
14. General Conditions of the Contract require the Contractor to submit, within thirty (30) days of the Contract Date, copies of current certification letters for all subcontractors, signed subcontracts with all subcontractors or a purchase order or invoice from each material supplier and/or manufacturer listed on the Schedule for MBE/WBE Participation.
15. A filed sub-Bidder is not required to submit a Schedule of MBE/WBE Participation with its Bid. It may submit a Letter of Intent with its Bid if it is a SDO certified MBE/ WBE. If a filed sub-Bidder intends to sub-subcontract work to a SDO certified MBE/WBE, and the awarding authority permits limited sub-sub-contracting for purposes of MBE/WBE participation, and the filed sub-Bidder wishes that sub-subcontract to be credited toward the participation goals for this Contract, the filed sub-Bidder should submit a Letter of Intent from that MBE/WBE with its Bid.

**ATTACHMENT D**  
**MODEL CONTRACT INSTRUCTIONS FOR**  
**MUNICIPAL CONTRACTS AND STATE ASSISTED BUILDING PROJECTS**

**A. Affirmative Marketing Participation Goals:**

The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms:

<b>Design Participation:</b>	<b>Combined MBE/WBE goal of (21.6%)</b>
<b>Construction Participation:</b>	<b>Combined MBE/WBE goal of (13.0%)</b>

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's Office. <sup>1</sup>

**B. MBE/WBE Participation Credit:**

1. MBE and WBE participation goals are not interchangeable.
2. Participation credit is only given for actual contract work performed by currently certified MBE, WBE or M/WBE firm.
3. If the firm awarded the contract is itself currently certified as a MBE/WBE, 100% participation credit will be given for the work performed.
4. If the prime contractor is not a certified firm, it shall only receive credit for the portion of work completed by the certified firm.
5. MBE/WBE participation credit will be given to a supplier **only** if they are regularly engaged in sales of equipment or supplies to the construction industry from an established place of businesses and bear the risk of loss for product sold prior to delivery to a customer.
6. A contractor can count only 10% of the contract price towards an MBE or WBE goal on DCAMM projects.

**C. Establishing MBE/WBE Status:**

1. A business will be eligible for participation credit only if it has been certified by the Supplier Diversity Office (SDO) as a minority business enterprise (MBE) or a woman business enterprise (WBE).
2. Certification as a MBE/WBE **by any other agency other than SDO does not** confer the status to the firm for the purposes of contract participation credit.
3. Participation credit shall only be given to firms which are certified at the time of contract award
4. A firm currently being initially reviewed as part of the certification process cannot be used by a contractor towards MBE/WBE participation credit.

**D. Performance of Contract Work by MBE/WBEs:**

1. Only currently certified MBE/WBE firms count towards participation goals. If during the course of a contract, a SDO certified MBE/WBE firm is decertified their participation credit will be counted up until the date of decertification
2. An awarding authority will not grant MBE/WBE participation credit unless the contract work is actually completed by a certified SDO MBE/WBE firm. No credit will be given for work done by others or for work not on a MBE/WBE schedule of participation.
3. Once a letter of intent and a MBE/WBE letter of participation are approved, a contractor may not perform this same work using its own staff without the prior express written prior approval of the Awarding Authority.
4. The Contractor shall monitor the performance of MBE/WBE Work to ensure that each scheduled MBE/WBE performs its own work with its own workforce.

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<sup>1</sup> See generally, M.G.L. c. 12, §§5A-5O, inclusive.



5. The Contractor and each MBE/WBE subcontractor shall provide the Awarding Authority with all information and documentation necessary to ascertain whether or not an MBE/WBE has performed its own MBE/WBE Work with its own personnel, tools and equipment.
6. Failure to submit documentation to the Awarding Authority shall establish conclusively for the purpose of giving MBE/WBE participation credit under this Contract that such MBE/WBE did not perform such work.

**E. Notification of Changes in MBE/WBE Work:**

If during the performance of a contract, a contractor determines or has reason to believe that:

1. A scheduled MBE/WBE is unable or unwilling to perform its MBE/WBE Work;
2. There has been or will be a change in any MBE/WBE Work; or
3. That the Contractor will be unable to meet the MBE/WBE participation goal(s) for the Contract for any reason.

Then he/she shall immediately notify the Awarding Authority in writing. Any notice of a change in MBE/WBE Work shall include a revised Schedule of MBE/WBE Participation, and additional or amended Letters of Intent and related subcontracts, as needed.

**F. Good Faith Efforts Needed to Support Changes/Reduction of MBE/WBE Participation Goals:**

If there is a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s), then he/she shall undertake a diligent, good faith effort to make up the shortfall as follows:

1. The Contractor shall identify all items of the Work remaining to be performed under the Contract that they made available for subcontracting to MBE/WBEs along with that which wasn't along with reasons why.
2. The Contractor shall send written notices to all MBE/WBEs ready, willing and able to perform such work. The contractor will provide the Awarding Authority with documentation identifying: (i) each MBE/WBE solicited, and (ii) each MBE/WBE listed in the SDO directory under the applicable trade category that was not solicited and the reasons why. The Contractor shall also advise the Awarding Authority of the dates that notices were sent and provide a copy of the written notice(s) sent.
3. The Contractor shall make reasonable efforts to follow up on the written notices, including telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted to the Awarding Authority upon request.
4. The Contractor shall make documented reasonable efforts to assist MBE/WBEs that need assistance in obtaining insurance, bonds, or lines of credit in order to perform work under the Contract. Supporting documentation will be provided to the Awarding Authority upon request.
5. The Contractor shall provide the Awarding Authority with a statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a proposal.
6. The Contractor shall take any additional measures including, without limitation, placing advertisements in appropriate media and trade association publications announcing the Contractor's interest in obtaining proposals from MBE/WBEs, and/or sending written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the project and of the work available to be subcontracted by the Contractor to MBE/WBEs.

If the Contractor is unable to meet the MBE/WBE participation goals for this Contract after complying fully with each of the above requirements and is otherwise in full compliance with the terms of this provision, the Awarding Authority may reduce the MBE/WBE participation goals for this Contract to the extent that such goals cannot be achieved.

**G. Suspension of Payment and/or Performance for Noncompliance:**

If a reduction of MBE/WBE goals was given but sufficient good faith efforts (see above) were not documented, then after proper written notice, the Awarding Authority has the discretion to:

1. Suspend payment to the Contractor of an amount equal to the value of the work which was to have been performed by an MBE/WBE pursuant to the Contractor's Schedule of MBE/WBE Participation but which was not so performed, in order to ensure that sufficient Contract funds will be available if liquidated damages are assessed;
2. Suspend the Contractor's performance of this Contract in whole or in part.

Notice Required Prior to Suspension: The Awarding Authority shall give the Contractor prompt written notice of any action taken and shall give the Contractor and any other interested party, including any MBE/WBEs, an opportunity to present evidence to it that the Contractor is in compliance with the requirements, or that there is some justifiable reason for waiving the requirements in whole or in part. The Awarding Authority may invite SDO to participate in these proceedings

If, based on a totality of the circumstances, it can be shown that all reasonable steps were taken and that the Contractor is in full compliance with the requirements of this Attachment, or that the Contractor has met or will meet the MBE/WBE participation goals for this Contract, the Awarding Authority shall release any funds withheld and lift any related suspension of the Contractor's performance.

#### **H. Liquidated Damages; Termination**

If payment by the Awarding Authority or performance by the Contractor is suspended, and if the breach cannot be cured or that same contractor fails to take all reasonable and immediate efforts to comply with the MBE/WBE participation goals set forth in this Contract, subject to the notice provisions above:

1. The Awarding Authority may terminate this Contract; or
2. The Awarding Authority may retain from final payment to the Contractor, as liquidated damages, an amount equal to the difference between:
  - a. The total of the MBE/WBE participation goals set forth in this Contract, and;
  - b. The amount of MBE/WBE participation credit earned by the Contractor for MBE/WBE Work performed under this Contract minus the cost to restore the loss to the Awarding Authority.
3. Any liquidated damages will be assessed separately for MBE and WBE participation.

Discretionary Option to Review Any Additional Mitigating Evidence Prior to Final Decision: Before exercising its rights and remedies, the Awarding Authority may but is not required to give the Contractor and any other interested party a final opportunity to present evidence that the Contractor is in compliance with the requirements or that there is some justifiable reason for waiving the requirements of this Attachment in whole or in part. The Awarding Authority may invite SDO to participate in these proceedings.

**EXHIBIT A**

**SCHEDULE FOR PARTICIPATION  
BY MINORITY/WOMEN BUSINESS ENTERPRISES**

**Project Number** \_\_\_\_\_  
**Project Location** \_\_\_\_\_  
**Project Name** \_\_\_\_\_

- A. Filed Sub-bidders utilizing MBE/WBE firms, and MBE/WBE Sub-bidders attach to Filed Sub-bid.**
- B. General Contractor must submit to the Awarding Authority within five (5) working days of the opening of General Bids.**

**BIDDER CERTIFICATION:**

The Bidder agrees that if awarded the contract it will expend at least the amount of the contract set forth below for MBE/WBE participation. For purposes of this commitment, the MBE and WBE designation means that a business has been certified by SDO as either a MBE, WBE or MBE/WBE. The Bidder must indicate the MBE/WBE firms it intends to utilize on the project as follows (attach additional sheets if necessary):

<b>Company Name &amp; Address</b>	<b>MBE or WBE</b>	<b>Describe MBE/WBE Scopes of Work (clarify "Labor Only", "Material Only" or "Labor and Material")</b>	<b>If Supplier, Indicate Total Value of Supplies (60% of Total Counts toward Participation)</b>	<b>Total Dollar Value of Participation</b>
1.				
2.				
3.				
4.				
5.				

**MBE Goal: \$** \_\_\_\_\_ **Total Dollar Value of MBE Commitment: \$** \_\_\_\_\_

**WBE Goal: \$** \_\_\_\_\_ **Total Dollar Value of WBE Commitment: \$** \_\_\_\_\_

The undersigned hereby certifies that he/she has read the terms and conditions of the contract with regard to MBE/WBE participation and is authorized to bind the Bidder to the commitment set forth above.

Name of Firm \_\_\_\_\_

Business Address \_\_\_\_\_

Print Name \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Title \_\_\_\_\_

Telephone No. \_\_\_\_\_ Fax No. \_\_\_\_\_

Date \_\_\_\_\_

**EXHIBIT B**

**LETTER OF INTENT  
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION**

(To be completed by MBE/WBE, and submitted by the General Bidder to the Municipal Affirmative Marketing Construction Officer (AMCO) within five (5) working days of the opening of General Bids or by Filed Sub-bidder with its bid.)

**Project Number** \_\_\_\_\_

**Project Name** \_\_\_\_\_

**Project Location** \_\_\_\_\_

**To** \_\_\_\_\_

**Name of General Bidder/Sub-bidder**

**Indicate SDO Certification:**

\_\_\_\_\_ **MBE**

\_\_\_\_\_ **WBE**

\_\_\_\_\_ **M/WBE**

1. This firm intends to perform work in connection with the above project.
2. This firm is currently certified by SDO to perform the work identified below, and has not changed its minority/women ownership, control, or management without notifying SDO within thirty (30) days of such a change.
3. This firm understands that if the General Bidder/Sub-bidder referenced above is awarded the contract, the Bidder intends to enter into an agreement with this firm to perform the activity described below for the prices indicated. This firm also understands that the above-referenced firm, as General Bidder/Sub-Bidder, will make substitutions only as allowed by the terms of the Contract.
4. This firm understands that under the terms of the contract, only work actually performed by an MBE/WBE will be credited toward MBE/WBE participation goals, and this firm cannot assign or subcontract out any of its work without prior written approval of the Awarding Authority, and that any such assignment or subcontracting will not be credited toward MBE/WBE participation goals.

**MBE/WBE PARTICIPATION**

Section/Item Number (If Applicable)	Describe MBE/WBE Scopes of Work (Clarify "Labor Only", "Material Only" or "Labor and Material")	If Supplier, Indicate Total Value of Supplies (60% of Total Counts Toward Participation)	Dollar Value of Participation

Total Dollar Value: \$ \_\_\_\_\_

Name of MBE/WBE Firm \_\_\_\_\_

Business Address \_\_\_\_\_

Print Name \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Title \_\_\_\_\_

Telephone No. \_\_\_\_\_

Fax No. \_\_\_\_\_

Date \_\_\_\_\_

**EXHIBIT C**

**CONTRACTOR PROGRESS PAYMENT REPORT  
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION**

**Project Number:** \_\_\_\_\_

**Project Name:** \_\_\_\_\_

**Project Location:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Periodical Payment No.:** \_\_\_\_\_

**General Contractor:** \_\_\_\_\_

**MBE and/or WBE:** \_\_\_\_\_

One copy of this report is to be submitted for each Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) at the time of submitting a request for payment. Copies of the report must be sent to the Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) named above and to the municipalities Affirmative Marketing Construction Officer (AMCO). The AMCO will forward a copy of each Contractor Progress Payment Report to SDO on a quarterly basis.

1. The total price to be paid to the above-named Minority Business Enterprise \_\_\_\_\_ and/or Women Business Enterprise \_\_\_\_\_:  
\$ \_\_\_\_\_
2. The amount remitted to the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under this project: \$ \_\_\_\_\_
3. Balance due the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under the above-named project: \$ \_\_\_\_\_
4. Comments or explanation of amounts indicated under items 1 and 2 above: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. We hereby certify that the information supplied herein (including pages attached) is correct and complete.

**General Contractor:**

**Minority and/or Women Business Enterprise**

\_\_\_\_\_  
**(Signed)**

\_\_\_\_\_  
**(Signed)**

\_\_\_\_\_  
**(Title)**

\_\_\_\_\_  
**(Title)**

\_\_\_\_\_  
**(Date)**

\_\_\_\_\_  
**(Date)**



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SECTION 00 31 32

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUMMARY

- A. For the preparation of Bidding Documents, Engineer has relied upon the following reports and tests of subsurface and latent physical conditions of the site. The locations of all bore holes and test pits are shown on the Drawings.
1. Soil boring and test pit data (attached)
    - a. The subsurface data are not guaranteed as to accuracy or completeness, nor are they a part of the Contract Documents.
    - b. Bidders are cautioned that the subsurface data have been utilized for general design purposes only. No explicit or implicit representation is made as to the nature of the materials which may be encountered below the surface of the ground.
    - c. The making available of this subsurface data to Bidders is not intended to relieve them from their responsibility to familiarize themselves with the subsurface and other site conditions.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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Project: Fall River DPW Improvement Project  
 Location: Fall River, Massachusetts  
 Client: Fall River Public Works

Boring No. B-1  
 Page 1 of 1  
 File No. F-5033-011  
 Checked by: B. Nereson

Drilling Co.: New England Boring Contractors

Foreman: M. Matairazo  
 T&B Rep.: A. Grams  
 Date Start: 03/21/24 Date End: 03/21/24  
 Location: See Exploration Location Plan  
 GS. Elev. 163' Datum: NAVD88

Casing	Sampler
HSA	Split Spoon
4.25" / 7.6"	1-3/8"/2"
--	140#
--	30"
Rig: <u>Gtech Drill GT8 (auto)</u>	

Groundwater Readings				
Date	Time	Depth	Casing	Sta. Time
Groundwater Not Encountered				

Depth (ft.)	Field PID Screening (ppm)	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes
5		S1 / 11	0-2	15-12	S1: Medium dense, black, fine to coarse SAND, some Gravel, trace Asphalt, moist	FILL	
				16-11			
		S2 / 13	2-4	9-7	S2: Medium dense, black, fine to coarse SAND, little Silt, trace Gravel, trace Asphalt, moist		
				9-11			
		S3 / 4	4-5.3	4-8	S3: Very dense, gray, GRAVEL, little fine to coarse Sand, trace Silt, moist		
			52/4"	Exploration Terminated at 5.3 feet - Auger and split-spoon refusal on possible Boulder or Bedrock	5.3'		
10							
15							
20							
25							
30							

Notes:	<u>Proportions Used</u>		<u>Density/Consistency</u>	
	TRACE (TR.)	0 - <10%	VERY LOOSE	0-4
	LITTLE (LI.)	10 - <20%	LOOSE	4-10
	SOME (SO.)	20 - <35%	MEDIUM DENSE	10-30
	AND	35 - <50%	DENSE	30-50
			VERY DENSE	>50
			VERY SOFT	<2
			SOFT	2-4
			MEDIUM	4-8
			STIFF	8-15
			VERY STIFF	15-30
			HARD	>30

Last Modified: 02/12/2025 at 8:17PM EST

Project: Fall River DPW Improvement Project  
 Location: Fall River, Massachusetts  
 Client: Fall River Public Works

Boring No. B-2  
 Page 1 of 1  
 File No. F-5033-011  
 Checked by: B. Nereson

Drilling Co.: New England Boring Contractors

Foreman: M. Matairazo  
 T&B Rep.: A. Grams  
 Date Start: 03/21/24 Date End: 03/21/24  
 Location: See Exploration Location Plan  
 GS. Elev. 164' Datum: NAVD88

Type: HSA  
 I.D./O.D.: 4.25" / 7.6"  
 Hammer Wt.: --  
 Hammer Fall: --  
 Rig: Gtech Drill GT8 (auto)

Casing: HSA  
 Sampler: Split Spoon  
1-3/8"/2"  
140#  
30"

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
Groundwater Not Encountered				

Depth (ft.)	Field PID Screening (ppm)	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes
5		S1 / 16	0-2	26-27	S1: Very dense, black, GRAVEL and fine to coarse SAND, trace Silt, moist	FILL	
				28-26			
		S2 / 8	2-4	30-18	S2: Very dense, black, GRAVEL and fine to coarse SAND, little Silt, moist		
				55/1"	Note: Cored through cobble from 4-4.5'		
5		S3 / 2	4.5-6.5	10-10	S3: Medium dense, gray, GRAVEL, little fine to medium SAND, trace Silt, moist Note: Rock in tip of sampler	6.5'	
				9-50			
		S4 / 5	6.5-8.5	12-25	S4: Medium dense, gray, GRAVEL, trace Silt, moist Note: Rock in tip of sampler	POSSIBLE GLACIAL TILL	
10				14-10		8.5'	
					Exploration Terminated at 8.5 feet - Casing and rollerbit refusal on possible Boulder or Bedrock		
15							
20							
25							
30							

Notes:	<u>Proportions Used</u>		<u>Density/Consistency</u>	
	TRACE (TR.)	0 - <10%	VERY LOOSE	0-4
	LITTLE (LI.)	10 - <20%	LOOSE	4-10
	SOME (SO.)	20 - <35%	MEDIUM DENSE	10-30
	AND	35 - <50%	DENSE	30-50
			VERY DENSE	>50
			VERY SOFT	<2
			SOFT	2-4
			MEDIUM	4-8
			STIFF	8-15
			VERY STIFF	15-30
			HARD	>30

Last Modified: 02/12/2025 at 8:17PM/EST

Project: Fall River DPW Improvement Project  
 Location: Fall River, Massachusetts  
 Client: Fall River Public Works

Boring No. B-3  
 Page 1 of 1  
 File No. F-5033-011  
 Checked by: B. Nereson

Drilling Co.: New England Boring Contractors

Foreman: <u>M. Matairazo</u>	Type	Casing	Sampler
T&B Rep.: <u>A. Grams</u>	I.D./O.D.	<u>FJC</u>	<u>Split Spoon</u>
Date Start: <u>03/21/24</u>	Date End: <u>03/21/24</u>	<u>4" / 4.25"</u>	<u>1-3/8"/2"</u>
Location: <u>See Exploration Location Plan</u>	Hammer Wt.	<u>--</u>	<u>140#</u>
GS. Elev. <u>165'</u>	Datum: <u>NAVD88</u>	<u>--</u>	<u>30"</u>
	Rig	<u>Gtech Drill GT8 (auto)</u>	

Groundwater Readings				
Date	Time	Depth	Casing	Sta. Time
Groundwater Not Encountered				

Depth (ft.)	Core Rate (min/foot)	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes
5		S1 / 10	0-2	19-23	S1: Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt, trace Asphalt, moist	FILL	
				19-36			
		S2 / 10	2-4	13-10	S2: Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, moist		
				9-50			
		S3 / 1	4-4.5	88/6"	S3: Very dense, brown, GRAVEL and fine to coarse SAND, trace Silt, moist Note: Cored through cobble from 4.5-5.5'		
10		S4 / 12	7-9	24-13	S4: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, little Asphalt, moist		
				13-11			
		S5 / 12	9-11	8-9	S5: Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt, trace Asphalt, moist		10.5'
				8-23			
		S6 / 10	11-13	19-46	S6: Very dense, gray, fine to coarse SAND and GRAVEL, little Silt, moist Note: Weathered rock in tip of sampler		12.6'
15				81-60/1"		13.5' WX ROCK	
	5	C1 / 53	13.5-18.5		C1: Very hard to hard, fresh to very slightly weathered, gray, coarse grained, GRANODIORITE, close to moderately close, shallow to moderately dipping, rough joints	BEDROCK	
	4.5						
	4						
	4.5				REC: 53/60=88% RQD: 50.5/60=84%		
	4					18.5	
20					Exploration Terminated at 18.5 feet		
25							
30							

Notes:	<b>Proportions Used</b>		<b>Density/Consistency</b>	
	TRACE (TR.)	0 - <10%	VERY LOOSE	0-4
	LITTLE (LI.)	10 - <20%	LOOSE	4-10
	SOME (SO.)	20 - <35%	MEDIUM DENSE	10-30
	AND	35 - <50%	DENSE	30-50
			VERY DENSE	>50
			VERY SOFT	<2
			SOFT	2-4
			MEDIUM	4-8
			STIFF	8-15
			VERY STIFF	15-30
			HARD	>30

Last Modified: 02/12/2025 at 8:17PM/EST

Project: Fall River DPW Improvement Project  
Location: Fall River, Massachusetts  
Client: Fall River Public Works

Boring No. B-4  
Page 1 of 1  
File No. F-5033-011  
Checked by: B. Nereson

Drilling Co.: New England Boring Contractors

Foreman: M. Matairazo  
T&B Rep.: A. Grams  
Date Start: 03/22/24 Date End: 03/22/24  
Location: See Exploration Location Plan  
GS. Elev. 164' Datum: NAVD88

Casing	Sampler
HSA	Split Spoon
I.D./O.D. 4.25" / 7.6"	1-3/8"/2"
Hammer Wt. --	140#
Hammer Fall --	30"
Rig	Gtech Drill GT8 (auto)

Groundwater Readings				
Date	Time	Depth	Casing	Sta. Time
Groundwater Not Encountered				

Depth (ft.)	Field PID Screening (ppm)	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes
5		S1 / 15	0-2	30-26	S1: Dense, brown, fine to coarse SAND, little Gravel, trace Silt, trace Asphalt, moist	FILL	
				21-20			
		S2 / 8	2-4	50-100/4"	S2: Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, moist	5'	
					Note: Advanced rollerbit through presumed cobble/boulder from 2.8-5'		
10		S3 / 4	5-6.6	18-17	S3: Very dense, gray, GRAVEL, trace fine to coarse Sand, trace Silt, moist	GLACIAL TILL	
				63-100/1	Note: Rock in tip of sampler, possible cobble/boulder		
		S4 / 6	7-8.4	111-100/5"	S4: Very dense, gray, fine to coarse SAND, some Gravel, little Silt, moist	8.4'	
					Exploration Terminated at 8.4 feet - Split-spoon refusal on possible Boulder or Bedrock		
15							
20							
25							
30							

Notes:	<b>Proportions Used</b>		<b>Density/Consistency</b>	
	TRACE (TR.)	0 - <10%	VERY LOOSE	0-4
	LITTLE (LI.)	10 - <20%	LOOSE	4-10
	SOME (SO.)	20 - <35%	MEDIUM DENSE	10-30
	AND	35 - <50%	DENSE	30-50
			VERY DENSE	>50
			VERY SOFT	<2
			SOFT	2-4
			MEDIUM	4-8
			STIFF	8-15
			VERY STIFF	15-30
			HARD	>30

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Project: Fall River DPW Improvement Project  
Location: Fall River, Massachusetts  
Client: Fall River Public Works

Boring No. B-5  
Page 1 of 1  
File No. F-5033-011  
Checked by: B. Nereson

Drilling Co.: New England Boring Contractors

Foreman: M. Matairazo  
T&B Rep.: A. Grams  
Date Start: 03/22/24 Date End: 03/22/24  
Location: See Exploration Location Plan  
GS. Elev. 159' Datum: NAVD88

Type: HSA  
I.D./O.D.: 4.25" / 7.6"  
Hammer Wt.: --  
Hammer Fall: --  
Rig: Gtech Drill GT8 (auto)

Casing: HSA  
Sampler: Split Spoon  
1-3/8"/2"  
140#  
30"

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
Groundwater Not Encountered				

Depth (ft.)	Field PID Screening (ppm)	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes
5		S1 / 24	0-2	12-17	S1: Medium dense, black, fine to coarse SAND and GRAVEL, trace Silt, trace Asphalt, moist	FILL	
				13-8			
		S2 / 2	2-4	6-6	S2: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace Asphalt, moist		
				6-3			
		S3 / 7	4-6	2-7	S3: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace Asphalt, moist		
				5-11			
10		S4 / 22	6-8	18-27	S4: Very dense, gray, fine to coarse SAND, little Gravel, moist		
				25-16			
		S5 / 8	8-10	15-25	S5: Very dense, black, fine to coarse SAND, little Gravel, little Silt, moist		
				55-22	Note: Slight petroleum-like odor		
		S6 / 16	10-12	12-20	S6: Dense, black, fine to coarse SAND, little Gravel, trace Organics, trace Glass, moist		
				17-20			
15		S7 / 7	12-14	8-4	S7: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace Asphalt, moist	13.5'	
				10-31	Note: Slight petroleum-like odor		
		S8 / 23	14-16	38-32	S8: Very dense, black, fine to coarse SAND and SILT, trace Gravel, moist	GLACIAL TILL	
				21-21			
		S9 / 10	16-18	24-19	S9: Dense, gray, fine to medium SAND, some Silt, trace Gravel		
				26-40			
20		S10 / 23	18-20	31-50	S10: Very dense, gray, fine to medium SAND, some Silt, trace Gravel	20'	
				30-29			
					Exploration Terminated at 20 feet - Refusal not encountered		
25							
30							

Notes:	<u>Proportions Used</u>		<u>Density/Consistency</u>	
	TRACE (TR.)	0 - <10%	VERY LOOSE	0-4
	LITTLE (LI.)	10 - <20%	LOOSE	4-10
	SOME (SO.)	20 - <35%	MEDIUM DENSE	10-30
	AND	35 - <50%	DENSE	30-50
			VERY DENSE	>50
			VERY SOFT	<2
			SOFT	2-4
			MEDIUM	4-8
			STIFF	8-15
			VERY STIFF	15-30
			HARD	>30

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Project/Site Information

**DPW Facility Improvements**  
**10 Lewiston St.**  
**Fall River, MA**

Test Pit No. **TP-1**  
 Page No. 1 of 1  
 File No. F-5033-011  
 Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24  
 Operator J. Demaris Ground Elev. 165'  
 Weather 70's cloudy Make John Deere Model 410k Time Started 7:15 -- AM  
 Capacity 1 cy Reach 15 ft. Time Completed 8:30 -- AM

Depth	Soil Description	Sample No.	PID Reading (ppm)	Excav. Effort	Boulder Count/Class	Note No.
0'	0'-1': Dark brown, fine to coarse SAND and GRAVEL, trace Silt, moist	S-1		M		
1'	1'-10': Brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist			M	5%/A	
2'				M	5%/A	
3'				M	10%/B	
4'				M	10%/B	
5'				M	10%/B	
6'				M	10%/B	
7'				M	10%/B	
8'				M	10%/B	
9'				M	10%/B	
10'					M	10%/B
11'	10'-13': Gray, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist	S-2		M	10%/B	
12'				M	10%/B	
13'				M	10%/B	1
	End of Exploration - 13' Refusal not encountered					

**Notes:**  
 1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan  Volume = <u>18.8</u> cu. yd.	Letter Designation A B C Excavation Effort E-----Easy M-----Moderate D-----Difficult	Boulder Class Size Range Classification 6" - 17" 18" - 36" 36" +	Proportions Used TRACE (TR.) 0 - 10% LITTLE (LI.) 10 - 20% SOME (SO.) 20 - 35% AND 35 - 50%	Abbreviations F = Fine M = Medium C = Coarse V = Very F/M = Fine to medium F/C = Fine to coarse GR = Gray BN = Brown YEL = Yellow	GROUNDWATER ( ) Encountered (X) Not Encountered Elapsed Time to Reading (Hours) Depth to Ground-water
	(Empty space for groundwater data)				

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Project/Site Information

**DPW Facility Improvements**  
**10 Lewiston St.**  
**Fall River, MA**

Test Pit No. **TP-2**  
 Page No. 1 of 1  
 File No. F-5033-011  
 Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24  
 Operator J. Demaris Ground Elev. 164'  
 Weather 70's cloudy Make John Deere Model 410k Time Started 9:00 -- AM  
 Capacity 1 cy Reach 15 ft. Time Completed 9:40 -- AM

Depth	Soil Description	Sample No.	PID Reading (ppm)	Excav. Effort	Boulder Count/Class	Note No.
0'	0'-2': Dark brown, fine to coarse SAND and GRAVEL, trace Silt, moist  2'-6': Brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist	S-1		M		
1'				M	5%/A	
2'				M	5%/A	
3'				M	10%/B	
4'				M	10%/B	
5'				M	10%/B	
6'	6'-7': Brown fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist <b>GLACIAL TILL</b>	S-2		D	10%/B	1
7'	End of Exploration - 7' Refusal on possible Bedrock or large Boulder					
	<b>FILL</b>					

**Notes:**  
 1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan  Volume = <u>10.1</u> cu. yd.	Letter Designation A B C Excavation Effort E-----Easy M-----Moderate D-----Difficult	Boulder Class Size Range Classification 6" - 17" 18" - 36" 36" +	Proportions Used TRACE (TR.) 0 - 10% LITTLE (LI.) 10 - 20% SOME (SO.) 20 - 35% AND 35 - 50%	Abbreviations F = Fine M = Medium C = Coarse V = Very F/M = Fine to medium F/C = Fine to coarse GR = Gray BN = Brown YEL = Yellow	GROUNDWATER ( ) Encountered (X) Not Encountered Elapsed Time to Reading (Hours) Depth to Ground-water
	(Empty space for groundwater data)				

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Project/Site Information

DPW Facility Improvements
10 Lewiston St.
Fall River, MA

Test Pit No. TP-3
Page No. 1 of 1
File No. F-5033-011
Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24
Operator J. Demaris Ground Elev. 161'
Weather 70's cloudy Make John Deere Model 410k Time Started 10:00 -- AM
Capacity 1 cy Reach 15 ft. Time Completed 10:40 -- AM

Table with 7 columns: Depth, Soil Description, Sample No., PID Reading (ppm), Excav. Effort, Boulder Count/Class, Note No. Includes soil data for 0-3' depth and 'FILL' label.

Notes:
1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan diagram showing a 10' x 3' area. Includes tables for Boulder Class, Proportions Used, Abbreviations, and GROUNDWATER status.

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Project/Site Information

**DPW Facility Improvements  
10 Lewiston St.  
Fall River, MA**

Test Pit No. **TP-4**  
Page No. 1 of 1  
File No. F-5033-011  
Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24  
 Operator J. Demaris Ground Elev. 161'  
 Weather 70's cloudy Make John Deere Model 410k Time Started 10:45 -- AM  
 Capacity 1 cy Reach 15 ft. Time Completed 11:30 -- AM

Depth	Soil Description	Sample No.	PID Reading (ppm)	Excav. Effort	Boulder Count/Class	Note No.
0'	0'-2': Brown, fine to coarse SAND and GRAVEL, trace Silt, moist  2'-8': Brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist  <b>FILL</b>	S-1		M		
1'				M	10%/A	
2'				M	10%/A	
3'				M	10%/B	
4'				M	10%/B	
5'				M	10%/B	
6'				M	10%/B	
7'				M	10%/B	
8'	8'-11': Dark brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist  <b>GLACIAL TILL</b>	S-2		M	10%/B	
9'				M	10%/B	
10'				M	10%/B	1
11'	End of Exploration - 11' Refusal not encountered					

**Notes:**  
1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan  Volume = <u>40.3</u> cu. yd.	Letter Designation A B C Excavation Effort E-----Easy M-----Moderate D-----Difficult	Boulder Class Size Range Classification 6" - 17" 18" - 36" 36" +	Proportions Used TRACE (TR.) 0 - 10% LITTLE (LI.) 10 - 20% SOME (SO.) 20 - 35% AND 35 - 50%	Abbreviations F = Fine M = Medium C = Coarse V = Very F/M = Fine to medium F/C = Fine to coarse GR = Gray BN = Brown YEL = Yellow	GROUNDWATER ( ) Encountered (X) Not Encountered Elapsed Time to Reading (Hours) Depth to Ground-water
	( ) Encountered (X) Not Encountered				

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Project/Site Information

**DPW Facility Improvements**  
**10 Lewiston St.**  
**Fall River, MA**

Test Pit No. **TP-5**  
 Page No. 1 of 1  
 File No. F-5033-011  
 Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24  
 Operator J. Demaris Ground Elev. 159'  
 Weather 70's cloudy Make John Deere Model 410k Time Started 12:45 -- PM  
 Capacity 1 cy Reach 15 ft. Time Completed 1:45 -- PM

Depth	Soil Description	Sample No.	PID Reading (ppm)	Excav. Effort	Boulder Count/Class	Note No.
0'	0'-2': Brown, fine to coarse SAND and GRAVEL, trace Silt, moist	S-1		M		
1'				M		
2'	2'-7': Brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist			M	5%/A	
3'				M	5%/A	
4'				M	5%/A	
5'				M	5%/A	
6'				M	5%/A	
7'				M	5%/A	
8'				M	5%/A	
9'				M	5%/A	
10'			M	5%/A	1	
	<b>FILL</b>					
	End of Exploration - 10.5'					
	Refusal not encountered - exploration terminated due to proximity to sewer main					

**Notes:**  
 1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan  Volume = <u>17.1</u> cu. yd.	Letter Designation A B C Excavation Effort E-----Easy M-----Moderate D-----Difficult	Boulder Class Size Range Classification 6" - 17" 18" - 36" 36" +	Proportions Used TRACE (TR.) 0 - 10% LITTLE (LI.) 10 - 20% SOME (SO.) 20 - 35% AND 35 - 50%	Abbreviations F = Fine M = Medium C = Coarse V = Very F/M = Fine to medium F/C = Fine to coarse GR = Gray BN = Brown YEL = Yellow	GROUNDWATER ( ) Encountered (X) Not Encountered Elapsed Time to Reading (Hours) Depth to Ground-water

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Project/Site Information

**DPW Facility Improvements**  
**10 Lewiston St.**  
**Fall River, MA**

Test Pit No. **TP-6**  
 Page No. 1 of 1  
 File No. F-5033-011  
 Checked By: B. Nereson

T&B Rep. N. Shaw Contractor Fall River DPW Date 07/25/24  
 Operator J. Demaris Ground Elev. 153'  
 Weather 70's cloudy Make John Deere Model 410k Time Started 2:10 -- PM  
 Capacity 1 cy Reach 15 ft. Time Completed 2:30 -- PM

Depth	Soil Description	Sample No.	PID Reading (ppm)	Excav. Effort	Boulder Count/Class	Note No.
0'	0'-2': Brown, fine to coarse SAND and GRAVEL, trace Silt, moist  2'-7': Brown, fine to coarse SAND and GRAVEL, trace Silt, occasional Boulders/Cobbles, moist	S-1		M		
1'				M		
2'				M	5%/A	
3'				M	5%/A	
4'				M	5%/A	
5'				M	5%/A	
6'			<b>FILL</b>			M
7'	7'-8': Brown, fine to coarse SAND, some Gravel, trace Silt, occasional Boulders/Cobbles, moist <b>GLACIAL TILL</b>	S-2		D	10%/B	1
8'	End of Exploration - 8' Refusal on possible Bedrock or large Boulder					

**Notes:**  
 1. Test pit backfilled in lifts and compacted with the heel of the bucket.

Test Pit Plan  Volume = <u>9.5</u> cu. yd.	Letter Designation A B C Excavation Effort E-----Easy M-----Moderate D-----Difficult	Boulder Class Size Range Classification 6" - 17" 18" - 36" 36" +	Proportions Used TRACE (TR.) 0 - 10% LITTLE (LI.) 10 - 20% SOME (SO.) 20 - 35% AND 35 - 50%	Abbreviations F = Fine M = Medium C = Coarse V = Very F/M = Fine to medium F/C = Fine to coarse GR = Gray BN = Brown YEL = Yellow	GROUNDWATER ( ) Encountered (X) Not Encountered Elapsed Time to Reading (Hours) Depth to Ground-water

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Section 00 41 00  
FORM FOR GENERAL BID  
MGL c.30 §39M Over \$50K

**TO THE AWARDING AUTHORITY:** City of Fall River

**A.** The Undersigned proposes to furnish all labor and materials required for **Fall River DCM Facility Improvements - Phase I [Project #25-25]** at **Fall River DCM Facility** in Fall River, Massachusetts, in accordance with the accompanying plans and specifications prepared by **Tighe & Bond** for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

**B.** This bid includes addenda numbered: \_\_\_\_\_

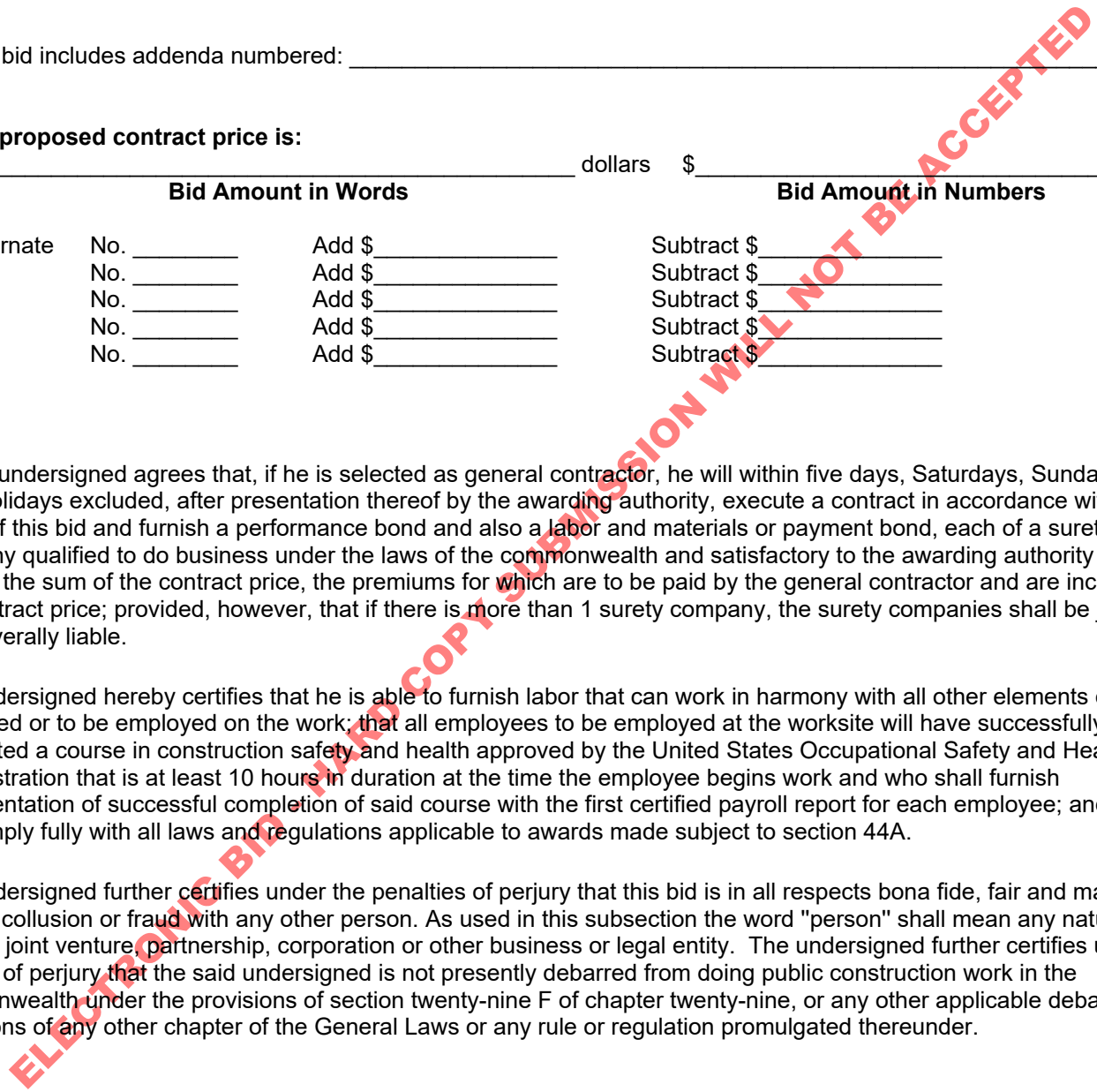
**C. The proposed contract price is:**

_____		dollars	\$	_____
<b>Bid Amount in Words</b>				<b>Bid Amount in Numbers</b>
For alternate	No. _____	Add \$	_____	Subtract \$ _____
	No. _____	Add \$	_____	Subtract \$ _____
	No. _____	Add \$	_____	Subtract \$ _____
	No. _____	Add \$	_____	Subtract \$ _____
	No. _____	Add \$	_____	Subtract \$ _____

**D.** The undersigned agrees that, if he is selected as general contractor, he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price; provided, however, that if there is more than 1 surety company, the surety companies shall be jointly and severally liable.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A.

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.



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\_\_\_\_\_  
**NAME OF BIDDER**

\_\_\_\_\_  
**SIGNATURE AND TITLE OF PERSON SIGNING BID**

\_\_\_\_\_  
**BUSINESS ADDRESS**  
\_\_\_\_\_

Date: \_\_\_\_\_

**ELECTRONIC BID - HARD COPY SUBMISSION WILL NOT BE ACCEPTED**

# BID BOND

**CONTRACTOR:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SURETY:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**AWARDING AUTHORITY:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

**BOND AMOUNT:** \_\_\_\_\_

**PROJECT:** \_\_\_\_\_

The Contractor and Surety are bound to the Awarding Authority in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Awarding Authority accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Awarding Authority and Contractor, and the Contractor either (1) enters into a contract with the Awarding Authority in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise, acceptable to the Awarding Authority, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Awarding Authority may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Awarding Authority and Contractor to extend the time in which the Awarding Authority may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Awarding Authority and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

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

**IN THE WITNESS WHEREOF,**

the Principal and Surety signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
(Witness) (Contractor as Principal) (Seal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness) (Surety) (Seal)

\_\_\_\_\_  
(Title)

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## CERTIFICATE OF AUTHORITY/CLERK'S CERTIFICATE

At a duly authorized meeting of the Board of Directors of \_\_\_\_\_  
(Name of Corporation)

held on \_\_\_\_\_ it was VOTED that:  
(Date)

\_\_\_\_\_, \_\_\_\_\_  
(Name) (Officer)

of this corporation, be and he/she hereby is authorized to submit bids and proposals, execute contracts, deeds and bonds in the name and on behalf of said corporation, and affix its corporate seal hereto; and such execution of any contract, deed or obligation in this corporation's name on its behalf by such (Officer) \_\_\_\_\_ under seal of the company, shall be valid and binding upon this corporation.

A True Copy,

**ATTEST:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**PLACE OF BUSINESS:** \_\_\_\_\_

**DATE OF THIS CERTIFICATE:** \_\_\_\_\_

I hereby certify that I am the clerk of the \_\_\_\_\_  
(Name of Corporation)

That \_\_\_\_\_ is the duly elected \_\_\_\_\_  
(Name) (Office)

of said corporation, and that the above vote has not been amended or rescinded and remains in full force and effect as of the date of this contract. \_\_\_\_\_  
(Clerk)

**CORPORATE SEAL:**



**CERTIFICATE OF NON-COLLUSION**

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

---

Signature of individual submitting bid or proposal

---

Name of Business (please type or print)

**CERTIFICATE OF TAX COMPLIANCE**

Pursuant to Massachusetts General Law Chapter 62C, Section 49A, the undersigned acting on behalf of the Contractor\*, certify under penalties of perjury that to the best knowledge and belief, the Contractor\* is in compliance with all laws of the Commonwealth relating to taxes, reporting of employee and contractors, and withholding and remitting child support.

**Individual**

---

Signature Date

---

Name (please print or type) Social Security Number

**Corporate**

---

Corporate Name (please print or type)

---

Signature of Corporate Officer Date

---

Name of Corporate Officer (please print or type) Title

---

Taxpayer Identification Number

As used in this certification, the word "Contractor" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.



## BID CONTRACTOR FEDERAL AWARD VERIFICATION FORM

NAME OF COMPANY: _____
TIN/EIN: _____
DbA (if applicable) _____
STREET ADDRESS: _____
CITY/STATE/ZIP: _____
PHONE NUMBER: _____

We here by certify: Signature of Authorized Person Certifying Date Street Address: Bidder certifies that neither it nor its principals are suspended or debarred from contracting for goods or services that are purchased from federal awards.

---

Signature of Authorized Person Certifying

Date

---

Print Name and Title



## BIDDER CERTIFICATION

Company Name:
Billing Address:
Mailing Address: <i>(if different than above)</i>
Telephone:
Email Address:
Employer or Federal ID #:
Printed Name of Title:
Authorized Signature:
Date Signed:

**SIMILAR PROJECTS - REFERENCE FORM**

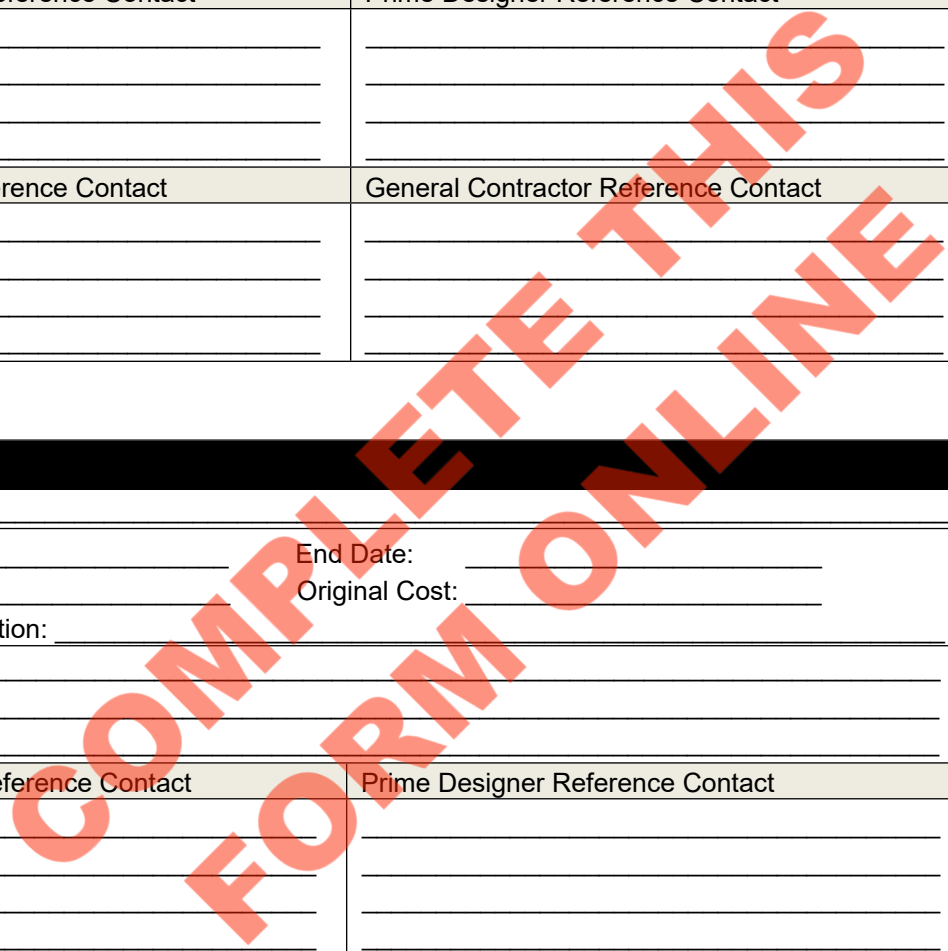
The bidder must provide five (5) similar projects performed & completed within the past five (5) years.

**Similar Project 1**

Project Address: _____	
Start Date: _____	End Date: _____
Current Cost: _____	Original Cost: _____
Cost Change Explanation: _____	
Project Description: _____ _____ _____	
Awarding Authority Reference Contact	Prime Designer Reference Contact
_____	_____
_____	_____
_____	_____
Project Manager Reference Contact	General Contractor Reference Contact
_____	_____
_____	_____
_____	_____

**Similar Project 2**

Project Address: _____	
Start Date: _____	End Date: _____
Current Cost: _____	Original Cost: _____
Cost Change Explanation: _____	
Project Description: _____ _____ _____	
Awarding Authority Reference Contact	Prime Designer Reference Contact
_____	_____
_____	_____
_____	_____
Project Manager Reference Contact	General Contractor Reference Contact
_____	_____
_____	_____
_____	_____



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**SIMILAR PROJECTS - REFERENCE FORM**

**Similar Project 3**

Project Address: \_\_\_\_\_

Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

Current Cost: \_\_\_\_\_ Original Cost: \_\_\_\_\_

Cost Change Explanation: \_\_\_\_\_

Project Description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Awarding Authority Reference Contact	Prime Designer Reference Contact
--------------------------------------	----------------------------------

_____ _____ _____ _____	_____ _____ _____ _____
----------------------------------	----------------------------------

Project Manager Reference Contact	General Contractor Reference Contact
-----------------------------------	--------------------------------------

_____ _____ _____ _____	_____ _____ _____ _____
----------------------------------	----------------------------------

**Similar Project 4**

Project Address: \_\_\_\_\_

Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

Current Cost: \_\_\_\_\_ Original Cost: \_\_\_\_\_

Cost Change Explanation: \_\_\_\_\_

Project Description: \_\_\_\_\_

\_\_\_\_\_

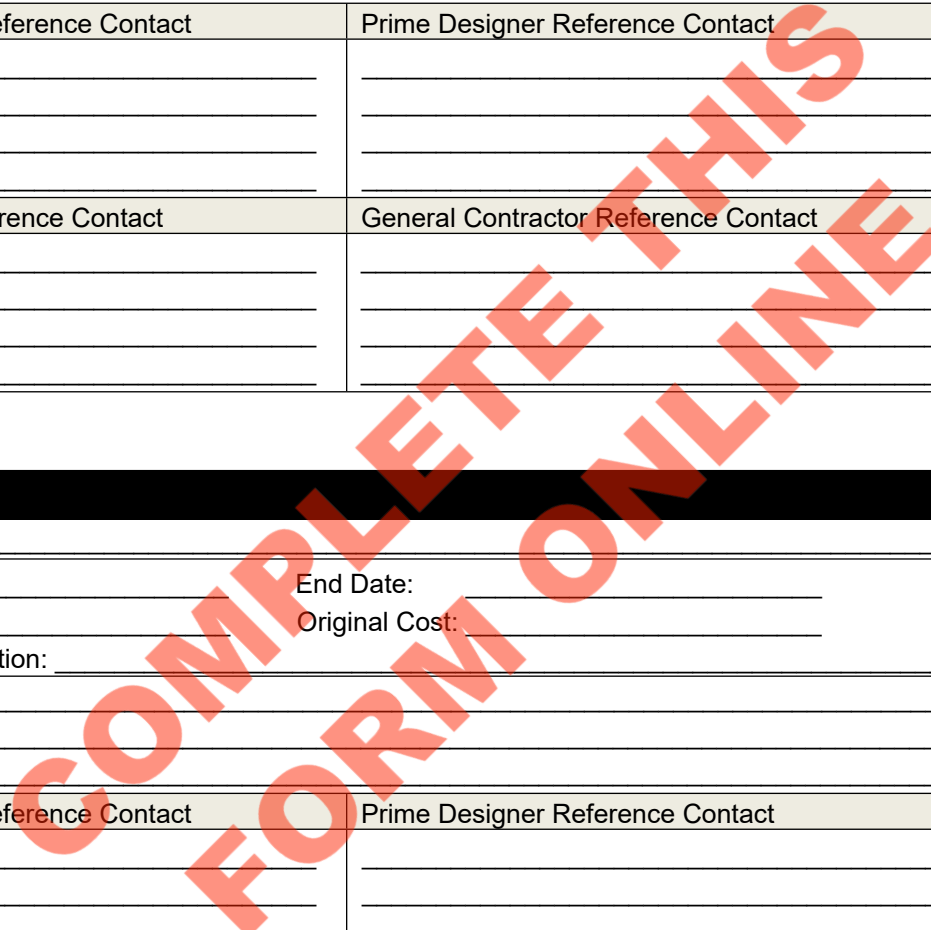
\_\_\_\_\_

Awarding Authority Reference Contact	Prime Designer Reference Contact
--------------------------------------	----------------------------------

_____ _____ _____ _____	_____ _____ _____ _____
----------------------------------	----------------------------------

Project Manager Reference Contact	General Contractor Reference Contact
-----------------------------------	--------------------------------------

_____ _____ _____ _____	_____ _____ _____ _____
----------------------------------	----------------------------------



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**SIMILAR PROJECTS - REFERENCE FORM**

Similar Project 5	
Project Address: _____	
Start Date: _____	End Date: _____
Current Cost: _____	Original Cost: _____
Cost Change Explanation: _____	
Project Description: _____ _____ _____	
Awarding Authority Reference Contact	Prime Designer Reference Contact
_____ _____ _____	_____ _____ _____
Project Manager Reference Contact	General Contractor Reference Contact
_____ _____ _____	_____ _____ _____

**COMPLETE THIS FORM ONLINE**

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**BID ATTACHMENT  
 UNIT PRICES SCHEDULE**



Project: **Fall River DCM Facility Improvements - Phase I**  
 Project No. **25-25**  
 Awarding Authority/Owner: **CITY OF FALL RIVER**  
 BDO# [D25-5PKL]

Bidder's Company Name: \_\_\_\_\_  
 Bidder's Contact Name: \_\_\_\_\_  
 Bidder's Contact: \_\_\_\_\_

1. General Bidders shall enter on the Schedule of Unit Prices, a single amount for each unit price requested which shall consist of the sum of the amounts listed on the sub-bidders schedule of unit prices, plus the amount for work to be performed by the General Contractor.
2. If applicable, Sub-bidders shall enter on the Schedule of Units Prices, the amount to be added or subtracted for the required unit of work which pertains to the work of that subtrade.
3. The unit prices are not part of the rule for award, will not be used to determine the low bidder (unless explicitly noted otherwise), and may be the basis for negotiations for future applicable additions and deducts.
4. All Unit Prices quoted shall include their pro-rata share of all costs for overhead & profit, bond, labor, materials, disposal, and equipment necessary to completely perform the Work required for that unit of work.

	<b>ITEM</b>	<b>Base Bid Quantity</b>	<b>Unit of Measure</b>	<b>Unit Cost Add</b>	<b>Unit Cost Deduct</b>
1.	Unclassified Excavation	4,500	CY	<input type="text"/>	<input type="text"/>
2.	Rock Excavation	1,400	CY	<input type="text"/>	<input type="text"/>
3.	Type D4 Contaminated Soil Excavation and Disposal	7,800	CY	<input type="text"/>	<input type="text"/>
4.	Type D1 Contaminated Soil Excavation and Disposal	12,700	CY	<input type="text"/>	<input type="text"/>
5.	Type C2 Contaminated Soil Excavation and Disposal	2,200	CY	<input type="text"/>	<input type="text"/>
6.	Type E3 Contaminated Soil Excavation and Disposal	25	CY	<input type="text"/>	<input type="text"/>

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7.	Stockpiled granite removal and disposal	1,100	CY	<input type="text"/>	<input type="text"/>
8.	Stockpiled Reinforced Concrete Removal and Disposal	1,500	CY	<input type="text"/>	<input type="text"/>
9.	Stockpiled Yard Waste and Mulch Removal and Disposal	750	CY	<input type="text"/>	<input type="text"/>
10.	Test Pits	150	CY	<input type="text"/>	<input type="text"/>
11.	Uniformed Traffic Police	1	UNIT	<input type="text"/>	<input type="text"/>
12.	Gas Service Relocation	1	UNIT	<input type="text"/>	<input type="text"/>

END OF UNIT PRICES SCHEDULE

SECTION 00 52 00

AGREEMENT

This Agreement is made this \_\_\_\_\_ day of \_\_\_\_\_ in the year two thousand twenty four between the City of Fall River, hereinafter called Owner and \_\_\_\_\_ hereinafter called Contractor.

Owner and Contractor hereby agree as follows:

ARTICLE 1 WORK

1.1 Contractor shall complete all Work as specified or indicated in the Contract Documents.

ARTICLE 2 ENGINEER

2.1 The Project has been designed by Tighe & Bond, Inc., 53 Southampton Road, Westfield, Massachusetts 01085 who is hereinafter called Engineer. Engineer will assume all duties and responsibilities, rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 3 CONTRACT TIMES

3.1 Time of the Essence

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

3.2 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed on or before November 3, 2025, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before December 1, 2025.

3.3 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$2,000.00 for each day that expires after the time specified in Paragraph 3.1 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$2,000.00 for each day that expires after the time specified in Paragraph 3.1 for completion and readiness for final payment until the Work is completed and ready for final payment.

#### ARTICLE 4 CONTRACT PRICE

- 4.1 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the prices stated in Contractor's Bid, attached hereto as an exhibit.
- 4.2 The total amount will be adjusted by measurement of actual installed quantities of unit price items in strict conformity with the provisions contained herein.

#### ARTICLE 5 PAYMENT PROCEDURES

- 5.1 Applications for Payment shall be processed in accordance with Article 14 of the General Conditions and in accordance with Massachusetts General Law.
- 5.2 Owner shall make progress payments on account of the Contract Price on the basis of processed Applications for Payment monthly during construction. All progress payments will be measured by the schedule of values established in Paragraph 2.07.A of the General Conditions, or in the event there is no schedule of values, as provided in the General Requirements.
- 5.3 Owner shall retain from progress payments 5 percent of the value of Work completed.

#### ARTICLE 6 CONTRACTOR'S REPRESENTATIONS

- 6.1 Contractor makes the following representations:
  - A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
  - B. Contractor has visited the site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
  - D. Contractor has carefully studied all:
    1. Reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
  - E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; and the Site-related reports and drawings identified in the Contract 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 Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

- F. Based on the information and observations referenced in Paragraph 6.1 above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 7 CONTRACT DOCUMENTS

### 7.1 Contents

- A. The Contract Documents consist of the following:
  - 1. This Agreement (pages 00 52 00 - 1 to 00 52 00 - 6, inclusive);
  - 2. Performance Bond;
  - 3. Payment Bond;
  - 4. General Conditions (title pages, table of contents, and pages 00 72 00 - 1 to 00 72 00 - 72, inclusive);
  - 5. Supplementary Conditions (pages 00 73 00 - 1 to 00 73 00 - 12, inclusive);
  - 6. General Requirements (Division 01);
  - 7. Specifications (Divisions 02 through 33);
  - 8. Drawings, with each sheet bearing the following general title: Fall River DCM Facility Improvement Project – Phase I, Fall River, Massachusetts;
  - 9. Addenda (numbers \_\_\_\_\_ to \_\_\_\_\_, inclusive);
  - 10. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor's Bid (pages 00 41 00 - 1 to 00 41 00 - 2, inclusive);
    - b. Documentation submitted by Contractor prior to Notice of Award;
  - 11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    - a. Notice to Proceed;
    - b. Written Amendments;
    - c. Work Change Directives;

- d. Change Order(s)
  - e. OSHA Training Certifications
  - f. MBE/WBE Participation Schedule, Letters of Intent, and SDO Certifications for each MBE/WBE
  - g. EEO Certification
- B. The documents listed in Paragraph 7.1.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the General Conditions.

## ARTICLE 8 MISCELLANEOUS

### 8.1 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

### 8.2 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are 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 Documents.

### 8.3 Successors and Assigns

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

### 8.4 Severability

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

### 8.5 Contractor Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.5:
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 or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

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

OWNER:

CONTRACTOR:

\_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_

By: \_\_\_\_\_

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

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

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest \_\_\_\_\_

Attest \_\_\_\_\_

Address for giving notices:

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution of other documents authorizing execution of Owner-Contractor Agreement.)

License No. \_\_\_\_\_  
(Where applicable)

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Certified as to the availability of funds:

\_\_\_\_\_

Date

\_\_\_\_\_

Signed

\_\_\_\_\_

Title

END OF SECTION

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## PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

### CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

### BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form:  None  See Paragraph 18

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

### CONTRACTOR AS PRINCIPAL

### SURETY

\_\_\_\_\_  
*(seal)*

Contractor's Name and Corporate Seal

\_\_\_\_\_  
*(seal)*

Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
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 shall be 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 satisfy 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 shall 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 shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall 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 shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall 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:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
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;
4. A brief description of the labor, materials, or equipment furnished;
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;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
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

shall be 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 shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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## PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

### CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

### BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form:  None  See Paragraph 16

---

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

### CONTRACTOR AS PRINCIPAL

### SURETY

\_\_\_\_\_  
*(seal)*

Contractor's Name and Corporate Seal

\_\_\_\_\_  
*(seal)*

Surety's Name and Corporate Seal

By: \_\_\_\_\_

Signature

By: \_\_\_\_\_

Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_

Signature

Attest: \_\_\_\_\_

Signature

\_\_\_\_\_  
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 shall be 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall 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 shall not be reduced or set off on account of any such unrelated obligations. No right of action shall 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 may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall 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 shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall 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 shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall 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 shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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## STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
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 form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting 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, or both; 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, or both; 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; or (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. 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), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree 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 the 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. *Engineer*—The individual or entity named as such in the Agreement.
21. *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.
22. *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. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *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.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *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.
28. *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.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *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.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *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.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *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.
36. *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.

37. *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 furnished by Owner which are designated for the use of Contractor.
38. *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.
39. *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.
40. *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 thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, 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.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *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.

48. *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 the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. 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:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. 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 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean 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, shall mean 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, shall mean 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. 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 Bonds and Evidence of Insurance*

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), 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 executed 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 specifically 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 *Initial 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 for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall 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.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items 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 items, or from those established in applicable transmittal protocols.

### **ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

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

- A. The Contract Documents are complementary; what is required by one 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 or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall 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.

#### **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, shall mean 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, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, 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, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 Documents 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 Documents 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 shall 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 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 thereunder.
- 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 give written notice to Owner and Contractor 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 editions, 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 shall preclude 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 thirtieth 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 sixtieth day after the day of Bid opening or the thirtieth 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 shall 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 shall 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 shall 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 the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the 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. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall 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 utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
  4. acts of war or terrorism.
- D. 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.
- E. Paragraph 8.03 governs 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.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times 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.

- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

**ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor 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; 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 7.12, 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 at law; 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 shall 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 known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
  - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); 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 upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  - 3. 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 either:
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; or
  2. is of such a nature as to require a change in the Drawings or Specifications; or
  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 the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; 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. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, 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 conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
  2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice as required by Paragraph 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, or both, then any such adjustment shall 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, or both, 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.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. 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 in the Contract Documents, or was not shown or indicated 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), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; 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 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. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, 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. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
    - 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;
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
    - d. 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, or both, then any such adjustment shall 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, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. 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 Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. 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, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, 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.
- 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 or 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.H shall obligate 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 shall obligate 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 all of Contractor's obligations under the Contract. These bonds shall 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 Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, 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 shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. 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.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

### 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. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements 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 and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements 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 and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. 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, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of 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.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect 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 shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

### 6.03 Contractor's Insurance

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
  - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
  - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *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:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  2. claims for damages insured by reasonably available personal injury liability coverage.
  3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
    - a. Such insurance shall 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, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *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. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *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 shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
1. include at least the specific coverages provided in this Article.
  2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
  3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
  4. remain in effect at least until final payment (and longer if expressly required in this Article) 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 Documents.
  5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed 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.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. 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.

6.05 *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 full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
  - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. 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 may be provided through other insurance policies acceptable to Owner and Contractor.
  - 3. 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.
  - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. 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).
  6. extend to cover damage or loss to insured property while in transit.
  7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
  8. allow for the waiver of the insurer's subrogation rights, as set forth below.
  9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
  10. not include a co-insurance clause.
  11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
  12. include performance/hot testing and start-up.
  13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed 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.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- 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 notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* 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 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers 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. 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 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 Subcontractors, all individuals or entities identified in the Supplementary Conditions as 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. None of the above waivers shall extend 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. 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:
  - 1. loss 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 perils whether or not insured by Owner; and
  - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner 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.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work 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 any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 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 6.05 shall 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, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

## ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

### 7.01 *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. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

### 7.02 *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 at all times maintain good discipline and order at the Site.
- B. 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 shall 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.

### 7.03 *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 shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall 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 shall 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.

7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, 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 material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it 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) it has a proven record of performance and availability of responsive service; and
      - 4) it is not objectionable to Owner.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it 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 shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment 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 material or equipment under the circumstances described below. To the extent possible such requests shall 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 material or equipment from anyone other than Contractor.
  - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.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 material or equipment that Contractor seeks to furnish or use. The application:
    - a. shall 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 that specified, and
      - 3) be suited to the same use as that 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 that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
  - d. shall 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 shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

#### 7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities 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, Supplier, or other individual or entity 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 five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. 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, Suppliers, or other individuals or entities 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, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, 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, Supplier, or other individual or entity, whether initially or as a replacement, shall 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 fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
2. shall create 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.

7.07 *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 a particular 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 shall be disclosed by Owner 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.

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. 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

7.09 *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.

7.10 *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. Except where otherwise expressly required by applicable Laws and Regulations, 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 shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give 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 notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *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.

7.12 *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. 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.
- B. 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. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when 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.
  - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
  - D. 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.
  - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.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).
  - F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
  - G. Contractor's duties and responsibilities for safety and protection shall 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.

#### 7.13 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of 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 threatened 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 thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified 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
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall 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 submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will 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.D.

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.D.
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. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
  1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. 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, conform to the information given in 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 shall 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.
  5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 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, shall 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, Sample, or other submittal shall 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.D.4.

E. *Resubmittal Procedures:*

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

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 and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper 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.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  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. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.

- D. 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 shall 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 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 performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury 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 shall 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.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
  - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

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

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

## 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 utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, 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.

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 at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner 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, or both. 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 shall 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. When applicable, any such equitable adjustment in Contract Price shall 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 is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- 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. 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 to 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.
- C. 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 to Contractor.

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- D. 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 shall 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 Documents (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 10.08. 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 *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 Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *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.

10.07 *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.

10.08 *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, shall 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 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 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *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 (if any) of which Engineer has been informed.

**ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. *Change Orders:*
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not 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, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. *Work Change Directives:* 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 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: 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. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.02 *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. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes 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 shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate 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.

#### 11.03 *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.

#### 11.04 *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 shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall 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); or
  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 11.04.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 11.04.C).

- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall 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 shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five 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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.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 five 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 shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall 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 will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 *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 shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

#### 11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; 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. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. 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. The supporting data shall 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. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
  2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall 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.
  3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *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 that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

#### 11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the 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 11.02, (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 in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *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 shall be submitted 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; and
  - 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.
- 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 shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall be incorporated in a Change Order 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. 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 shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall 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. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, 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, shall 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 shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall 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, who 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 shall 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 for services specifically related to the Work.
5. Supplemental costs including 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, and hand tools not owned by the workers, 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.
  - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the 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 property insurance established in accordance with Paragraph 6.05), 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 shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall 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 shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. 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.
- 5. 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:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

### 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 on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a 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 on account of Work covered by allowances, and the Contract Price shall 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, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
  - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
  - 2. there is no corresponding adjustment with respect to any other item of Work; and
  - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

**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 will 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 therewith 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 shall 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 shall 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 shall 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 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 shall 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 special 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, or both, 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 shall 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 rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven 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 on account of 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. 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 shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and 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.
  2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
  3. 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, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, 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 on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of 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 that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
  - j. liquidated 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;
  - l. there are other items entitling 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 shall 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 shall be treated as an amount due as determined by Paragraph 15.01.C.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 seven 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 shall 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 seven 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 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 6.05 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 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall 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 disputes that Contractor believes are unsettled; 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 Application and Acceptance:***

1. 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 ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall 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. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. 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. *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.

**D. *Payment Becomes Due:*** Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- 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 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 terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then 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 other adjacent areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, 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 therefrom.
- B. If 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 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 correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. 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.
- D. 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.

- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not 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, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall 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) ten 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) 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 seven 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 shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate For Convenience*

- A. Upon seven 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 on account of loss of anticipated overhead, profits, or revenue, 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 seven 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, seven 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; and
  2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising 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; or
  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 Documents requires the giving of written notice, it will be deemed to have been validly given if:
1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

### **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 shall not constitute a waiver of that provision, nor shall 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 or completion of the Contract or termination 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 *Headings*

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



SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

PART 1 AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2013 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

The address system used in the Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Delete paragraph 1.01A.38 in its entirety and insert the following in its place:

1.01A.38. Specifications – Sections included under Division 1 through Division 33 of the Project Manual.

SC-1.01 Add the following language at the end of the first sentence of paragraph 1.01A.40:

or has been completed except for work having a contract price of less than one percent of the then adjusted total Contract Price.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.02 Delete paragraph 2.02A in its entirety.

ARTICLE 3 –DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Replace paragraph 3.01E with the following paragraph:

3.01E In the event of conflicts, inconsistencies or discrepancies among the Contract Documents, to the extent applicable, the better quality or greater quantity of work shall be provided without change to the Contract Price. In the event of such conflicts, inconsistencies or discrepancies which do not relate to the quality or quantity of work, the Contractor shall request clarifications or interpretations from the Engineer as provided herein.

SC-3.01 Add the following new paragraph immediately after paragraph 3.01E:

- 3.01F Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

#### ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

- SC-4.01 Delete paragraph 4.01A in its entirety and insert the following in its place:

- 4.01A The Contract Times will commence to run on the date specified in the Notice to Proceed.

#### ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

- SC-5.03 Add the following new paragraphs immediately after paragraph 5.03B.3:

- 5.03C In the preparation of Drawings and Specifications, Engineer has relied upon the data obtained from tests of subsurface and latent physical conditions of the site. Such data is in the form of boring and test pit logs which are included in the Project Manual. The locations of the test borings are shown on the Drawings. Such logs and samples are not part of the Contract Documents.

- 5.03C.1 The subsurface data are not guaranteed as to accuracy or completeness.

- 5.03C.2 Bidders are cautioned that the subsurface data have been utilized for general design purposes only. No explicit or implicit representation is made as to the nature of the materials which may be encountered below the surface of the ground.

- 5.03C.3 The making available of this subsurface data to Bidders is not intended to relieve them from their responsibility to familiarize themselves with subsurface and other site conditions.

- SC-5.04 Add the following new paragraph immediately after paragraph 5.04D.4:

- 5.04D.5 Adjustment resulting from subsurface or latent physical conditions will be in accordance with Massachusetts General Law Chapter 30, Section 39N referenced in Part II of the Supplementary Conditions.

- SC-5.06 Add the following new paragraphs immediately after paragraph 5.06A.2:

5.06A.3 The following tables regarding Hazardous Environmental Conditions at the Site are known to the Owner. Copies of these tables are included as attachments in the Division 2 Specifications.

5.06A.3.a The Specification Sections 02 80 00 includes information and tables for hazardous materials and universal waste materials identified in the existing attendant booth and salt shed.

5.06A.3.b The Specification Sections 02 81 00 includes information and tables for contaminated soils identified on the site.

**ARTICLE 6 - BONDS AND INSURANCE**

SC-6.03 Add the following new paragraph immediately after paragraph 6.03B.3:

6.03B.4 Insurance certificate(s) shall also contain the following:

1. Confirmation that the General Liability policy covers only the Work under this Contract, with project specific limits.
2. Confirmation that automobile insurance covers all Scheduled, Hired and Non-Owned vehicles.
3. Names of all additional insureds as specified herein.

SC-6.03 Add the words "and Paragraph 6.04" after the words "Paragraph 6.03" in Paragraph 6.03I.

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

6.03.K The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State: Massachusetts	<u>Statutory</u>
----------------------	------------------

Employer's Liability:

Bodily injury, each accident	<u>Statutory</u>
------------------------------	------------------

Bodily injury by disease, each employee	<u>Statutory</u>
---	------------------

Bodily injury/disease aggregate	<u>Statutory</u>
---------------------------------	------------------

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	<u>\$2,000,000</u>
-------------------	--------------------

Products - Completed Operations Aggregate	<u>\$1,000,000</u>
---	--------------------

Personal and Advertising Injury	<u>\$1,000,000</u>
---------------------------------	--------------------

Each Occurrence  
(Bodily Injury and Property Damage) \$1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person \$

Each accident \$

Property Damage:

Each accident \$

[or]

Combined Single Limit of \$1,000,000

4. Excess or Umbrella Liability:

Per Occurrence \$1,000,000

General Aggregate \$5,000,000

5. Contractor's Pollution Liability:

Each Occurrence \$1,000,000

General Aggregate \$3,000,000

If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following:

- a) City of Fall River  
1 Government Center  
Fall River, MA 02722
- b) City of Fall River – City Operations Department  
1 Government Center  
Fall River, MA 02722
- c) Tighe & Bond, Inc.  
53 Southampton Road  
Westfield, MA 01085
- d) Architectural Consulting Group, Inc.  
2206 Acushnet Avenue  
New Bedford, MA 02745

7. Contractor's Professional Liability:

Each Claim \$ 500,000

Annual Aggregate \$ 1,000,000

SC-6.04 Delete paragraph 6.04 in its entirety and insert the following in its place:

6.04 Contractor shall purchase and maintain a separate Owner's Protective Liability policy, issued to Owner at the expense of Contractor, including Owner as named insured. This insurance shall provide coverage for not less than the following amounts:

Bodily Injury	<u>\$1,000,000</u>	Each Occurrence
	<u>\$5,000,000</u>	Aggregate

Property Damage	<u>\$1,000,000</u>	Each Occurrence
	<u>\$5,000,000</u>	Aggregate

- A. Insurance coverage for the Contractor's Comprehensive General and Excess Liability policies and for the Owner's Protective Liability policy shall be written by one and the same insurance company to avoid the expense of duplicate and/or overlapping coverage and to facilitate and expedite the settlement of claims.
- B. The Owner's Protective Liability policy shall protect from claims which may arise from operations under the Contract, including operations performed for a named insured by independent contractors and general inspection or monitoring by a named insured. The policy also shall protect against Automobile Non-Ownership Liability in connection with the Contractor's operations under the Contract, whether such operations be by itself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

SC-6.05 Add the following new subparagraph after subparagraph 6.05.A.1:

6.05.A.1.a In addition to Owner, Contractor, and all Subcontractors, include as insureds the following:

- a) City of Fall River  
1 Government Center  
Fall River, MA 02722
- b) City of Fall River – City Operations Department  
1 Government Center  
Fall River, MA 02722
- c) Tighe & Bond, Inc.  
53 Southampton Road  
Westfield, MA 01085
- d) Architectural Consulting Group, Inc.  
2206 Acushnet Avenue  
New Bedford, MA 02745

**ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES**

SC-7.02 Add the following new paragraph immediately after paragraph 7.02B.

7.02C Whenever Owner shall notify Contractor in writing that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.

SC-7.06 Add the following language at the end of paragraph 7.06O.2:

Contractor shall make payments to Subcontractors in accordance with Massachusetts General Law Chapter 30, Section 39F which is referenced in PART II of these Supplementary Conditions.

SC-7.07 Delete paragraph 7.07B in its entirety and replace it with the following:

7.07B Not used.

SC-7.08 Delete the word "Owner" in the last sentence of Paragraph 7.08A and replace with the word "Contractor."

SC-7.09 Add the following sentence at the end of paragraph 7.09.A.

All materials provided under this Contract are exempt from the Sales and Use Taxes of the Commonwealth of Massachusetts. The tax exemption number will be provided to the Contractor.

SC-7.10 Add the following new paragraph immediately after paragraph 7.10C.

7.10D Contractor shall comply with all applicable provisions of Chapter 30, Section 39R of the Massachusetts General Laws regarding Contractor's records.

SC-7.18 Add the following new paragraph immediately after paragraph 7.18.C.

7.18D If, through acts of neglect on the part of Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against Owner on account of any such damage alleged to have been sustained, Owner shall notify Contractor, who shall indemnify, defend, and save harmless Owner against any such claim.

## ARTICLE 8 - OTHER WORK AT THE SITE

SC-8.01 Add the following new paragraph immediately after paragraph 8.01.D:

- 8.01E The Phase II and Phase III construction projects at the site are anticipated to be performed concurrently by contractors to be selected via public bid. The Phase II project consists of construction of a proposed high arch gambrel style salt shed. The location of the proposed salt shed is shown on the site plans. The Phase III project consists of repairs to portions of the existing DCM building's envelope and structural components.

#### ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

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

- B. On this Project, by agreement with the Owner, 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.
- C. The Resident Project Representative (RPR) will be the Owner’s Project Manager (OPM) representative at the Site, will act as directed by and under the supervision of the OPM, and will confer with the OPM and Engineer regarding RPR's actions.
1. RPR's dealings in matters pertaining to the Work in general shall be with OPM, Engineer, and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor.
- D. The RPR shall 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 Contractor’s work.
  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. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize Owner to occupy the Project in whole or in part.

**ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

SC-11.06 Insert the following sentence at the end of Paragraph 11.06.A.2:

If Engineer does not take action on the Change Proposal and neither Owner nor Contractor submit a letter to the other party indicating that the Change Proposal is deemed denied, then the Change Proposal shall be deemed denied after 60 days of Engineer’s receipt of the Contractor’s supporting data, thereby commencing the time for appeal of the denial under Article 12.

**ARTICLE 13 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

SC-13.01 Delete the word “superintendents,” in the second sentence after the word “limitation,” in paragraph 13.01B.1.

SC-13.01 Delete paragraph 13.01B.5.c in its entirety and replace with the following:

13.01B.5.c The fair rental and operating cost of all machinery and equipment used on the extra work for the period of such use. The fair rental and operating cost for all machinery and equipment shall be based upon the most recent edition of “Rental Rate Bluebook for Construction Equipment” (the “Bluebook”), published by Equipment Watch (equipmentwatch.com), or a similar publication approved by Engineer and adjusted for regional and age adjustments as specified in the “Bluebook.” Rental periods corresponding to the overall period of use shall be used, except if a piece of equipment used on extra work is already on the job, or has previously been rented for a long period of time (months), then the long-term rental rate (monthly) shall be used in determining costs. The hourly rental rate for long-term rental equipment will be determined by the monthly rental rate divided by 176.

For the situation where equipment is on the job and available for use but cannot be used due to a delay or suspension of a portion or all of the Contract activities, a rental standby rate may be paid if the Contractor can conclusively demonstrate to the satisfaction of the Engineer that: (1) the equipment cannot be used elsewhere on the Project or demobilized and remobilized at a cost lower than the cost of standby time, (2) that the equipment cannot be put in use due to factors beyond the Contractor’s control, and (3) the equipment on standby would have been used as part of the Work that is suspended or put on hold. The standby rate will be calculated as no more than 50% of the rental rate as listed in the “Bluebook” and adjusted for regional and age adjustments. Lesser standby rates may apply if the Owner or Engineer can demonstrate that the Contractor’s standby cost is less than this rate. The standby rate will



not include operating costs. A standby rate will not be paid for equipment which is being employed for portions of the Work which are still underway. A standby rate will also not be paid for equipment which is readily demobilized including construction equipment categorized as “shop tools” or “miscellaneous” in the “Bluebook.” Standby rates for durations of less than four hours will not be considered.

SC-13.01 Insert in the first sentence after the word “architects,” the word “superintendents,” in paragraph 13.01C.1

SC-13.01 Add the following new paragraph immediately after paragraph 13.01C.5:

13.01C.6 Costs of or rental of small tools; costs of or rental of buildings.

13.02C Not used.

SC-13.03 Delete Paragraph 13.03B in its entirety and replace it with the following:

13.03B Since subject to change upon determination of actual quantities, estimated quantities of items of Unit Price Work are not guaranteed and serve to facilitate comparison of Bids and to determine an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

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

SC-14.02 Insert after the word “notice” the words “(minimum 24 hours)” in paragraph 14.02A.

SC-14.03 Delete paragraph 14.03B in its entirety and replace with the following:

14.03B *Engineer’s Authority:* At any time during the progress of the Work, Engineer shall have the authority to determine whether Work is defective, and reject defective Work, even though such work has been previously inspected and paid for.

SC-14.06 Add the following new paragraph immediately after paragraph 14.06A.

14.06B If Owner stops work under Paragraph 14.06, Contractor shall not be entitled to an extension of Contract Time nor to an increase in Contract Price.

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

SC-15.01 Insert the following sentence at the end of paragraph 15.01B.1:

The Certificate of Insurance for stored materials must list Tighe & Bond and the City of Fall River as additional insureds.

- SC-15.01 Delete paragraph 15.01C.1 in its entirety and insert the following in its place:
- 15.01C.1 Progress Payments will be made in accordance with Massachusetts General Law Chapter 30, Section 39K, which is referenced in Part II of these Supplementary Conditions.
- SC-15.01 Delete paragraph 15.01D.1 in its entirety and insert the following in its place:
- 15.01D.1 Progress Payments will be made in accordance with Massachusetts General Law Chapter 30, Section 39K, which is referenced in Part II of these Supplementary Conditions.
- SC-15.03 Delete the second sentence in Paragraph 15.03A in its entirety.
- SC-15.03 Add the following new paragraph immediately after paragraph 15.03A:
- 15.03A.1 Substantial Completion shall be as defined in Chapter 30, Section 39G of the Massachusetts General Laws.
- SC-15.03 Delete paragraph 15.03C in its entirety and insert the following in its place:
- 15.03C If, after consultation with Owner, Engineer considers and the Owner agrees that the Work is substantially complete, Engineer will prepare and deliver to Contractor, in a form approved by Owner, a Certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be included with the certificate a list of items to be completed or corrected before final payment.
- SC-15.03 Delete the word “preliminary” from paragraph 15.03D.
- SC-15.03 Add the following new paragraph immediately after paragraph 15.03F:
- 15.03G. The procedure for Substantial Completion shall be in accordance with Chapter 30, Section 39K of the Massachusetts General Laws.
- SC-15.04 Add the following new paragraph immediately after paragraph 15.04A.3:
- 15.04A.4 Owner may at any time request Contractor in writing to permit Owner to take over operation of any part of the Work although it is not substantially complete. A copy of such request will be sent to Engineer, and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such lists to Owner and Contractor together with a written recommendation as to the division of

responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time when Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.

Paragraph 15.04.A.4 shall be renumbered to 15.04.A.5

SC-15.06 Delete paragraph 15.06.D in its entirety and insert the following in its place:

- D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, or other time period in accordance with applicable laws and regulations, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### ARTICLE 16 - SUSPENSION OF WORK AND TERMINATION

SC-16.01 Delete paragraph 16.01.A in its entirety and insert the following in its place:

- 16.01.A Owner may order, at any time and without cause, suspension of the Work in accordance with Massachusetts General Law Chapter 30, Section 39O, which is referenced in Part II of the Supplementary Conditions.

SC- 16.02 Add the following new paragraph immediately after paragraph 16.02.A.4:

- 16.02.A.5 If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein specified.

#### ARTICLE 17 - FINAL RESOLUTION OF DISPUTES

SC-17.02 Add the following paragraph after paragraph 17.01:

- 17.02 Venue  
A. Any suit by either party arising under this Contract shall be brought only in the Superior Court in the county where the Project is located. The parties hereto waive any argument that this venue is improper or that the forum is inconvenient.

#### ARTICLE 18 - MISCELLANEOUS

SC-18.08 Add the following new paragraphs immediately after paragraph 18.08.

18.09 Wage Rates

- A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of minimum wage rates established in compliance with laws shall be a part of these Contract Documents. Copies of the wage schedules are included in Part II of these Supplementary Conditions. If it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administering the laws mentioned above. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation.
- B. The schedules of wages referred to above are minimum rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of those specified in the schedules shall be resolved by Contractor.
- C. The said schedules of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the site of the work.
- D. Both Federal and State schedules of minimum wage rates are included in Part II of these Supplementary Conditions. Where rates differ, the higher rates shall apply as a minimum for that trade.

18.10 US EPA Phase II Storm Water Program

Comply with requirement of the US EPA Phase II Storm Water Program for Construction Activities Greater than 1 Acre.

**PART II – FEDERAL AND STATE GOVERNMENT PROVISIONS**

Federal and State Government Provisions referenced or included herein, have been selected from those to which specific references have been made elsewhere in the Contract Documents. Each and every other provision of law or clause required by law to be inserted in this Contract shall be deemed to be also inserted herein in accordance with paragraph 3.01.F of the Supplementary Conditions.

**1.0 FEDERAL GOVERNMENT PROVISIONS**

**1.1 Labor Standards Provisions for Federal and Federally Assisted Contracts**

**1.2 Federal Wage Rates**

## 2.0 COMMONWEALTH OF MASSACHUSETTS PROVISIONS

- 2.1 The Owner and Contractor agree that the following Commonwealth of Massachusetts Provisions apply to the work to be performed under this Contract and that these provisions supersede any conflicting provisions of this Contract.
- 2.2 Applicable provisions of Massachusetts General Laws and Regulations and/or the United States Code and Code of Federal Regulations govern this Contract and any provision in violation of the foregoing shall be deemed null, void and of no effect. Where conflict between Code of Federal Regulations and State Laws and Regulations exist, the more stringent requirements shall apply.
- 2.3 Massachusetts General Laws
  - 2.3.1 Chapter 30, Section 39F
  - 2.3.2 Chapter 30, Section 39G
  - 2.3.3 Chapter 30, Section 39I
  - 2.3.4 Chapter 30, Section 39J
  - 2.3.5 Chapter 30, Section 39K
  - 2.3.6 Chapter 30, Section 39L
  - 2.3.7 Chapter 30, Section 39M
  - 2.3.8 Chapter 30, Section 39N
  - 2.3.9 Chapter 30, Section 39O
  - 2.3.10 Chapter 30, Section 39P
  - 2.3.11 Chapter 30, Section 39Q
  - 2.3.12 Chapter 30, Section 39R
  - 2.3.13 Chapter 44, Section 31C
  - 2.3.14 Chapter 82, Section 40
  - 2.3.15 Chapter 149, Section 34
  - 2.3.16 Chapter 149, Section 44F
  - 2.3.17 Chapter 149, Section 44G

2.3.18 Chapter 149, Section 44J

2.4 520 CMR 14.00 Excavation Trench Safety

2.5 State Wage Rates

2.6 Massachusetts Construction Grants Policy Memoranda

END OF SECTION

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Project\Design\Spec\PHASE 1\Div. 0\007300.docx

**ATTACHMENTS TO SUPPLEMENTARY CONDITIONS**

**ATTACHMENT A  
FEDERAL (DAVIS-BACON) WAGE RATES**



**ATTACHMENT B  
MASSACHUSETTS STATE WAGE RATES**

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MAURA HEALEY  
GovernorKIM DRISCOLL  
Lt. GovernorAs determined by the Director under the provisions of the  
Massachusetts General Laws, Chapter 149, Sections 26 to 27HLAUREN JONES  
SecretaryMICHAEL FLANAGAN  
Director

## Prevailing Wage Rates

**Awarding Authority:** City of Fall River

**Contract Number:** F5033-011 **City/Town:** FALL RIVER

**Description of Work:** Removal and disposal of:  
existing salt shed  
attendant booth

**Job Location:** 10 Lewiston Street

### Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets from DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

**Classification** Fall River DCM Facility Improvements - Phase I  
**Project #25-25**  
**Construction**

	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2025	\$39.95	\$15.57	\$20.17	\$0.00	\$75.69
	06/01/2025	\$40.95	\$15.57	\$20.17	\$0.00	\$76.69
	12/01/2025	\$40.95	\$15.57	\$21.78	\$0.00	\$78.30
	01/01/2026	\$40.95	\$16.17	\$21.78	\$0.00	\$78.90
	06/01/2026	\$41.95	\$16.17	\$21.78	\$0.00	\$79.90
	12/01/2026	\$41.95	\$16.17	\$23.52	\$0.00	\$81.64
	01/01/2027	\$41.95	\$16.77	\$23.52	\$0.00	\$82.24
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2025	\$40.02	\$15.57	\$20.17	\$0.00	\$75.76
	06/01/2025	\$41.02	\$15.57	\$20.17	\$0.00	\$76.76
	12/01/2025	\$41.02	\$15.57	\$21.78	\$0.00	\$78.37
	01/01/2026	\$41.02	\$16.17	\$21.78	\$0.00	\$78.97
	06/01/2026	\$42.02	\$16.17	\$21.78	\$0.00	\$79.97
	12/01/2026	\$42.02	\$16.17	\$23.52	\$0.00	\$81.71
	01/01/2027	\$42.02	\$16.77	\$23.52	\$0.00	\$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2025	\$40.14	\$15.57	\$20.17	\$0.00	\$75.88
	06/01/2025	\$41.14	\$15.57	\$20.17	\$0.00	\$76.88
	12/01/2025	\$41.14	\$15.57	\$21.78	\$0.00	\$78.49
	01/01/2026	\$41.14	\$16.17	\$21.78	\$0.00	\$79.09
	06/01/2026	\$42.14	\$16.17	\$21.78	\$0.00	\$80.09
	12/01/2026	\$42.14	\$16.17	\$23.52	\$0.00	\$81.83
	01/01/2027	\$42.14	\$16.77	\$23.52	\$0.00	\$82.43
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2024	\$117.16	\$10.08	\$24.29	\$0.00	\$151.53
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2024	\$40.61	\$9.65	\$17.70	\$0.00	\$67.96
	06/01/2025	\$42.00	\$9.65	\$17.70	\$0.00	\$69.35
	12/01/2025	\$43.38	\$9.65	\$17.70	\$0.00	\$70.73
	06/01/2026	\$44.82	\$9.65	\$17.70	\$0.00	\$72.17
	12/01/2026	\$46.26	\$9.65	\$17.70	\$0.00	\$73.61
	06/01/2027	\$47.71	\$9.65	\$17.70	\$0.00	\$75.06
	12/01/2027	\$49.16	\$9.65	\$17.70	\$0.00	\$76.51
	06/01/2028	\$50.66	\$9.65	\$17.70	\$0.00	\$78.01
	12/01/2028	\$52.16	\$9.65	\$17.70	\$0.00	\$79.51
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (SOUTHERN MASS)</i>	12/01/2024	\$42.80	\$14.50	\$11.05	\$0.00	\$68.35
	06/01/2025	\$43.80	\$14.50	\$11.05	\$0.00	\$69.35
	12/01/2025	\$44.80	\$14.50	\$11.05	\$0.00	\$70.35

Last Modified: 02/12/2025 at 8:17PM EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25						
ASPHALT RAKER LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE OPERATING ENGINEERS LOCAL 4	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER OPERATING ENGINEERS LOCAL 4	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01
For apprentice rates see "Apprentice- LABORER"						

Last Modified: 02/12/2025 at 8:17PM EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Full River DCM Facility Improvements - Phase I Project #25-25 BLOCK PAVER, RAMMER / CURB SETTER LABORERS - ZONE 2	12/01/2024	\$40.61	\$9.65	\$17.70	\$0.00	\$67.96
	06/01/2025	\$42.00	\$9.65	\$17.70	\$0.00	\$69.35
	12/01/2025	\$43.38	\$9.65	\$17.70	\$0.00	\$70.73
	06/01/2026	\$44.82	\$9.65	\$17.70	\$0.00	\$72.17
	12/01/2026	\$46.26	\$9.65	\$17.70	\$0.00	\$73.61
	06/01/2027	\$47.71	\$9.65	\$17.70	\$0.00	\$75.06
	12/01/2027	\$49.16	\$9.65	\$17.70	\$0.00	\$76.51
	06/01/2028	\$50.66	\$9.65	\$17.70	\$0.00	\$78.01
	12/01/2028	\$52.16	\$9.65	\$17.70	\$0.00	\$79.51
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER BOILERMAKERS LOCAL 29	01/01/2024	\$48.12	\$7.07	\$20.60	\$0.00	\$75.79

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
2	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
3	70	\$33.68	\$7.07	\$14.23	\$0.00	\$54.98
4	75	\$36.09	\$7.07	\$15.24	\$0.00	\$58.40
5	80	\$38.50	\$7.07	\$16.25	\$0.00	\$61.82
6	85	\$40.90	\$7.07	\$17.28	\$0.00	\$65.25
7	90	\$43.31	\$7.07	\$18.28	\$0.00	\$68.66
8	95	\$45.71	\$7.07	\$19.32	\$0.00	\$72.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) BRICKLAYERS LOCAL 3 (NEW BEDFORD)	02/01/2025	\$65.80	\$11.49	\$23.59	\$0.00	\$100.88
	08/01/2025	\$67.95	\$11.49	\$23.59	\$0.00	\$103.03
	02/01/2026	\$69.30	\$11.49	\$23.59	\$0.00	\$104.38
	08/01/2026	\$71.50	\$11.49	\$23.59	\$0.00	\$106.58
	02/01/2027	\$72.90	\$11.49	\$23.59	\$0.00	\$107.98

**Project #25-25**

**Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 New Bedford**

**Effective Date - 02/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.90	\$11.49	\$23.59	\$0.00	\$67.98
2	60	\$39.48	\$11.49	\$23.59	\$0.00	\$74.56
3	70	\$46.06	\$11.49	\$23.59	\$0.00	\$81.14
4	80	\$52.64	\$11.49	\$23.59	\$0.00	\$87.72
5	90	\$59.22	\$11.49	\$23.59	\$0.00	\$94.30

**Effective Date - 08/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.98	\$11.49	\$23.59	\$0.00	\$69.06
2	60	\$40.77	\$11.49	\$23.59	\$0.00	\$75.85
3	70	\$47.57	\$11.49	\$23.59	\$0.00	\$82.65
4	80	\$54.36	\$11.49	\$23.59	\$0.00	\$89.44
5	90	\$61.16	\$11.49	\$23.59	\$0.00	\$96.24

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

<b>BULLDOZER/GRADER/SCRAPER</b>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>CAISSON &amp; UNDERPINNING BOTTOM MAN</b>	12/01/2024	\$48.10	\$9.65	\$18.22	\$0.00	\$75.97
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$49.60	\$9.65	\$18.22	\$0.00	\$77.47
	12/01/2025	\$51.10	\$9.65	\$18.22	\$0.00	\$78.97
	06/01/2026	\$52.65	\$9.65	\$18.22	\$0.00	\$80.52
	12/01/2026	\$54.15	\$9.65	\$18.22	\$0.00	\$82.02

For apprentice rates see "Apprentice- LABORER"

<b>CAISSON &amp; UNDERPINNING LABORER</b>	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87

For apprentice rates see "Apprentice- LABORER"

<b>CAISSON &amp; UNDERPINNING TOP MAN</b>	12/01/2024	\$47.28	\$9.65	\$18.22	\$0.00	\$75.15
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$48.78	\$9.65	\$18.22	\$0.00	\$76.65
	12/01/2025	\$50.28	\$9.65	\$18.22	\$0.00	\$78.15
	06/01/2026	\$51.83	\$9.65	\$18.22	\$0.00	\$79.70
	12/01/2026	\$53.33	\$9.65	\$18.22	\$0.00	\$81.20

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25 CARBIDE CORE DRILL OPERATOR LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

CARPENTER CARPENTERS -ZONE 2 (Eastern Massachusetts)	09/01/2024	\$48.37	\$9.83	\$19.97	\$0.00	\$78.17
	03/01/2025	\$49.62	\$9.83	\$19.97	\$0.00	\$79.42
	09/01/2025	\$50.87	\$9.83	\$19.97	\$0.00	\$80.67
	03/01/2026	\$52.12	\$9.83	\$19.97	\$0.00	\$81.92
	09/01/2026	\$53.37	\$9.83	\$19.97	\$0.00	\$83.17
	03/01/2027	\$54.62	\$9.83	\$19.97	\$0.00	\$84.42

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$21.77	\$9.83	\$1.73	\$0.00	\$33.33
2	45	\$21.77	\$9.83	\$1.73	\$0.00	\$33.33
3	55	\$26.60	\$9.83	\$3.40	\$0.00	\$39.83
4	55	\$26.60	\$9.83	\$3.40	\$0.00	\$39.83
5	70	\$33.86	\$9.83	\$16.51	\$0.00	\$60.20
6	70	\$33.86	\$9.83	\$16.51	\$0.00	\$60.20
7	80	\$38.70	\$9.83	\$18.24	\$0.00	\$66.77
8	80	\$38.70	\$9.83	\$18.24	\$0.00	\$66.77

**Effective Date - 03/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.33	\$9.83	\$1.73	\$0.00	\$33.89
2	45	\$22.33	\$9.83	\$1.73	\$0.00	\$33.89
3	55	\$27.29	\$9.83	\$3.40	\$0.00	\$40.52
4	55	\$27.29	\$9.83	\$3.40	\$0.00	\$40.52
5	70	\$34.73	\$9.83	\$16.51	\$0.00	\$61.07
6	70	\$34.73	\$9.83	\$16.51	\$0.00	\$61.07
7	80	\$39.70	\$9.83	\$18.24	\$0.00	\$67.77
8	80	\$39.70	\$9.83	\$18.24	\$0.00	\$67.77

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Full River DCM Facility Improvements - Phase I Project #25-25 CARPENTER WOOD FRAME CARPENTERS-ZONE 3 (Wood Frame)	10/01/2024	\$26.65	\$7.02	\$4.80	\$0.00	\$38.47
	10/01/2025	\$27.75	\$7.02	\$4.80	\$0.00	\$39.57
	10/01/2026	\$28.85	\$7.02	\$4.80	\$0.00	\$40.67

All Aspects of New Wood Frame Work

**Apprentice - CARPENTER (Wood Frame) - Zone 3**

**Effective Date - 10/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$15.99	\$7.02	\$0.00	\$0.00	\$23.01
2	60	\$15.99	\$7.02	\$0.00	\$0.00	\$23.01
3	65	\$17.32	\$7.02	\$1.00	\$0.00	\$25.34
4	70	\$18.66	\$7.02	\$1.00	\$0.00	\$26.68
5	75	\$19.99	\$7.02	\$4.80	\$0.00	\$31.81
6	80	\$21.32	\$7.02	\$4.80	\$0.00	\$33.14
7	85	\$22.65	\$7.02	\$4.80	\$0.00	\$34.47
8	90	\$23.99	\$7.02	\$4.80	\$0.00	\$35.81

**Effective Date - 10/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.65	\$7.02	\$0.00	\$0.00	\$23.67
2	60	\$16.65	\$7.02	\$0.00	\$0.00	\$23.67
3	65	\$18.04	\$7.02	\$1.00	\$0.00	\$26.06
4	70	\$19.43	\$7.02	\$1.00	\$0.00	\$27.45
5	75	\$20.81	\$7.02	\$4.80	\$0.00	\$32.63
6	80	\$22.20	\$7.02	\$4.80	\$0.00	\$34.02
7	85	\$23.59	\$7.02	\$4.80	\$0.00	\$35.41
8	90	\$24.98	\$7.02	\$4.80	\$0.00	\$36.80

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

CEMENT MASONRY/PLASTERING BRICKLAYERS LOCAL 3 (NEW BEDFORD)	07/01/2024	\$49.19	\$13.35	\$24.21	\$1.80	\$88.55
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Last Modified: 02/12/2025 at 8:17PM/EST

**Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (New Bedford)**

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.60	\$13.35	\$16.43	\$0.00	\$54.38
2	60	\$29.51	\$13.35	\$19.21	\$1.80	\$63.87
3	65	\$31.97	\$13.35	\$20.21	\$1.80	\$67.33
4	70	\$34.43	\$13.35	\$21.21	\$1.80	\$70.79
5	75	\$36.89	\$13.35	\$22.21	\$1.80	\$74.25
6	80	\$39.35	\$13.35	\$23.21	\$1.80	\$77.71
7	90	\$44.27	\$13.35	\$24.21	\$1.80	\$83.63

**Notes:**

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

**Apprentice to Journeyworker Ratio:1:3**

<b>CHAIN SAW OPERATOR</b> <i>LABORERS - ZONE 2</i>	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

<b>CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$58.18	\$15.55	\$16.50	\$0.00	\$90.23
	06/01/2025	\$59.51	\$15.55	\$16.50	\$0.00	\$91.56
	12/01/2025	\$60.98	\$15.55	\$16.50	\$0.00	\$93.03
	06/01/2026	\$62.31	\$15.55	\$16.50	\$0.00	\$94.36
	12/01/2026	\$63.79	\$15.55	\$16.50	\$0.00	\$95.84

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>COMPRESSOR OPERATOR</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>DELEADER (BRIDGE)</b> <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36
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**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.23	\$9.95	\$0.00	\$0.00	\$39.18
2	55	\$32.15	\$9.95	\$6.66	\$0.00	\$48.76
3	60	\$35.08	\$9.95	\$7.26	\$0.00	\$52.29
4	65	\$38.00	\$9.95	\$7.87	\$0.00	\$55.82
5	70	\$40.92	\$9.95	\$20.32	\$0.00	\$71.19
6	75	\$43.85	\$9.95	\$20.93	\$0.00	\$74.73
7	80	\$46.77	\$9.95	\$21.53	\$0.00	\$78.25
8	90	\$52.61	\$9.95	\$22.74	\$0.00	\$85.30

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN LABORERS - ZONE 2	12/02/2024	\$47.00	\$9.65	\$18.40	\$0.00	\$75.05
	06/02/2025	\$48.50	\$9.65	\$18.40	\$0.00	\$76.55
	12/01/2025	\$50.00	\$9.65	\$18.40	\$0.00	\$78.05
	06/01/2026	\$51.55	\$9.65	\$18.40	\$0.00	\$79.60
	12/07/2026	\$53.05	\$9.65	\$18.40	\$0.00	\$81.10
	06/07/2027	\$54.65	\$9.65	\$18.40	\$0.00	\$82.70
	12/06/2027	\$56.25	\$9.65	\$18.40	\$0.00	\$84.30
	06/05/2028	\$57.93	\$9.65	\$18.40	\$0.00	\$85.98
	12/04/2028	\$59.60	\$9.65	\$18.40	\$0.00	\$87.65

For apprentice rates see "Apprentice- LABORER"

DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 2	12/02/2024	\$48.00	\$9.65	\$18.40	\$0.00	\$76.05
	06/02/2025	\$49.50	\$9.65	\$18.40	\$0.00	\$77.55
	12/01/2025	\$51.00	\$9.65	\$18.40	\$0.00	\$79.05
	06/01/2026	\$52.55	\$9.65	\$18.40	\$0.00	\$80.60
	12/07/2026	\$54.05	\$9.65	\$18.40	\$0.00	\$82.10
	06/07/2027	\$55.65	\$9.65	\$18.40	\$0.00	\$83.70
	12/06/2027	\$57.25	\$9.65	\$18.40	\$0.00	\$85.30
	06/05/2028	\$58.93	\$9.65	\$18.40	\$0.00	\$86.98
	12/04/2028	\$60.60	\$9.65	\$18.40	\$0.00	\$88.65

For apprentice rates see "Apprentice- LABORER"

DEMO: BURNERS LABORERS - ZONE 2	12/02/2024	\$47.75	\$9.65	\$18.40	\$0.00	\$75.80
	06/02/2025	\$49.25	\$9.65	\$18.40	\$0.00	\$77.30
	12/01/2025	\$50.75	\$9.65	\$18.40	\$0.00	\$78.80
	06/01/2026	\$52.30	\$9.65	\$18.40	\$0.00	\$80.35
	12/07/2026	\$53.80	\$9.65	\$18.40	\$0.00	\$81.85
	06/07/2027	\$55.40	\$9.65	\$18.40	\$0.00	\$83.45
	12/06/2027	\$57.00	\$9.65	\$18.40	\$0.00	\$85.05
	06/05/2028	\$58.68	\$9.65	\$18.40	\$0.00	\$86.73
	12/04/2028	\$60.35	\$9.65	\$18.40	\$0.00	\$88.40

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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
City of Fall River Fall River DCM Facility Improvements - Phase I Project #25-25 For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 2	12/02/2024	\$48.00	\$9.65	\$18.40	\$0.00	\$76.05
	06/02/2025	\$49.50	\$9.65	\$18.40	\$0.00	\$77.55
	12/01/2025	\$51.00	\$9.65	\$18.40	\$0.00	\$79.05
	06/01/2026	\$52.55	\$9.65	\$18.40	\$0.00	\$80.60
	12/07/2026	\$54.05	\$9.65	\$18.40	\$0.00	\$82.10
	06/07/2027	\$55.65	\$9.65	\$18.40	\$0.00	\$83.70
	12/06/2027	\$57.25	\$9.65	\$18.40	\$0.00	\$85.30
	06/05/2028	\$58.93	\$9.65	\$18.40	\$0.00	\$86.98
	12/04/2028	\$60.60	\$9.65	\$18.40	\$0.00	\$88.65
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 2	12/02/2024	\$47.75	\$9.65	\$18.40	\$0.00	\$75.80
	06/02/2025	\$49.25	\$9.65	\$18.40	\$0.00	\$77.30
	12/01/2025	\$50.75	\$9.65	\$18.40	\$0.00	\$78.80
	06/01/2026	\$52.30	\$9.65	\$18.40	\$0.00	\$80.35
	12/07/2026	\$53.80	\$9.65	\$18.40	\$0.00	\$81.85
	06/07/2027	\$55.40	\$9.65	\$18.40	\$0.00	\$83.45
	12/06/2027	\$57.00	\$9.65	\$18.40	\$0.00	\$85.05
	06/05/2028	\$58.68	\$9.65	\$18.40	\$0.00	\$86.73
	12/04/2028	\$60.35	\$9.65	\$18.40	\$0.00	\$88.40
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER LABORERS - ZONE 2	12/02/2024	\$47.00	\$9.65	\$18.40	\$0.00	\$75.05
	06/02/2025	\$48.50	\$9.65	\$18.40	\$0.00	\$76.55
	12/01/2025	\$50.00	\$9.65	\$18.40	\$0.00	\$78.05
	06/01/2026	\$51.55	\$9.65	\$18.40	\$0.00	\$79.60
	12/07/2026	\$53.05	\$9.65	\$18.40	\$0.00	\$81.10
	06/07/2027	\$54.65	\$9.65	\$18.40	\$0.00	\$82.70
	12/06/2027	\$56.25	\$9.65	\$18.40	\$0.00	\$84.30
	06/05/2028	\$57.93	\$9.65	\$18.40	\$0.00	\$85.98
	12/04/2028	\$59.60	\$9.65	\$18.40	\$0.00	\$87.65
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR OPERATING ENGINEERS LOCAL 4	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2024	\$78.11	\$10.08	\$24.29	\$0.00	\$112.48
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Diver wage 70/80/90 2A \$69.83, 3A \$91.79,4A \$102.14 Total Rate						
DIVER TENDER PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2024	\$51.97	\$10.08	\$24.29	\$0.00	\$86.34
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Piledriver wage 70/80/90 2A \$54.20, 3A \$73.93,4A \$82.05 Total Rate						
DIVER TENDER (EFFLUENT) PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2024	\$83.69	\$10.08	\$24.29	\$0.00	\$118.06
For apprentice rates see "Apprentice- PILE DRIVER"						

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**Classification** Fall River DCM Facility Improvements - Phase I **Effective Date** **Base Wage** **Health** **Pension** **Supplemental Unemployment** **Total Rate**

**Project #25-25**  
 DIVER/SLURRY (EFFLUENT) 08/01/2024 \$117.16 \$10.08 \$24.29 \$0.00 \$151.53  
 PILE DRIVER LOCAL 56 (ZONE 2)

For apprentice rates see "Apprentice- PILE DRIVER"

DRAWBRIDGE OPERATOR (Construction) 07/01/2020 \$26.77 \$6.67 \$3.93 \$0.16 \$37.53  
 DRAWBRIDGE - SEIU LOCAL 888

ELECTRICIAN 09/01/2024 \$50.02 \$12.00 \$17.72 \$0.00 \$79.74  
 ELECTRICIANS LOCAL 223  
 09/01/2025 \$52.25 \$12.25 \$18.61 \$0.00 \$83.11  
 09/01/2026 \$54.72 \$12.50 \$19.56 \$0.00 \$86.78

**Apprentice - ELECTRICIAN - Local 223**

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.01	\$12.00	\$0.60	\$0.00	\$32.61
2	45	\$22.51	\$12.00	\$0.68	\$0.00	\$35.19
3	50	\$25.01	\$12.00	\$0.75	\$0.00	\$37.76
4	55	\$27.51	\$12.00	\$0.85	\$0.00	\$40.36
5	60	\$30.01	\$12.00	\$0.95	\$0.00	\$42.96
6	65	\$32.51	\$12.00	\$1.05	\$0.00	\$45.56
7	70	\$35.01	\$12.00	\$1.15	\$0.00	\$48.16
8	75	\$37.52	\$12.00	\$1.25	\$0.00	\$50.77

**Effective Date - 09/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.90	\$12.25	\$0.63	\$0.00	\$33.78
2	45	\$23.51	\$12.25	\$0.71	\$0.00	\$36.47
3	50	\$26.13	\$12.25	\$0.78	\$0.00	\$39.16
4	55	\$28.74	\$12.25	\$0.86	\$0.00	\$41.85
5	60	\$31.35	\$12.25	\$0.94	\$0.00	\$44.54
6	65	\$33.96	\$12.25	\$1.02	\$0.00	\$47.23
7	70	\$36.58	\$12.25	\$1.10	\$0.00	\$49.93
8	75	\$39.19	\$12.25	\$1.18	\$0.00	\$52.62

**Notes:**

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR 01/01/2022 \$65.62 \$16.03 \$20.21 \$0.00 \$101.86  
 ELEVATOR CONSTRUCTORS LOCAL 4

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**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.81	\$16.03	\$0.00	\$0.00	\$48.84
2	55	\$36.09	\$16.03	\$20.21	\$0.00	\$72.33
3	65	\$42.65	\$16.03	\$20.21	\$0.00	\$78.89
4	70	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
5	80	\$52.50	\$16.03	\$20.21	\$0.00	\$88.74

**Notes:**

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2024	\$51.78	\$15.30	\$16.40	\$0.00	\$83.48
	05/01/2025	\$53.22	\$15.30	\$16.40	\$0.00	\$84.92
	11/01/2025	\$54.51	\$15.30	\$16.40	\$0.00	\$86.21
	05/01/2026	\$55.95	\$15.30	\$16.40	\$0.00	\$87.65
	11/01/2026	\$57.24	\$15.30	\$16.40	\$0.00	\$88.94
	05/01/2027	\$58.67	\$15.30	\$16.40	\$0.00	\$90.37
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2024	\$53.37	\$15.30	\$16.40	\$0.00	\$85.07
	05/01/2025	\$54.82	\$15.30	\$16.40	\$0.00	\$86.52
	11/01/2025	\$56.12	\$15.30	\$16.40	\$0.00	\$87.82
	05/01/2026	\$57.57	\$15.30	\$16.40	\$0.00	\$89.27
	11/01/2026	\$58.87	\$15.30	\$16.40	\$0.00	\$90.57
	05/01/2027	\$60.32	\$15.30	\$16.40	\$0.00	\$92.02
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2024	\$25.37	\$15.30	\$16.40	\$0.00	\$57.07
	05/01/2025	\$26.22	\$15.30	\$16.40	\$0.00	\$57.92
	11/01/2025	\$26.98	\$15.30	\$16.40	\$0.00	\$58.68
	05/01/2026	\$27.83	\$15.30	\$16.40	\$0.00	\$59.53
	11/01/2026	\$28.59	\$15.30	\$16.40	\$0.00	\$60.29
	05/01/2027	\$29.44	\$15.30	\$16.40	\$0.00	\$61.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 223</i>	09/01/2024	\$50.02	\$12.00	\$17.72	\$0.00	\$79.74
	09/01/2025	\$52.25	\$12.25	\$18.61	\$0.00	\$83.11
	09/01/2026	\$54.72	\$12.50	\$19.56	\$0.00	\$86.78

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Project #25-25

For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE	09/01/2024	\$42.52	\$12.00	\$15.30	\$0.00	\$69.82
LOCAL 223 / COMMISSIONING ELECTRICIANS	09/01/2025	\$44.41	\$12.25	\$16.09	\$0.00	\$72.75
	09/01/2026	\$46.51	\$12.50	\$16.93	\$0.00	\$75.94

For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIREMAN (ASST. ENGINEER)	12/01/2024	\$45.96	\$15.55	\$16.50	\$0.00	\$78.01
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$47.02	\$15.55	\$16.50	\$0.00	\$79.07
	12/01/2025	\$48.19	\$15.55	\$16.50	\$0.00	\$80.24
	06/01/2026	\$49.25	\$15.55	\$16.50	\$0.00	\$81.30
	12/01/2026	\$50.43	\$15.55	\$16.50	\$0.00	\$82.48

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FLAGGER & SIGNALER (HEAVY & HIGHWAY)	12/01/2024	\$27.01	\$9.65	\$17.80	\$0.00	\$54.46
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	06/01/2025	\$28.09	\$9.65	\$17.80	\$0.00	\$55.54
	12/01/2025	\$28.09	\$9.65	\$17.80	\$0.00	\$55.54
	06/01/2026	\$29.21	\$9.65	\$17.80	\$0.00	\$56.66
	12/01/2026	\$29.21	\$9.65	\$17.80	\$0.00	\$56.66

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FLOORCOVERER	09/01/2024	\$56.23	\$8.83	\$20.27	\$0.00	\$85.33
FLOORCOVERERS LOCAL 2168 ZONE 1	03/01/2025	\$57.73	\$8.83	\$20.27	\$0.00	\$86.83
	09/01/2025	\$59.23	\$8.83	\$20.27	\$0.00	\$88.33
	03/01/2026	\$60.73	\$8.83	\$20.27	\$0.00	\$89.83
	09/01/2026	\$62.23	\$8.83	\$20.27	\$0.00	\$91.33
	03/01/2027	\$63.73	\$8.83	\$20.27	\$0.00	\$92.83

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**Apprentice - FLOORCOVERER - Local 2168 Zone I**

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$25.30	\$8.83	\$1.76	\$0.00	\$35.89
2	45	\$25.30	\$8.83	\$1.76	\$0.00	\$35.89
3	55	\$30.93	\$8.83	\$3.52	\$0.00	\$43.28
4	55	\$30.93	\$8.83	\$3.52	\$0.00	\$43.28
5	70	\$39.36	\$8.83	\$16.75	\$0.00	\$64.94
6	70	\$39.36	\$8.83	\$16.75	\$0.00	\$64.94
7	80	\$44.98	\$8.83	\$18.51	\$0.00	\$72.32
8	80	\$44.98	\$8.83	\$18.51	\$0.00	\$72.32

**Effective Date - 03/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$25.98	\$8.83	\$1.76	\$0.00	\$36.57
2	45	\$25.98	\$8.83	\$1.76	\$0.00	\$36.57
3	55	\$31.75	\$8.83	\$3.52	\$0.00	\$44.10
4	55	\$31.75	\$8.83	\$3.52	\$0.00	\$44.10
5	70	\$40.41	\$8.83	\$16.75	\$0.00	\$65.99
6	70	\$40.41	\$8.83	\$16.75	\$0.00	\$65.99
7	80	\$46.18	\$8.83	\$18.51	\$0.00	\$73.52
8	80	\$46.18	\$8.83	\$18.51	\$0.00	\$73.52

Notes: Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

FORK LIFT/CHERRY PICKER OPERATING ENGINEERS LOCAL 4	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GENERATOR/LIGHTING PLANT/HEATERS OPERATING ENGINEERS LOCAL 4	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) GLAZIERS LOCAL 1333	06/01/2020	\$39.18	\$10.80	\$10.45	\$0.00	\$60.43
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**Apprentice - GLAZIER - Local 1333**

**Effective Date - 06/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.59	\$10.80	\$1.80	\$0.00	\$32.19
2	56	\$22.04	\$10.80	\$1.80	\$0.00	\$34.64
3	63	\$24.49	\$10.80	\$2.45	\$0.00	\$37.74
4	69	\$26.94	\$10.80	\$2.45	\$0.00	\$40.19
5	75	\$29.39	\$10.80	\$3.15	\$0.00	\$43.34
6	81	\$31.83	\$10.80	\$3.15	\$0.00	\$45.78
7	88	\$34.28	\$10.80	\$10.45	\$0.00	\$55.53
8	94	\$36.73	\$10.80	\$10.45	\$0.00	\$57.98

Notes:

**Apprentice to Journeyworker Ratio:1:3**

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58

Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 12/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$31.37	\$0.00	\$0.00	\$0.00	\$31.37
2	60	\$34.22	\$15.55	\$16.50	\$0.00	\$66.27
3	65	\$37.07	\$15.55	\$16.50	\$0.00	\$69.12
4	70	\$39.92	\$15.55	\$16.50	\$0.00	\$71.97
5	75	\$42.77	\$15.55	\$16.50	\$0.00	\$74.82
6	80	\$45.62	\$15.55	\$16.50	\$0.00	\$77.67
7	85	\$48.48	\$15.55	\$16.50	\$0.00	\$80.53
8	90	\$51.33	\$15.55	\$16.50	\$0.00	\$83.38

**Effective Date - 06/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$32.08	\$0.00	\$0.00	\$0.00	\$32.08
2	60	\$35.00	\$15.55	\$16.50	\$0.00	\$67.05
3	65	\$37.91	\$15.55	\$16.50	\$0.00	\$69.96
4	70	\$40.83	\$15.55	\$16.50	\$0.00	\$72.88
5	75	\$43.75	\$15.55	\$16.50	\$0.00	\$75.80
6	80	\$46.66	\$15.55	\$16.50	\$0.00	\$78.71
7	85	\$49.58	\$15.55	\$16.50	\$0.00	\$81.63
8	90	\$52.50	\$15.55	\$16.50	\$0.00	\$84.55

**Notes:**

**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - B	10/01/2024	\$42.33	\$14.59	\$19.04	\$2.24	\$78.20
	04/01/2025	\$43.83	\$14.59	\$19.04	\$2.24	\$79.70
	10/01/2025	\$45.08	\$14.59	\$19.04	\$2.24	\$80.95
	04/01/2026	\$46.58	\$14.59	\$19.04	\$2.24	\$82.45

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 223	09/01/2024	\$50.02	\$12.00	\$17.72	\$0.00	\$79.74
	09/01/2025	\$52.25	\$12.25	\$18.61	\$0.00	\$83.11
	09/01/2026	\$54.72	\$12.50	\$19.56	\$0.00	\$86.78

For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - B	10/01/2024	\$42.33	\$30.43	\$19.04	\$2.24	\$94.04
	04/01/2025	\$43.83	\$30.43	\$19.04	\$2.24	\$95.54
	10/01/2025	\$45.08	\$30.43	\$19.04	\$2.24	\$96.79
	04/01/2026	\$46.58	\$30.43	\$19.04	\$2.24	\$98.29

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (TESTING AND BALANCING - WATER) PLUMBERS & PIPEFITTERS LOCAL 51	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

Last Modified: 02/12/2025 at 8:17PM EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Project #25-25</b>						
HVAC MECHANIC PLUMBERS & PIPEFITTERS LOCAL 51	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS LABORERS - ZONE 2	12/01/2024	\$40.61	\$9.65	\$17.70	\$0.00	\$67.96
	06/01/2025	\$42.00	\$9.65	\$17.70	\$0.00	\$69.35
	12/01/2025	\$43.38	\$9.65	\$17.70	\$0.00	\$70.73
	06/01/2026	\$44.82	\$9.65	\$17.70	\$0.00	\$72.17
	12/01/2026	\$46.26	\$9.65	\$17.70	\$0.00	\$73.61
	06/01/2027	\$47.71	\$9.65	\$17.70	\$0.00	\$75.06
	12/01/2027	\$49.16	\$9.65	\$17.70	\$0.00	\$76.51
	06/01/2028	\$50.66	\$9.65	\$17.70	\$0.00	\$78.01
	12/01/2028	\$52.16	\$9.65	\$17.70	\$0.00	\$79.51
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)	09/01/2024	\$51.23	\$14.75	\$19.61	\$0.00	\$85.59
	09/01/2025	\$54.31	\$14.75	\$19.61	\$0.00	\$88.67
	09/01/2026	\$57.38	\$14.75	\$19.61	\$0.00	\$91.74

**Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Southern MA**

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.62	\$14.75	\$14.32	\$0.00	\$54.69
2	60	\$30.74	\$14.75	\$15.37	\$0.00	\$60.86
3	70	\$35.86	\$14.75	\$16.43	\$0.00	\$67.04
4	80	\$40.98	\$14.75	\$17.49	\$0.00	\$73.22

**Effective Date - 09/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.16	\$14.75	\$14.32	\$0.00	\$56.23
2	60	\$32.59	\$14.75	\$15.37	\$0.00	\$62.71
3	70	\$38.02	\$14.75	\$16.43	\$0.00	\$69.20
4	80	\$43.45	\$14.75	\$17.49	\$0.00	\$75.69

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER IRONWORKERS LOCAL 37	03/16/2021	\$42.46	\$7.70	\$17.10	\$0.00	\$67.26
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**Apprentice - IRONWORKER - Local 37**

Effective Date - 03/16/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	70	\$29.72	\$7.70	\$17.10	\$0.00	\$54.52
2	75	\$31.85	\$7.70	\$17.10	\$0.00	\$56.65
3	80	\$33.97	\$7.70	\$17.10	\$0.00	\$58.77
4	85	\$36.09	\$7.70	\$17.10	\$0.00	\$60.89
5	90	\$38.21	\$7.70	\$17.10	\$0.00	\$63.01
6	95	\$40.34	\$7.70	\$17.10	\$0.00	\$65.14

Notes:

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01
For apprentice rates see "Apprentice- LABORER"						
LABORER LABORERS - ZONE 2	12/01/2024	\$39.86	\$9.65	\$17.70	\$0.00	\$67.21
	06/01/2025	\$41.25	\$9.65	\$17.70	\$0.00	\$68.60
	12/01/2025	\$42.63	\$9.65	\$17.70	\$0.00	\$69.98
	06/01/2026	\$44.07	\$9.65	\$17.70	\$0.00	\$71.42
	12/01/2026	\$45.51	\$9.65	\$17.70	\$0.00	\$72.86
	06/01/2027	\$46.96	\$9.65	\$17.70	\$0.00	\$74.31
	12/01/2027	\$48.41	\$9.65	\$17.70	\$0.00	\$75.76
	06/01/2028	\$49.91	\$9.65	\$17.70	\$0.00	\$77.26
	12/01/2028	\$51.41	\$9.65	\$17.70	\$0.00	\$78.76

Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - LABORER - Zone 2**

**Effective Date - 12/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.92	\$9.65	\$17.70	\$0.00	\$51.27
2	70	\$27.90	\$9.65	\$17.70	\$0.00	\$55.25
3	80	\$31.89	\$9.65	\$17.70	\$0.00	\$59.24
4	90	\$35.87	\$9.65	\$17.70	\$0.00	\$63.22

**Effective Date - 06/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$24.75	\$9.65	\$17.70	\$0.00	\$52.10
2	70	\$28.88	\$9.65	\$17.70	\$0.00	\$56.23
3	80	\$33.00	\$9.65	\$17.70	\$0.00	\$60.35
4	90	\$37.13	\$9.65	\$17.70	\$0.00	\$64.48

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER (HEAVY & HIGHWAY)	12/01/2024	\$39.86	\$9.65	\$17.80	\$0.00	\$67.31
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	06/01/2025	\$41.25	\$9.65	\$17.80	\$0.00	\$68.70
	12/01/2025	\$42.63	\$9.65	\$17.80	\$0.00	\$70.08
	06/01/2026	\$44.07	\$9.65	\$17.80	\$0.00	\$71.52
	12/01/2026	\$45.51	\$9.65	\$17.80	\$0.00	\$72.96

**Apprentice - LABORER (Heavy & Highway) - Zone 2**

**Effective Date - 12/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.92	\$9.65	\$17.80	\$0.00	\$51.37
2	70	\$27.90	\$9.65	\$17.80	\$0.00	\$55.35
3	80	\$31.89	\$9.65	\$17.80	\$0.00	\$59.34
4	90	\$35.87	\$9.65	\$17.80	\$0.00	\$63.32

**Effective Date - 06/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$24.75	\$9.65	\$17.80	\$0.00	\$52.20
2	70	\$28.88	\$9.65	\$17.80	\$0.00	\$56.33
3	80	\$33.00	\$9.65	\$17.80	\$0.00	\$60.45
4	90	\$37.13	\$9.65	\$17.80	\$0.00	\$64.58

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

Last Modified: 02/12/2025 at 8:17PM/EST

Classification: Fall River DCM Facility Improvements - Phase I Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Project #25-25

LABORER: CARPENTER TENDER  
LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$39.86	\$9.65	\$17.70	\$0.00	\$67.21
06/01/2025	\$41.25	\$9.65	\$17.70	\$0.00	\$68.60
12/01/2025	\$42.63	\$9.65	\$17.70	\$0.00	\$69.98
06/01/2026	\$44.07	\$9.65	\$17.70	\$0.00	\$71.42
12/01/2026	\$45.51	\$9.65	\$17.70	\$0.00	\$72.86
06/01/2027	\$46.96	\$9.65	\$17.70	\$0.00	\$74.31
12/01/2027	\$48.41	\$9.65	\$17.70	\$0.00	\$75.76
06/01/2028	\$49.91	\$9.65	\$17.70	\$0.00	\$77.26
12/01/2028	\$51.41	\$9.65	\$17.70	\$0.00	\$78.76

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER  
LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$39.86	\$9.65	\$17.70	\$0.00	\$67.21
06/01/2025	\$41.25	\$9.65	\$17.70	\$0.00	\$68.60
12/01/2025	\$42.63	\$9.65	\$17.70	\$0.00	\$69.98
06/01/2026	\$44.07	\$9.65	\$17.70	\$0.00	\$71.42
12/01/2026	\$45.51	\$9.65	\$17.70	\$0.00	\$72.86
06/01/2027	\$46.96	\$9.65	\$17.70	\$0.00	\$74.31
12/01/2027	\$48.41	\$9.65	\$17.70	\$0.00	\$75.76
06/01/2028	\$49.91	\$9.65	\$17.70	\$0.00	\$77.26
12/01/2028	\$51.41	\$9.65	\$17.70	\$0.00	\$78.76

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER  
LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/02/2024	\$39.95	\$9.65	\$17.76	\$0.00	\$67.36
06/02/2025	\$41.34	\$9.65	\$17.76	\$0.00	\$68.75
12/01/2025	\$42.72	\$9.65	\$17.76	\$0.00	\$70.13
06/01/2026	\$44.16	\$9.65	\$17.76	\$0.00	\$71.57
12/07/2026	\$45.60	\$9.65	\$17.76	\$0.00	\$73.01
06/07/2027	\$47.05	\$9.65	\$17.76	\$0.00	\$74.46
12/06/2027	\$48.50	\$9.65	\$17.76	\$0.00	\$75.91
06/05/2028	\$50.00	\$9.65	\$17.76	\$0.00	\$77.41
12/04/2028	\$51.50	\$9.65	\$17.76	\$0.00	\$78.91

For apprentice rates see "Apprentice- LABORER"

LABORER: MASON TENDER  
LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

LABORER: MASON TENDER (HEAVY & HIGHWAY)  
LABORERS - ZONE 2 (HEAVY & HIGHWAY)

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

Last Modified: 02/12/2025 at 8:17PM/EST

**Classification** Fall River DCM Facility Improvements - Phase I **Effective Date** **Base Wage** **Health** **Pension** **Supplemental Unemployment** **Total Rate**

**Project #25-25**

LABORER: MULTI-TRADE TENDER

LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$39.86	\$9.65	\$17.70	\$0.00	\$67.21
06/01/2025	\$41.25	\$9.65	\$17.70	\$0.00	\$68.60
12/01/2025	\$42.63	\$9.65	\$17.70	\$0.00	\$69.98
06/01/2026	\$44.07	\$9.65	\$17.70	\$0.00	\$71.42
12/01/2026	\$45.51	\$9.65	\$17.70	\$0.00	\$72.86
06/01/2027	\$46.96	\$9.65	\$17.70	\$0.00	\$74.31
12/01/2027	\$48.41	\$9.65	\$17.70	\$0.00	\$75.76
06/01/2028	\$49.91	\$9.65	\$17.70	\$0.00	\$77.26
12/01/2028	\$51.41	\$9.65	\$17.70	\$0.00	\$78.76

For apprentice rates see "Apprentice- LABORER"

LABORER: TREE REMOVER

LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$39.86	\$9.65	\$17.70	\$0.00	\$67.21
06/01/2025	\$41.25	\$9.65	\$17.70	\$0.00	\$68.60
12/01/2025	\$42.63	\$9.65	\$17.70	\$0.00	\$69.98
06/01/2026	\$44.07	\$9.65	\$17.70	\$0.00	\$71.42
12/01/2026	\$45.51	\$9.65	\$17.70	\$0.00	\$72.86
06/01/2027	\$46.96	\$9.65	\$17.70	\$0.00	\$74.31
12/01/2027	\$48.41	\$9.65	\$17.70	\$0.00	\$75.76
06/01/2028	\$49.91	\$9.65	\$17.70	\$0.00	\$77.26
12/01/2028	\$51.41	\$9.65	\$17.70	\$0.00	\$78.76

This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"

LASER BEAM OPERATOR

LABORERS - ZONE 2

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

LASER BEAM OPERATOR (HEAVY & HIGHWAY)

LABORERS - ZONE 2 (HEAVY & HIGHWAY)

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

MARBLE & TILE FINISHERS

BRICKLAYERS LOCAL 3 - MARBLE & TILE

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
02/01/2025	\$50.36	\$11.49	\$21.62	\$0.00	\$83.47
08/01/2025	\$52.08	\$11.49	\$21.62	\$0.00	\$85.19
02/01/2026	\$53.16	\$11.49	\$21.62	\$0.00	\$86.27
08/01/2026	\$54.92	\$11.49	\$21.62	\$0.00	\$88.03
02/01/2027	\$56.04	\$11.49	\$21.62	\$0.00	\$89.15

Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.18	\$11.49	\$21.62	\$0.00	\$58.29
2	60	\$30.22	\$11.49	\$21.62	\$0.00	\$63.33
3	70	\$35.25	\$11.49	\$21.62	\$0.00	\$68.36
4	80	\$40.29	\$11.49	\$21.62	\$0.00	\$73.40
5	90	\$45.32	\$11.49	\$21.62	\$0.00	\$78.43

**Effective Date - 08/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.04	\$11.49	\$21.62	\$0.00	\$59.15
2	60	\$31.25	\$11.49	\$21.62	\$0.00	\$64.36
3	70	\$36.46	\$11.49	\$21.62	\$0.00	\$69.57
4	80	\$41.66	\$11.49	\$21.62	\$0.00	\$74.77
5	90	\$46.87	\$11.49	\$21.62	\$0.00	\$79.98

**Notes:**

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**Apprentice to Journeyworker Ratio:1:3**

MARBLE MASONS, TILELAYERS & TERRAZZO MECH	02/01/2025	\$65.82	\$11.49	\$23.56	\$0.00	\$100.87
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2025	\$67.97	\$11.49	\$23.56	\$0.00	\$103.02
	02/01/2026	\$69.32	\$11.49	\$23.56	\$0.00	\$104.37
	08/01/2026	\$71.52	\$11.49	\$23.56	\$0.00	\$106.57
	02/01/2027	\$72.92	\$11.49	\$23.56	\$0.00	\$107.97

Last Modified: 02/12/2025 at 8:17PM EST



**Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile**

**Effective Date - 02/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.91	\$11.49	\$23.56	\$0.00	\$67.96
2	60	\$39.49	\$11.49	\$23.56	\$0.00	\$74.54
3	70	\$46.07	\$11.49	\$23.56	\$0.00	\$81.12
4	80	\$52.66	\$11.49	\$23.56	\$0.00	\$87.71
5	90	\$59.24	\$11.49	\$23.56	\$0.00	\$94.29

**Effective Date - 08/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.99	\$11.49	\$23.56	\$0.00	\$69.04
2	60	\$40.78	\$11.49	\$23.56	\$0.00	\$75.83
3	70	\$47.58	\$11.49	\$23.56	\$0.00	\$82.63
4	80	\$54.38	\$11.49	\$23.56	\$0.00	\$89.43
5	90	\$61.17	\$11.49	\$23.56	\$0.00	\$96.22

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES) OPERATING ENGINEERS LOCAL 4	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE OPERATING ENGINEERS LOCAL 4	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 2) MILLWRIGHTS LOCAL 1121 - Zone 2	01/06/2025	\$45.09	\$10.08	\$21.47	\$0.00	\$76.64
	01/05/2026	\$47.42	\$10.08	\$21.47	\$0.00	\$78.97

Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - MILLWRIGHT - Local 1121 Zone 2**

**Effective Date - 01/06/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.80	\$10.08	\$5.50	\$0.00	\$40.38
2	65	\$29.31	\$10.08	\$6.50	\$0.00	\$45.89
3	75	\$33.82	\$10.08	\$18.97	\$0.00	\$62.87
4	85	\$38.33	\$10.08	\$19.97	\$0.00	\$68.38

**Effective Date - 01/05/2026**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$26.08	\$10.08	\$5.50	\$0.00	\$41.66
2	65	\$30.82	\$10.08	\$6.50	\$0.00	\$47.40
3	75	\$35.57	\$10.08	\$18.97	\$0.00	\$64.62
4	85	\$40.31	\$10.08	\$19.97	\$0.00	\$70.36

**Notes:** Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66)  
 Steps are 2,000 hours

**Apprentice to Journeyworker Ratio:1:4**

<b>MORTAR MIXER LABORERS - ZONE 2</b>	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

<b>OILER (OTHER THAN TRUCK CRANES,GRADALLS) OPERATING ENGINEERS LOCAL 4</b>	12/01/2024	\$25.37	\$15.30	\$16.40	\$0.00	\$57.07
	06/01/2025	\$25.97	\$15.30	\$16.40	\$0.00	\$57.67
	12/01/2025	\$26.63	\$15.30	\$16.40	\$0.00	\$58.33
	06/01/2026	\$27.22	\$15.30	\$16.40	\$0.00	\$58.92
	12/01/2026	\$27.89	\$15.30	\$16.40	\$0.00	\$59.59

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OILER (TRUCK CRANES, GRADALLS) OPERATING ENGINEERS LOCAL 4</b>	12/01/2024	\$31.08	\$15.30	\$16.40	\$0.00	\$62.78
	06/01/2025	\$31.80	\$15.30	\$16.40	\$0.00	\$63.50
	12/01/2025	\$32.60	\$15.30	\$16.40	\$0.00	\$64.30
	06/01/2026	\$33.32	\$15.30	\$16.40	\$0.00	\$65.02
	12/01/2026	\$34.12	\$15.30	\$16.40	\$0.00	\$65.82

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Last Modified: 02/12/2025 at 8:17PM/EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36
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**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.23	\$9.95	\$0.00	\$0.00	\$39.18
2	55	\$32.15	\$9.95	\$6.66	\$0.00	\$48.76
3	60	\$35.08	\$9.95	\$7.26	\$0.00	\$52.29
4	65	\$38.00	\$9.95	\$7.87	\$0.00	\$55.82
5	70	\$40.92	\$9.95	\$20.32	\$0.00	\$71.19
6	75	\$43.85	\$9.95	\$20.93	\$0.00	\$74.73
7	80	\$46.77	\$9.95	\$21.53	\$0.00	\$78.25
8	90	\$52.61	\$9.95	\$22.74	\$0.00	\$85.30

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2025	\$49.36	\$9.95	\$23.95	\$0.00	\$83.26
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\* If 30% or more of surfaces to be painted are new construction,  
NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New**

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.68	\$9.95	\$0.00	\$0.00	\$34.63
2	55	\$27.15	\$9.95	\$6.66	\$0.00	\$43.76
3	60	\$29.62	\$9.95	\$7.26	\$0.00	\$46.83
4	65	\$32.08	\$9.95	\$7.87	\$0.00	\$49.90
5	70	\$34.55	\$9.95	\$20.32	\$0.00	\$64.82
6	75	\$37.02	\$9.95	\$20.93	\$0.00	\$67.90
7	80	\$39.49	\$9.95	\$21.53	\$0.00	\$70.97
8	90	\$44.42	\$9.95	\$22.74	\$0.00	\$77.11

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

Last Modified: 02/12/2025 at 8:17PM EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER (SPRAY OR SANDBLAST, REPAINT) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$47.42	\$9.95	\$23.95	\$0.00	\$81.32

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**

**Effective Date - 01/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.71	\$9.95	\$0.00	\$0.00	\$33.66
2	55	\$26.08	\$9.95	\$6.66	\$0.00	\$42.69
3	60	\$28.45	\$9.95	\$7.26	\$0.00	\$45.66
4	65	\$30.82	\$9.95	\$7.87	\$0.00	\$48.64
5	70	\$33.19	\$9.95	\$20.32	\$0.00	\$63.46
6	75	\$35.57	\$9.95	\$20.93	\$0.00	\$66.45
7	80	\$37.94	\$9.95	\$21.53	\$0.00	\$69.42
8	90	\$42.68	\$9.95	\$22.74	\$0.00	\$75.37

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$47.96	\$9.95	\$23.95	\$0.00	\$81.86
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**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**

**Effective Date - 01/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.98	\$9.95	\$0.00	\$0.00	\$33.93
2	55	\$26.38	\$9.95	\$6.66	\$0.00	\$42.99
3	60	\$28.78	\$9.95	\$7.26	\$0.00	\$45.99
4	65	\$31.17	\$9.95	\$7.87	\$0.00	\$48.99
5	70	\$33.57	\$9.95	\$20.32	\$0.00	\$63.84
6	75	\$35.97	\$9.95	\$20.93	\$0.00	\$66.85
7	80	\$38.37	\$9.95	\$21.53	\$0.00	\$69.85
8	90	\$43.16	\$9.95	\$22.74	\$0.00	\$75.85

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, REPAINT) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$46.02	\$9.95	\$23.95	\$0.00	\$79.92
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Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**

**Effective Date - 01/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.01	\$9.95	\$0.00	\$0.00	\$32.96
2	55	\$25.31	\$9.95	\$6.66	\$0.00	\$41.92
3	60	\$27.61	\$9.95	\$7.26	\$0.00	\$44.82
4	65	\$29.91	\$9.95	\$7.87	\$0.00	\$47.73
5	70	\$32.21	\$9.95	\$20.32	\$0.00	\$62.48
6	75	\$34.52	\$9.95	\$20.93	\$0.00	\$65.40
7	80	\$36.82	\$9.95	\$21.53	\$0.00	\$68.30
8	90	\$41.42	\$9.95	\$22.74	\$0.00	\$74.11

**Notes:**  
 Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY)	12/01/2024	\$39.86	\$9.65	\$17.80	\$0.00	\$67.31
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	06/01/2025	\$41.25	\$9.65	\$17.80	\$0.00	\$68.70
	12/01/2025	\$42.63	\$9.65	\$17.80	\$0.00	\$70.08
	06/01/2026	\$44.07	\$9.65	\$17.80	\$0.00	\$71.52
	12/01/2026	\$45.51	\$9.65	\$17.80	\$0.00	\$72.96
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER	01/01/2025	\$39.78	\$15.57	\$20.17	\$0.00	\$75.52
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2025	\$40.78	\$15.57	\$20.17	\$0.00	\$76.52
	12/01/2025	\$40.78	\$15.57	\$21.78	\$0.00	\$78.13
	01/01/2026	\$40.78	\$16.17	\$21.78	\$0.00	\$78.73
	06/01/2026	\$41.78	\$16.17	\$21.78	\$0.00	\$79.73
	12/01/2026	\$41.78	\$16.17	\$23.52	\$0.00	\$81.47
	01/01/2027	\$41.78	\$16.77	\$23.52	\$0.00	\$82.07
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2024	\$51.97	\$10.08	\$24.29	\$0.00	\$86.34
PILE DRIVER LOCAL 56 (ZONE 2)	For apprentice rates see "Apprentice- PILE DRIVER"					
PILE DRIVER	08/01/2024	\$51.97	\$10.08	\$24.29	\$0.00	\$86.34
PILE DRIVER LOCAL 56 (ZONE 2)						

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**Apprentice - PILE DRIVER - Local 56 Zone 2**

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$23.39	\$10.08	\$2.53	\$0.00	\$36.00
2	55	\$28.58	\$10.08	\$5.07	\$0.00	\$43.73
3	70	\$36.38	\$10.08	\$19.22	\$0.00	\$65.68
4	80	\$41.58	\$10.08	\$21.76	\$0.00	\$73.42

**Notes:**  
 % Indentured BEFORE 8/1/2020, 50/60/70/75/80/80/90/90  
 Step 1 \$60.36/2 \$65.75/3 \$70.75/4 \$73.35/5&6 \$75.95/7&8 81.14

**Apprentice to Journeyworker Ratio:1:5**

PIPELAYER LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01

For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

PLUMBER & PIPEFITTER PLUMBERS & PIPEFITTERS LOCAL 51	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59

Last Modified: 02/12/2025 at 8:17PM EST

**Apprentice - PLUMBER/PIPEFITTER - Local 51**

**Effective Date - 08/26/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$21.90	\$10.15	\$2.50	\$0.00	\$34.55
2	50	\$27.37	\$10.15	\$2.50	\$0.00	\$40.02
3	60	\$32.84	\$10.15	\$8.80	\$0.00	\$51.79
4	70	\$38.32	\$10.15	\$14.08	\$0.00	\$62.55
5	80	\$43.79	\$10.15	\$17.60	\$0.00	\$71.54

**Effective Date - 08/25/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$23.00	\$10.15	\$2.50	\$0.00	\$35.65
2	50	\$28.75	\$10.15	\$2.50	\$0.00	\$41.40
3	60	\$34.49	\$10.15	\$8.80	\$0.00	\$53.44
4	70	\$40.24	\$10.15	\$14.08	\$0.00	\$64.47
5	80	\$45.99	\$10.15	\$17.60	\$0.00	\$73.74

**Notes:**  
 Steps 2000hrs. Prior 9/1/05; 40/40/45/50/55/60/65/75/80/85

**Apprentice to Journeyworker Ratio:1:3**

PNEUMATIC CONTROLS (TEMP.) PLUMBERS & PIPEFITTERS LOCAL 51	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR LABORERS - ZONE 2	12/01/2024	\$40.61	\$9.65	\$17.70	\$0.00	\$67.96
	06/01/2025	\$42.00	\$9.65	\$17.70	\$0.00	\$69.35
	12/01/2025	\$43.38	\$9.65	\$17.70	\$0.00	\$70.73
	06/01/2026	\$44.82	\$9.65	\$17.70	\$0.00	\$72.17
	12/01/2026	\$46.26	\$9.65	\$17.70	\$0.00	\$73.61
	06/01/2027	\$47.71	\$9.65	\$17.70	\$0.00	\$75.06
	12/01/2027	\$49.16	\$9.65	\$17.70	\$0.00	\$76.51
	06/01/2028	\$50.66	\$9.65	\$17.70	\$0.00	\$78.01
	12/01/2028	\$52.16	\$9.65	\$17.70	\$0.00	\$79.51

For apprentice rates see "Apprentice- LABORER"

PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

Last Modified: 02/12/2025 at 8:17PM EST

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Fall River DCM Facility Improvements - Phase I</b>						
<b>Project #25-25</b>						
<b>POWDERMAN &amp; BLASTER</b>	12/01/2024	\$40.86	\$9.65	\$17.70	\$0.00	\$68.21
<i>LABORERS - ZONE 2</i>	06/01/2025	\$42.25	\$9.65	\$17.70	\$0.00	\$69.60
	12/01/2025	\$43.63	\$9.65	\$17.70	\$0.00	\$70.98
	06/01/2026	\$45.07	\$9.65	\$17.70	\$0.00	\$72.42
	12/01/2026	\$46.51	\$9.65	\$17.70	\$0.00	\$73.86
	06/01/2027	\$47.96	\$9.65	\$17.70	\$0.00	\$75.31
	12/01/2027	\$49.41	\$9.65	\$17.70	\$0.00	\$76.76
	06/01/2028	\$50.91	\$9.65	\$17.70	\$0.00	\$78.26
	12/01/2028	\$52.41	\$9.65	\$17.70	\$0.00	\$79.76
For apprentice rates see "Apprentice- LABORER"						
<b>POWDERMAN &amp; BLASTER (HEAVY &amp; HIGHWAY)</b>	12/01/2024	\$40.86	\$9.40	\$17.55	\$0.00	\$67.81
<i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	06/01/2025	\$42.25	\$9.40	\$17.55	\$0.00	\$69.20
	12/01/2025	\$43.63	\$9.40	\$17.55	\$0.00	\$70.58
	06/01/2026	\$45.07	\$9.40	\$17.55	\$0.00	\$72.02
	12/01/2026	\$46.51	\$9.40	\$17.55	\$0.00	\$73.46
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
<b>POWER SHOVEL/DERRICK/TRENCHING MACHINE</b>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>PUMP OPERATOR (CONCRETE)</b>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>PUMP OPERATOR (DEWATERING, OTHER)</b>	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>READY-MIX CONCRETE DRIVER</b>	01/01/2025	\$27.60	\$11.26	\$6.15	\$0.00	\$45.01
<i>TEAMSTERS 170 - Dauphinis (Bellingham)</i>						
<b>RECLAIMERS</b>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Last Modified: 02/12/2025 at 8:17PM EST



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25 RIDE-ON MOTORIZED BUGGY OPERATOR LABORERS - ZONE 2	12/01/2024	\$40.11	\$9.65	\$17.70	\$0.00	\$67.46
	06/01/2025	\$41.50	\$9.65	\$17.70	\$0.00	\$68.85
	12/01/2025	\$42.88	\$9.65	\$17.70	\$0.00	\$70.23
	06/01/2026	\$44.32	\$9.65	\$17.70	\$0.00	\$71.67
	12/01/2026	\$45.76	\$9.65	\$17.70	\$0.00	\$73.11
	06/01/2027	\$47.21	\$9.65	\$17.70	\$0.00	\$74.56
	12/01/2027	\$48.66	\$9.65	\$17.70	\$0.00	\$76.01
	06/01/2028	\$50.16	\$9.65	\$17.70	\$0.00	\$77.51
	12/01/2028	\$51.66	\$9.65	\$17.70	\$0.00	\$79.01
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE OPERATING ENGINEERS LOCAL 4	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofing Waterproofing &Roofing Damproofg) ROOFERS LOCAL 33	02/01/2025	\$52.28	\$13.03	\$21.70	\$0.00	\$87.01
	08/01/2025	\$53.78	\$13.03	\$21.70	\$0.00	\$88.51
	02/01/2026	\$55.03	\$13.03	\$21.70	\$0.00	\$89.76

**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.14	\$13.03	\$15.55	\$0.00	\$54.72
2	60	\$31.37	\$13.03	\$21.70	\$0.00	\$66.10
3	65	\$33.98	\$13.03	\$21.70	\$0.00	\$68.71
4	75	\$39.21	\$13.03	\$21.70	\$0.00	\$73.94
5	85	\$44.44	\$13.03	\$21.70	\$0.00	\$79.17

**Effective Date - 08/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.89	\$13.03	\$15.55	\$0.00	\$55.47
2	60	\$32.27	\$13.03	\$21.70	\$0.00	\$67.00
3	65	\$34.96	\$13.03	\$21.70	\$0.00	\$69.69
4	75	\$40.34	\$13.03	\$21.70	\$0.00	\$75.07
5	85	\$45.71	\$13.03	\$21.70	\$0.00	\$80.44

**Notes:** \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1  
 Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.  
 (Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

**Apprentice to Journeyworker Ratio:\*\***

ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 33	02/01/2025	\$52.53	\$13.03	\$21.70	\$0.00	\$87.26
	08/01/2025	\$54.03	\$13.03	\$21.70	\$0.00	\$88.76
	02/01/2026	\$55.28	\$13.03	\$21.70	\$0.00	\$90.01

For apprentice rates see "Apprentice- ROOFER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25 SHEETMETAL WORKER	10/01/2024	\$42.33	\$14.59	\$19.04	\$2.24	\$78.20
SHEETMETAL WORKERS LOCAL 17 - B	04/01/2025	\$43.83	\$14.59	\$19.04	\$2.24	\$79.70
	10/01/2025	\$45.08	\$14.59	\$19.04	\$2.24	\$80.95
	04/01/2026	\$46.58	\$14.59	\$19.04	\$2.24	\$82.45

**Apprentice - SHEET METAL WORKER - Local 17-B**

**Effective Date - 10/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.93	\$14.59	\$4.18	\$1.09	\$36.79
2	45	\$19.05	\$14.59	\$4.71	\$1.17	\$39.52
3	50	\$21.17	\$14.59	\$11.84	\$1.45	\$49.05
4	55	\$23.28	\$14.59	\$11.84	\$1.52	\$51.23
5	60	\$25.40	\$14.59	\$15.53	\$1.64	\$57.16
6	65	\$27.51	\$14.59	\$15.84	\$1.71	\$59.65
7	70	\$29.63	\$14.59	\$16.15	\$1.78	\$62.15
8	75	\$31.75	\$14.59	\$16.45	\$1.86	\$64.65
9	80	\$33.86	\$14.59	\$16.76	\$1.93	\$67.14
10	85	\$35.98	\$14.59	\$17.07	\$2.00	\$69.64

**Effective Date - 04/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.53	\$14.59	\$4.18	\$1.09	\$37.39
2	45	\$19.72	\$14.59	\$4.71	\$1.17	\$40.19
3	50	\$21.92	\$14.59	\$11.84	\$1.45	\$49.80
4	55	\$24.11	\$14.59	\$11.84	\$1.52	\$52.06
5	60	\$26.30	\$14.59	\$15.53	\$1.64	\$58.06
6	65	\$28.49	\$14.59	\$15.84	\$1.71	\$60.63
7	70	\$30.68	\$14.59	\$16.15	\$1.78	\$63.20
8	75	\$32.87	\$14.59	\$16.45	\$1.86	\$65.77
9	80	\$35.06	\$14.59	\$16.76	\$1.93	\$68.34
10	85	\$37.26	\$14.59	\$17.07	\$2.00	\$70.92

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25 SPECIALIZED EARTH MOVING EQUIP > 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	01/01/2025	\$40.53	\$15.57	\$20.17	\$0.00	\$76.27
	06/01/2025	\$41.53	\$15.57	\$20.17	\$0.00	\$77.27
	12/01/2025	\$41.53	\$15.57	\$21.78	\$0.00	\$78.88
	01/01/2026	\$41.53	\$16.17	\$21.78	\$0.00	\$79.48
	06/01/2026	\$42.53	\$16.17	\$21.78	\$0.00	\$80.48
	12/01/2026	\$42.53	\$16.17	\$23.52	\$0.00	\$82.22
	01/01/2027	\$42.53	\$16.77	\$23.52	\$0.00	\$82.82
SPRINKLER FITTER SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2	10/01/2024	\$63.31	\$11.51	\$23.80	\$0.00	\$98.62
	03/01/2025	\$64.93	\$11.51	\$23.80	\$0.00	\$100.24

**Apprentice - SPRINKLER FITTER - Local 550 (Section B) Zone 2**

**Effective Date - 10/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$22.16	\$11.51	\$13.07	\$0.00	\$46.74
2	40	\$25.32	\$11.51	\$13.90	\$0.00	\$50.73
3	45	\$28.49	\$11.51	\$14.72	\$0.00	\$54.72
4	50	\$31.66	\$11.51	\$15.55	\$0.00	\$58.72
5	55	\$34.82	\$11.51	\$16.38	\$0.00	\$62.71
6	60	\$37.99	\$11.51	\$17.20	\$0.00	\$66.70
7	65	\$41.15	\$11.51	\$18.03	\$0.00	\$70.69
8	70	\$44.32	\$11.51	\$18.85	\$0.00	\$74.68
9	75	\$47.48	\$11.51	\$19.68	\$0.00	\$78.67
10	80	\$50.65	\$11.51	\$20.50	\$0.00	\$82.66

**Effective Date - 03/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$22.73	\$11.51	\$13.07	\$0.00	\$47.31
2	40	\$25.97	\$11.51	\$13.90	\$0.00	\$51.38
3	45	\$29.22	\$11.51	\$14.72	\$0.00	\$55.45
4	50	\$32.47	\$11.51	\$15.55	\$0.00	\$59.53
5	55	\$35.71	\$11.51	\$16.38	\$0.00	\$63.60
6	60	\$38.96	\$11.51	\$17.20	\$0.00	\$67.67
7	65	\$42.20	\$11.51	\$18.03	\$0.00	\$71.74
8	70	\$45.45	\$11.51	\$18.85	\$0.00	\$75.81
9	75	\$48.70	\$11.51	\$19.68	\$0.00	\$79.89
10	80	\$51.94	\$11.51	\$20.50	\$0.00	\$83.95

**Notes:** Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 223</i>	09/01/2024	\$40.69	\$11.75	\$14.53	\$0.00	\$66.97
	09/01/2025	\$42.52	\$12.00	\$15.30	\$0.00	\$69.82
	09/01/2026	\$44.41	\$12.25	\$16.09	\$0.00	\$72.75
	09/01/2027	\$46.51	\$12.50	\$16.93	\$0.00	\$75.94

**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 223**

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Notes:** See Electrician Apprentice Wages

Telecom Apprentice Wages shall be the same as the Electrician Apprentice Wages

**Apprentice to Journeyworker Ratio:2:3\*\*\***

TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2025	\$64.74	\$11.49	\$23.59	\$0.00	\$99.82
	08/01/2025	\$66.89	\$11.49	\$23.59	\$0.00	\$101.97
	02/01/2026	\$68.24	\$11.49	\$23.59	\$0.00	\$103.32
	08/01/2026	\$70.44	\$11.49	\$23.59	\$0.00	\$105.52
	02/01/2027	\$71.84	\$11.49	\$23.59	\$0.00	\$106.92

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**Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.37	\$11.49	\$23.59	\$0.00	\$67.45
2	60	\$38.84	\$11.49	\$23.59	\$0.00	\$73.92
3	70	\$45.32	\$11.49	\$23.59	\$0.00	\$80.40
4	80	\$51.79	\$11.49	\$23.59	\$0.00	\$86.87
5	90	\$58.27	\$11.49	\$23.59	\$0.00	\$93.35

**Effective Date - 08/01/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.45	\$11.49	\$23.59	\$0.00	\$68.53
2	60	\$40.13	\$11.49	\$23.59	\$0.00	\$75.21
3	70	\$46.82	\$11.49	\$23.59	\$0.00	\$81.90
4	80	\$53.51	\$11.49	\$23.59	\$0.00	\$88.59
5	90	\$60.20	\$11.49	\$23.59	\$0.00	\$95.28

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

<b>TEST BORING DRILLER</b>	12/01/2024	\$51.28	\$9.65	\$18.22	\$0.00	\$79.15
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$52.78	\$9.65	\$18.22	\$0.00	\$80.65
	12/01/2025	\$54.28	\$9.65	\$18.22	\$0.00	\$82.15
	06/01/2026	\$55.83	\$9.65	\$18.22	\$0.00	\$83.70
	12/01/2026	\$57.33	\$9.65	\$18.22	\$0.00	\$85.20

For apprentice rates see "Apprentice- LABORER"

<b>TEST BORING DRILLER HELPER</b>	12/01/2024	\$47.07	\$9.65	\$18.22	\$0.00	\$74.94
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$48.57	\$9.65	\$18.22	\$0.00	\$76.44
	12/01/2025	\$50.07	\$9.65	\$18.22	\$0.00	\$77.94
	06/01/2026	\$51.62	\$9.65	\$18.22	\$0.00	\$79.49
	12/01/2026	\$53.12	\$9.65	\$18.22	\$0.00	\$80.99

For apprentice rates see "Apprentice- LABORER"

<b>TEST BORING LABORER</b>	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87

For apprentice rates see "Apprentice- LABORER"

<b>TRACTORS/PORTABLE STEAM GENERATORS</b>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Last Modified: 02/12/2025 at 8:17PM EST

Classification: Fall River DCM Facility Improvements - Phase I Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Project #25-25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2025	\$40.82	\$15.57	\$20.17	\$0.00	\$76.56
	06/01/2025	\$41.82	\$15.57	\$20.17	\$0.00	\$77.56
	12/01/2025	\$41.82	\$15.57	\$21.78	\$0.00	\$79.17
	01/01/2026	\$41.82	\$16.17	\$21.78	\$0.00	\$79.77
	06/01/2026	\$42.82	\$16.17	\$21.78	\$0.00	\$80.77
	12/01/2026	\$42.82	\$16.17	\$23.52	\$0.00	\$82.51
	01/01/2027	\$42.82	\$16.77	\$23.52	\$0.00	\$83.11

TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2024	\$59.18	\$9.65	\$19.00	\$0.00	\$87.83
	06/01/2025	\$60.68	\$9.65	\$19.00	\$0.00	\$89.33
	12/01/2025	\$62.18	\$9.65	\$19.00	\$0.00	\$90.83
	06/01/2026	\$63.73	\$9.65	\$19.00	\$0.00	\$92.38
	12/01/2026	\$65.23	\$9.65	\$19.00	\$0.00	\$93.88

For apprentice rates see "Apprentice- LABORER"

TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2024	\$61.18	\$9.65	\$19.00	\$0.00	\$89.83
	06/01/2025	\$62.68	\$9.65	\$19.00	\$0.00	\$91.33
	12/01/2025	\$64.18	\$9.65	\$19.00	\$0.00	\$92.83
	06/01/2026	\$65.73	\$9.65	\$19.00	\$0.00	\$94.38
	12/01/2026	\$67.23	\$9.65	\$19.00	\$0.00	\$95.88

For apprentice rates see "Apprentice- LABORER"

TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2024	\$51.25	\$9.65	\$19.00	\$0.00	\$79.90
	06/01/2025	\$52.75	\$9.65	\$19.00	\$0.00	\$81.40
	12/01/2025	\$54.25	\$9.65	\$19.00	\$0.00	\$82.90
	06/01/2026	\$55.80	\$9.65	\$19.00	\$0.00	\$84.45
	12/01/2026	\$57.30	\$9.65	\$19.00	\$0.00	\$85.95

For apprentice rates see "Apprentice- LABORER"

TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2024	\$53.25	\$9.65	\$19.00	\$0.00	\$81.90
	06/01/2025	\$54.75	\$9.65	\$19.00	\$0.00	\$83.40
	12/01/2025	\$56.25	\$9.65	\$19.00	\$0.00	\$84.90
	06/01/2026	\$57.80	\$9.65	\$19.00	\$0.00	\$86.45
	12/01/2026	\$59.30	\$9.65	\$19.00	\$0.00	\$87.95

For apprentice rates see "Apprentice- LABORER"

VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53

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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Fall River DCM Facility Improvements - Phase I Project #25-25						
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2024	\$40.61	\$9.65	\$17.70	\$0.00	\$67.96
	06/01/2025	\$42.00	\$9.65	\$17.70	\$0.00	\$69.35
	12/01/2025	\$43.38	\$9.65	\$17.70	\$0.00	\$70.73
	06/01/2026	\$44.82	\$9.65	\$17.70	\$0.00	\$72.17
	12/01/2026	\$46.26	\$9.65	\$17.70	\$0.00	\$73.61
	06/01/2027	\$47.71	\$9.65	\$17.70	\$0.00	\$75.06
	12/01/2027	\$49.16	\$9.65	\$17.70	\$0.00	\$76.51
	06/01/2028	\$50.66	\$9.65	\$17.70	\$0.00	\$78.01
	12/01/2028	\$52.16	\$9.65	\$17.70	\$0.00	\$79.51
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

**Additional Apprentice Information:**

All apprentices must be registered with the Division of Apprenticeship Training (DAS) in accordance with M.G.L. c. 23, §§ 11E-11L. Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the hourly prevailing wage rate established by the Commissioner under the provisions of M.G.L. c. 149, §§ 26-27D. Apprentice ratios are established by DAS pursuant to M.G.L. c. 23, §§ 11E-11L. Ratios are expressed as the allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified. The ratios listed herein have been taken from relevant private collective bargaining agreements (CBAs) and are provided for illustrative purposes only. They have not been independently verified as being accurate or continuing to be accurate. Parties having questions regarding what ratio to use should contact DAS.

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Superseded General Decision Number: MA20240001

State: Massachusetts

Construction Type: Building

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk and Suffolk Counties in Massachusetts.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes and apartments up to and including 4 stories)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

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ASBE0006-001 09/01/2024

Rates Fringes

Insulator/asbestos worker  
 Includes the application  
 of all insulating  
 materials, protective  
 coverings, coatings, and  
 finishes to all types of  
 mechanical systems  
 (ZONE A).....\$ 55.45 36.63  
 (ZONE B).....\$ 55.45 36.63

ZONES:

ZONE A

BARNSTABLE COUNTY (Brewster, Chatham, Dennis, Eastham,  
 Harwich, Orleans, Provincetown, Truro, Wellfleet, Yarmouth)  
 BRISTOL COUNTY (Easton), MIDDLESEX COUNTY, and NORFOLK  
 COUNTY (Avon, Braintree, Brookline, Canton, Cohasset,  
 Dedham, Dover, Foxborough, Holbrook, Medfield, Medway,  
 Millis, Milton, Needham, Norfolk, Norwood, Quincy,  
 Randolph, Sharon, Stoughton, Walpole, Wellesley, Westwood,  
 Weymouth)

ZONE B

BARNSTABLE COUNTY (Barnstable, Bourne, Falmouth, Mashpee,  
 Sandwich), BRISTOL COUNTY (All cities except Easton),and  
 NORFOLK COUNTY (Bellingham, Franklin, Plainville)

-----  
 ASBE0006-002 09/01/2024

BARNSTABLE (Brewster, Chatham, Dennis, Eastham, Harwich,  
 Orleans, Provincetown, Truro, Wellfleet and Yarmouth); BRISTOL  
 (Easton); ESSEX; MIDDLESEX; NORFOLK (Avon, Braintree,  
 Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Holbrook,  
 Hull, Medfield, Medway, Millis, Milton, Needham, Norfolk,  
 Norwood, Quincy, Randolph, Sharon Stoughton, Walpole,  
 Wellesley, Westwood, and Weymouth) AND SUFFOLK COUNTIES

Rates Fringes

HAZARDOUS MATERIAL HANDLER  
 (Includes preparation,  
 wetting, stripping, removal,  
 scrapping, vacuuming,  
 bagging and disposing of all  
 insulation materials from  
 mechanical systems whether  
 they contain asbestos or not)....\$ 55.45 36.63

-----  
 ASBE0006-010 09/01/2024

BARNSTABLE (Barnstable, Bourne, Falmouth, Mashpee and  
 Sandwich); BRISTOL (Acushnet, Attleboro city, Berkeley,  
 Dartmouth, Dighton, Fairhaven, Fall river City, Freetown,  
 Marion, Mansfield, New Bedford City, North Attleboro, Norton,  
 Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton City and  
 Westport); DUKES; NANTUCKET; NORFOLK (Bellingham, Franklin,  
 Plainville, and Wrentham); PLYMOUTH (Lakeville, Mattapoisett,

	Rates	Fringes
Insulator/asbestos worker (Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.)....	\$ 55.45	36.63
-----		
BOIL0029-001 01/01/2021		

	Rates	Fringes
BOILERMAKER.....	\$ 45.87	29.02
-----		
BRMA0001-008 08/01/2023		

FOXBORO CHAPTER  
 BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North  
 Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton) AND  
 NORFOLK (Bellingham, Canton, Dedham, Foxboro, Franklin,  
 Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood,  
 Wrentham) COUNTIES

	Rates	Fringes
Bricklayer, Cement Mason, Plasterer.....	\$ 60.26	33.71
-----		
BRMA0001-009 08/01/2023		

LOWELL CHAPTER  
 MIDDLESEX (Acton, Asby, Ayer, Bedford, Billerica, Boxboro,  
 Carlisle, Chemsford, Dracut, Dunstable, Ft. Denvens, Groton,  
 Littleton, Lowell, North Acton, Pepperell, Shirley, South  
 Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford,  
 Wilmington)

	Rates	Fringes
Bricklayer and plasterer.....	\$ 60.26	33.71
-----		
BRMA0001-010 08/01/2023		

LOWELL CHAPTER  
 MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson,  
 Maynard, Natick, Sherbourn, Stow); and NORFOLK (Medfield,  
 Medway, Millis)

	Rates	Fringes
BRICKLAYER.....	\$ 60.26	33.71
-----		
BRMA0003-001 08/01/2024		

	Rates	Fringes
Marble & Tile Finisher.....	\$ 49.32	35.26
Marble, Tile & Terrazzo		

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City of Fall River

Fall River DCM Facility Improvements - Phase I 37.51  
Project #25-25  
TERRAZZO FINISHER.....\$ 63.44 37.33

-----  
BRMA003-003 08/01/2024

BOSTON CHAPTER

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford, Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

Rates Fringes

BRICKLAYER.....\$ 64.50 37.54  
-----

BRMA003-006 08/01/2024

LYNN CHAPTER

ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salisbury, Salem, Saugus, Swampscott, Topsfield Wakefield, Wenham, West Newbury); and MIDDLESEX (Reading, North Reading, Wakefield)

Rates Fringes

Bricklayer, cement mason and plasterer.....\$ 64.50 37.54  
-----

BRMA003-007 08/01/2024

WALTHAM CHAPTER

MIDDLESEX (Belmont, Burlington, Concord, Lexington, Lincoln, Stoneham, Sudbury, Waltham, Watertown, Wayland, Weston, Winchester, Woburn)

Rates Fringes

Bricklayer and plasterer.....\$ 64.50 37.54  
-----

BRMA003-008 08/01/2024

NEWTON CHAPTER

MIDDLESEX (Newton) and NORFOLK (Dover, Needham, Wellesley)

Rates Fringes

Bricklayer, cement mason and plasterer.....\$ 64.50 37.54  
-----

BRMA003-009 08/01/2024

NEW BEDFORD

BARNSTABLE; BRISTOL (Acushnet, Dartmouth, Farhaven, Fall River, Freetown, New Bedford, Somerset, Swansea, Westport); DUKES; and NANTUCKET COUNTIES

Rates Fringes

Bricklayer, cement mason and

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City of Fall River  
Fall River DCM Facility Improvements - Phase I 37.54  
Project #25-25  
-----

BRMA003-010 08/01/2024

QUINCY CHAPTER  
NORFOLK COUNTY (Avon, Braintree, Cohasset, Holbrook, Quincy,  
Randolph, Soughton, Weymouth)

	Rates	Fringes
Bricklayer, cement mason and plasterer.....	\$ 64.50	37.54

-----  
CARP0056-011 08/01/2024

SUFFOLK (All of County); and those areas of BARNSTABLE,  
BRISTOL, ESSEX, MIDDLESEX & NORFOLK COUNTIES situated inside  
Boston Beltway (I-495) and North of Cape Cod Canal. ALL of  
DUKES AND NANTUCKET COUNTIES

	Rates	Fringes
PILEDRIVERMAN.....	\$ 55.79	35.47

-----  
CARP0056-012 08/01/2024

The areas of BARNSTABLE, BRISTOL, and NORFOLK COUNTIES situated  
OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN.....	\$ 55.79	35.47

-----  
CARP0056-013 08/01/2024

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE  
Boston Beltway (I-495)

	Rates	Fringes
PILEDRIVERMAN.....	\$ 49.19	35.47

-----  
CARP0327-001 09/01/2024

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,  
Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

	Rates	Fringes
CARPENTER.....	\$ 58.69	31.05

-----  
CARP0339-001 09/01/2024

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX  
(Except Belmont, Cambridge, Everett, Malden, Medford,  
Somerville); AND NORFOLK (Bellingham, Canton, Foxboro,  
Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood,  
Plainville, Sharon, Walpole, Wellesley, Westwood, Wrentham)

City of Fall River  
 Fall River DCM Facility Improvements - Phase I Fringes  
 Project #25-25

02/12/2025

CARPENTER.....\$ 48.10                      30.95

-----  
 CARP0346-003 09/01/2024

NORFOLK COUNTY (Braintree, Cohasset, Scituate, Weymouth,  
 Quincy)

Rates                      Fringes

CARPENTER.....\$ 48.10                      30.95

-----  
 CARP0624-005 09/01/2017

DUKES; NANTUCKET

Rates                      Fringes

CARPENTER.....\$ 46.43                      28.35

-----  
 CARP0624-007 09/01/2017

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro); AND  
 NORFOLK (Avon, Holbrook, Randolph, Stoughton) COUNTIES

Rates                      Fringes

CARPENTER.....\$ 39.28                      27.90

-----  
 CARP1121-001 01/01/2024

SUFFOLK COUNTY

Rates                      Fringes

MILLWRIGHT.....\$ 48.03                      33.49

-----  
 CARP1121-003 01/01/2024

BARNSTABLE, BRISTOL, DUKES, ESSEX, MIDDLESEX, NANTUCKET and  
 NORFOLK COUNTIES

Rates                      Fringes

MILLWRIGHT.....\$ 42.76                      33.24

-----  
 CARP2168-001 09/01/2024

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,  
 Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

Rates                      Fringes

FLOOR LAYER: Carpet.....\$ 55.00                      31.25

-----  
 CARP2168-004 09/01/2024

BRISTOL; ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett,  
 Malden, Medford, Somerville); Remainder of Norfolk County

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City of Fall River  
 Fall River DCM Facility Improvements - Phase I  
 Project #25-25

02/12/2025

	Rates	Fringes
FLOOR LAYER: Carpet.....	\$ 55.00	31.25

-----  
 CARP2168-005 09/01/2024

BARNSTABALE; DUKES; AND NANTUCKET

	Rates	Fringes
FLOOR LAYER: Carpet.....	\$ 48.69	31.25

-----  
 ELEC0096-001 09/01/2024

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

	Rates	Fringes
ELECTRICIAN.....	\$ 45.99	33.06
Teledata System Installer.....	\$ 35.29	32.98

-----  
 ELEC0099-001 06/01/2024

BRISTOL (Attleboro, North Attleboro, Seekonk)

	Rates	Fringes
ELECTRICIAN.....	\$ 52.11	47.25%
Teledata System Installer.....	\$ 39.09	11.02%+15.31

-----  
 ELEC0103-001 09/01/2024

ESSEX; MIDDLESEX (Excluding Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend); NORFOLK (Excluding Avon, Holbrook, Plainville, Randolph, Stoughton) SUFFOLK

	Rates	Fringes
Teledata System Installer.....	\$ 51.02	34.01

-----  
 ELEC0103-002 09/01/2024

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX (Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford, Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury, Tyngsboro, Westford, Wilmington)

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
 ELEC0103-004 09/01/2024

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Manchester, Marblehead, Middleton, Peabody, Rockport, Salem, Topsfield, Wenham)

City of Fall River  
 Fall River DCM Facility Improvements - Phase I  
 Project #25-25

02/12/2025

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
 ELEC0103-005 09/01/2024

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Belmont, Cambridge, Concord, Everett, Framingham, Holliston, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklino, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham and Hull);SUFFOLK

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
 ELEC0104-001 09/04/2023

	Rates	Fringes
Line Construction:		
Cableman.....	\$ 59.93	29.26+A
Equipment Operator.....	\$ 46.69	25.30+A
Groundman.....	\$ 30.21	12.39+A
Lineman.....	\$ 54.93	29.26+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

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 ELEC0223-005 09/01/2024

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro, Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook, Plainville, Randolph, Stoughton)

	Rates	Fringes
ELECTRICIAN.....	\$ 50.02	31.09%+15.50

-----  
 ELEC0223-006 09/01/2024

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro, Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook, Plainville, Randolph, Stoughton)

	Rates	Fringes
Teledata System Installer.....	\$ 42.52	31.09%+15.25

-----  
 ELEV0004-001 01/01/2024

	Rates	Fringes
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City of Fall River  
Fall River DCM Facility Improvements - Phase I

Project #25-25  
ELEVATOR MECHANICS.....\$ 71.21 37.885+a+b

FOOTNOTE FOR ELEVATOR MECHANICS:

- a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.
- b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

-----  
ENGI0004-001 12/01/2024

	Rates	Fringes
Power equipment operators:		
Group 1.....	\$ 57.03	33.20
Group 2.....	\$ 56.40	33.20
Group 3.....	\$ 36.67	33.20
Group 4.....	\$ 45.96	33.20
Group 5.....	\$ 24.92	33.20
Group 6.....	\$ 30.63	33.20

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

- A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft.	+2.28
Over 185 ft.	+4.05
Over 210 ft.	+5.67
Over 250 ft.	+8.59
Over 295 ft.	+11.86
Over 350 ft.	+13.82

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

- Group 1: Crane; shovel; truck crane; cherry picker; dragline; trench hoe; backhoe; three drum machine; derrick; pile driver; elevator tower; hoist; gradall; shovel dozer; front end loader; fork lift; suger; boring machine; rotaryu drill; post hole hammer; post hole digger; pumpcrete machine; asphalt plant (on site); concrete batching and/or mixing plant (on site); crusher plant (on site); paving concrete mixer; timber jack
- Group 2: Sonic or vibratory hammer; grader; scraper; tandem scraper; concrete pump; bulldozer; tractor; york rake; mulching machine; portable steam boiler; portable steam generator; roller; spreader; tamper (self propelled or tractor drawn); asphalt paver; mechanic - maintenance; paving screed machine; stationary steam boiler; paving concrete finishing machine; cal truck; ballast regulator; switch tamper; rail anchor machine; tire truck
- Group 3: Pumps (1-3 grouped); compressor; welding machine (1-3 grouped); generator; concrete vibrator; heater (power driven 1- 5); well point system (operating); syphon-pulsometer; concrete mixer; valves controlling permanent plant air or steam; conveyor; Jackson type tamper; single diaphragm pump; lighting plant
- Group 4: Assistant engineer (fireman)
- Group 5: Oiler (other than truck cranes and gradalls)
- Group 6: Oiler (on truck cranes and gradalls) stant engineer (on truck crane and gradall)

-----  
 IRON0007-006 03/16/2024

AREA 1: BRISTOL (Easton); ESSEX (Beverly, Gloucester, Lynn, Lynnfield, Manchester, Marblehead, Nahant, Rockport, Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford, Belmont, Burlington, Cambridge, Carlisle, Concord, Dunstable, Everett, Framingham, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway); SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex, Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action, Billerica, Chelmsford, Dracut, Groton, Groveland, Littleton, Lowell, Middleton, North Reading, Pepperell, Tewksbury, Tyngsboro, Westford, Wilmington)

Rates Fringes

Ironworkers:

AREA 1.....	\$ 54.68	36.48
AREA 2.....	\$ 50.27	36.48

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 IRON0007-010 03/16/2024

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton, Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

Rates Fringes

IRONWORKER.....	\$ 54.38	36.48
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 IRON0037-005 09/16/2024

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Mansfield, New Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET; NORFOLK (Billingham, Franklin, Plainville, Wrentham)

Rates Fringes

IRONWORKER.....	\$ 41.59	32.98
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 LABO0022-001 12/01/2024

Rates Fringes

Laborers: (HEAVY CONSTRUCTION)

GROUP 1.....	\$ 38.95	29.41
GROUP 2.....	\$ 39.20	29.41
GROUP 3.....	\$ 39.70	29.41
GROUP 4.....	\$ 39.95	29.41
GROUP 5.....	\$ 39.70	29.41
GROUP 6.....	\$ 40.95	29.41

LABORERS CLASSIFICATIONS

City of Fall River  
 Fall River DCM Facility Improvements - Phase I

Project #25-25  
 GROUP 1: Laborers; carpenter tenders; cement finisher  
 tenders, plasterer tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser  
 beam operator; mason tender; pipelayer; pneumatic drill  
 operator; pneumatic tool operator; wagon drill operator,  
 jack hammer operator, pavement breaker, carbide core  
 drilling machine, chain saw operator, barco type jumping  
 tampers, concrete pump, motorized mortar mixer,  
 ride-on-motorized buggy

GROUP 3: Air track operator; block paver; rammer; curb  
 setter, hydraulic and similar self powered drills

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste  
 Laborers

-----  
 LAB00022-003 12/01/2024

Rates Fringes

Plasterer tender

BARNSTABLE, BRISTOL,  
 DUKES, ESSEX, NANTUCKET,  
 MIDDLESEX (with the  
 exception of Arlington,  
 Belmont, Burlington,  
 Cambridge, Everett,  
 Malden, Medford, Melrose,  
 Reading, Somerville,  
 Stoneham, Wakefield,  
 Winchester, Winthrop and  
 Woburn); NORFOLK (with the  
 exception of Brookline  
 Dedham and Milton) COUNTIES.\$ 38.95 29.41  
 SUFFOLK COUNTY (Boston,  
 Chelsea, Revere, Winthrop,  
 Deer Island, Nut Island);  
 MIDDLESEX COUNTY  
 (Arlington, Belmont,  
 Burlington, Cambridge,  
 Everett, Malden, Medford,  
 Melrose, Reading,  
 Somerville, Stoneham,  
 Wakefield, Winchester,  
 Winthrop and Woburn only);  
 NORFOLK COUNTY (Brookline,  
 Dedham, and Milton only)....\$ 46.20 29.41

-----  
 LAB00022-004 12/01/2024

Rates Fringes

Plasterer tender.....\$ 38.95 29.41

-----  
 LAB00022-005 12/01/2024

Rates Fringes

City of Fall River  
 Fall River DCM Facility Improvements - Phase I  
 Project #25-25

BRISTOL,  
 DUKES, ESSEX, NANTUCKET,  
 MIDDLESEX (with the  
 exception of Arlington,  
 Belmont, Burlington,  
 Cambridge, Everett,  
 Malden, Medford, Melrose,  
 Reading, Somerville,  
 Stoneham, Wakefield,  
 Winchester, Winthrop and  
 Woburn); NORFOLK (with the  
 exception of Brookline  
 Dedham and Milton) COUNTIES.\$ 38.95                      29.41  
 SUFFOLK COUNTY (Boston,  
 Chelsea, Revere, Winthrop,  
 Deer Island, Nut Island);  
 MIDDLESEX COUNTY  
 (Arlington, Belmont,  
 Burlington, Cambridge,  
 Everett, Malden, Medford,  
 Melrose, Reading,  
 Somerville, Stoneham,  
 Wakefield, Winchester,  
 Winthrop and Woburn only);  
 NORFOLK COUNTY (Brookline,  
 Dedham, and Milton only)....\$ 46.20                      29.41

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 LAB0022-009 12/01/2024

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut  
 Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington,  
 Cambridge, Everett, Malden, Medford, Melrose, Reading,  
 Somerville, Stoneham, Wakefield, Winchester, Winthrop, and  
 Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton  
 only)

Rates                      Fringes

Laborers:

GROUP 1.....	\$ 46.10	29.41
GROUP 2.....	\$ 46.35	29.41
GROUP 3.....	\$ 46.85	29.41
GROUP 4.....	\$ 47.10	29.41
GROUP 5.....	\$ 46.85	29.41
GROUP 6.....	\$ 48.10	29.41
GROUP 7.....	\$ 27.01	29.41

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt  
 raker carbide core drilling machine; chain saw operator;  
 pipelayer; barco type jumping tampers; laser beam; concrete  
 pump; mason tender; motorized mortar mixer; ride-on  
 motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; rammer; curb setter,  
 hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

Project #25-25  
 GROUP 6: Asbestos removal laborers/haz-mat laborers

GROUP 7: Flaggers

-----  
 LAB00022-010 12/01/2024

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET;  
 MIDDLESEX (with the exception of Arlington, Belmont,  
 Burlington, Cambridge, Everett, Malden, Medford, Melrose,  
 Reading, Somerville, Stoneham, Wakfield, Winchester, Winthrop  
 and Woburn); NORFOLK (with the exception of Brookline, Dedham  
 and Milton)

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 38.95	29.41
GROUP 2.....	\$ 39.20	29.41
GROUP 3.....	\$ 39.70	29.41
GROUP 4.....	\$ 39.95	29.41
GROUP 5.....	\$ 39.70	29.41
GROUP 6.....	\$ 40.95	29.41

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt  
 raker carbide core drilling machine; chain saw operator;  
 pipelayer; barco type jumping tampers; laser beam; concrete  
 pump; mason tender; motorized mortar mixer; ride-on  
 motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; hammer; curb setter,  
 hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

GROUP 6: Asbestos removal laborers/haz-mat laborers

-----  
 LAB01421-004 12/01/2021

BARNSTABLE, BRISTOL, DUKES, ESSEX, MIDDLESEX, NANTUCKET NORFOLK  
 AND SUFFOLK COUNTIES

	Rates	Fringes
Laborers: (Wrecking)		
Group 1.....	\$ 41.33	27.37
Group 2.....	\$ 42.08	27.37
Group 3.....	\$ 42.33	27.37
Group 4.....	\$ 37.33	27.37
Group 5.....	\$ 40.43	27.37
Group 6.....	\$ 41.33	27.37

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type

City of Fall River

Fall River DCM Facility Improvements Phase I  
Loaders, Hydraulic Excavators, Backhoes, Type Hammer Operators, Concrete  
Cutting Saws  
Project #25-25

- Group 4: Yardman (Salvage Yard Only).
- Group 5: Yardman, Burners, Sawyers.
- Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

-----  
PAIN0011-007 06/01/2024

BARNSTABLE, BRISTOL, DUKES, AND NANTUCKET COUNTIES

	Rates	Fringes
GLAZIER.....	\$ 41.63	25.80

FOOTNOTE:

A. PAID HOLIDAY: LABOR DAY (provided employee has worked any part of the week prior to Labor Day and any part of the week after Labor Day)

-----  
PAIN0035-004 07/01/2024

BARNSTABLE; BRISTOL; ESSEX; NANTUCKET; DUKES; COUNTIES;  
REMAINDER OF NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES

	Rates	Fringes
PAINTER		
NEW CONSTRUCTION:		
Brush, Taper.....	\$ 46.26	36.00
Spray, Sandblast.....	\$ 47.66	36.00
REPAINT:		
Brush, Taper.....	\$ 44.32	36.00
Spray, Sandblast.....	\$ 45.72	36.00

-----  
PAIN0035-013 07/01/2024

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville)  
SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

	Rates	Fringes
PAINTER		
NEW CONSTRUCTION:		
Brush, Taper.....	\$ 46.26	36.00
Spray, Sandblast.....	\$ 47.66	36.00
REPAINT:		
Brush, Taper.....	\$ 44.32	36.00
Spray, Sandblast.....	\$ 45.72	36.00

-----  
PAIN0035-020 07/01/2024

ESSEX; MIDDLESEX; NORFOLK; SUFFOLK

	Rates	Fringes
GLAZIER.....	\$ 46.26	36.00

-----  
PLAS0534-001 07/01/2024

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

City of Fall River  
 Fall River DCM Facility Improvements - Phase I Fringes  
 Project #25-25

02/12/2025

CEMENT MASON/CONCRETE FINISHER...\$ 49.19 40.86

-----  
 PLAS0534-004 07/01/2024

MIDDLESEX; NORFOLK AND SUFFOLK COUNTIES

Rates Fringes

PLASTERER.....\$ 49.19 40.86

-----  
 PLUM0004-001 09/01/2024

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and  
 Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

Rates Fringes

Plumbers and Pipefitters.....\$ 55.00 28.77

-----  
 PLUM0012-005 09/01/2024

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,  
 Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,  
 Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen,  
 Middleton, Newbury, Newburyport, North Andover, Peabody,  
 Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West  
 Newbury)

Rates Fringes

PLUMBER.....\$ 69.04 35.53

-----  
 PLUM0012-007 09/01/2024

ESSEX (Lynn, Lynnfield, Nahant, Saugus, and Swampscott);  
 MIDDLESEX (Acton, Arlington, Ashford, Ayer-except west of  
 Greenville Branch of Boston & Maine Rail Road, Bedford,  
 Belmont, Billerica, Boxboro, Burlington, Cambridge, Carlise,  
 Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,  
 Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,  
 Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,  
 Newton, North Reading, Pepperell, Reading, Sherborn,  
 Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,  
 Wakefield, Watham, Watertown, Wayland, Westford, Wilmington,  
 Winchester and Woburn), NORFOLK (Bellingham, Braintree,  
 Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,  
 Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood,  
 Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,  
 Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate);  
 SUFFOLK; WORCESTER (Hopedale and Southboro)

Rates Fringes

PLUMBER.....\$ 69.04 35.53

-----  
 PLUM0051-004 08/26/2024

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; AND NORFOLK (Avon,  
 Holbrook, Randolph, Stoughton) COUNTIES

Last Modified: 02/12/2025 at 8:17PM EST

City of Fall River  
 Fall River DCM Facility Improvements - Phase I  
 Project #25-25

02/12/2025

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 52.49	33.60

-----  
 PLUM0537-005 09/01/2023

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Saugus, Swampscott, Topsfield, Wenham, West Newbury); MIDDLESEX (Acton, Arlington, Ashford, Ayer-except west of Greenville Branch of Boston & Maine Rail Road, Bedford, Belmont, Billerica, Boxboro, Burlington, Cambridge, Carlise, Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham, Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton, Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick, Newton, North Reading, Pepperell, Reading, Sherborn, Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro, Wakefield, Watham, Watertown, Wayland, Westford, Wilmington, Winchester and Woburn), NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin, Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate); SUFFOLK; WORCHESTER (Hopedale and Southboro)

	Rates	Fringes
PIPEFITTER.....	\$ 63.48	36.67

-----  
 ROOF0033-001 08/01/2024

	Rates	Fringes
Roofers: All Tear-off and/or removal of any types of roofing and all spudding, sweeping, vacuuming and/or cleanup of any and all areas of any type where a roof is to be relaid.....	\$ 51.03	35.38

-----  
 SFMA0550-001 10/01/2024

BRISTOL (Portion within 35 mile radius from Boston City Hall; ESSEX; MIDDLESEX (Except Ashby, Townsend, and portions of Pepperell and Shirley beyond 35 mile radius from Boston City Hall); NORFOLK; PLYMOUTH (Portion within 35 mile radius of Boston City Hall); SUFFOLK

	Rates	Fringes
SPRINKLER FITTER.....	\$ 70.34	36.67

a. PAID HOLIDAYS: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Last Modified: 02/12/2025 at 8:17PM EST



----- Fall River DCM Facility Improvements - Phase I -----  
Project #2525  
SFMA0599-002 04/01/2024

BRISTOL (Seekonk, Swansea, and Somerset)

	Rates	Fringes
SPRINKLER FITTER.....	\$ 63.31	36.67

a. PAID HOLIDAYS: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

-----  
SFMA0669-001 04/01/2024

BARNSTABLE; BRISTOL (Beyond 35 mile radius of Boston City Hall); DUKES; MIDDLESEX (Ashby, Townsend, portions of Pepperell and Shirley beyond 35 mile radius of Boston City Hall); NANTUCKET; PLYMOUTH (Beyond 35 mile radius of Boston City Hall)

	Rates	Fringes
SPRINKLER FITTER.....	\$ 49.70	29.16

-----  
SHEE0017-003 08/01/2024

BRISTOL (Attleboro, Berkley, Easton, Mansfield, North Attleboro, Norton, Raynham, Taunton); ESSEX; MIDDLESEX; NORFOLK; PLYMOUTH (except except Marion, Mattapoisett, Rochester, Wareham); SUFFOLK

	Rates	Fringes
Sheet metal worker.....	\$ 57.94	47.67

-----  
SHEE0017-007 08/01/2024

BARNSTABLE; BRISTOL (Acushnet, Assonet, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, New Bedford, Rehoboth, Seekonk, Somerset, Swansea, Westport); DUKES; AND NANTUCKET

	Rates	Fringes
Sheet metal worker.....	\$ 57.94	47.67

-----  
TEAM0379-001 06/01/2024

	Rates	Fringes
Truck drivers:		
Group 1.....	\$ 39.78	35.24+a+b
Group 2.....	\$ 39.95	35.24+a+b
Group 3.....	\$ 40.02	35.24+a+b
Group 4.....	\$ 40.14	35.24+a+b
Group 5.....	\$ 40.24	35.24+a+b
Group 6.....	\$ 40.53	35.24+a+b
Group 7.....	\$ 40.82	35.24+a+b

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE  
TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE

Last Modified: 02/12/2025 at 8:17PM EST

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.  
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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

Last Modified: 02/12/2025 at 8:17PM EST

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The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210.

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END OF GENERAL DECISION"

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Work of the Contract is shown and described in Drawings and Project Manual entitled:

Fall River DCM Facility Improvements Project – Phase I  
City of Fall River  
February 2025

Tighe & Bond, Inc.  
Consulting Engineers  
Westfield, Massachusetts

2. The Work includes the following major items:
  - a. Demolition and disposal of existing salt shed, truck scale, scale house, and attendant booth.
  - b. Removal and Disposal of contaminated soils
  - c. New gravity sanitary sewers, and precast concrete sewer manholes
  - d. New storm sewers, drainage manholes, and catch basins
  - e. New underground electrical conduit and site lighting
  - f. New water mains, hydrants, and service connections
  - g. New gas piping and fittings
  - h. Full depth bituminous concrete pavement reconstruction
  - i. Segmental and cast-in-place retaining wall system
  - j. Chain link fences and gates
  - k. Landscaping and plantings

B. Related Requirements

1. Section 00 73 00 - Supplementary Conditions

1.2 SUBMITTALS

A. Informational Submittals

1. Submit copies of permits or approvals required for the Work, prior to initiating the Work.

1.3 PROJECT/SITE CONDITIONS

A. Permits

1. Obtain the permits and approvals listed below:
  - a. National Pollution Discharge Elimination System (NPDES) Stormwater Permit
  - b. Permits and licenses of a temporary nature necessary to perform the Work.
  - c. Permits for disposal of construction wastes including disposal of cleared and grubbed materials.
  - d. Other permits or licenses required for the Contractor's operations or required elsewhere in the Contract Documents and not included herein.
2. Obtain required time extensions to permits obtained by the Contractor, if construction authorized by permits has not been completed by the expiration date noted on these permits.
3. Permits require that a representative of the permitting authority or the Owner be present on site during construction or given the opportunity to observe conditions prior to backfilling or otherwise proceeding with construction. Notify the Owner, Engineer, and the permitting authority prior to performing Work that is governed by the permit.
4. Obtain permits and approvals from appropriate jurisdictional agencies and property owners for use of premises not furnished by the Owner, and for all off-site areas.
5. Submit copies of permits prior to performance of Work authorized by permits.

B. Existing Conditions

1. Use of Premises and Off-site Work
  - a. The Work shall occur on the Owner's property and within the limits of Work shown on the Drawings.
  - b. Obtain permits and approvals for use of any land and access thereto that is deemed necessary for the Work, where such land is not available for use by the Owner, including land for temporary construction facilities, access and egress, or for storage of materials. Confine apparatus and storage to such additional areas.
  - c. Obtain permits and written approvals from appropriate jurisdictional agencies for the use of premises not available for use by the Owner, including all offsite staging areas, borrow pits and waste areas. Submit copies of all permits and approvals to the Owner prior to using areas.
  - d. Provide for the disposal of waste materials off-site in accordance with all applicable laws.
  - e. Adhere to the limits of Work and traffic control plans as indicated, to minimize obstruction to traffic and inconvenience to the Owner, general public, and residents in the vicinity of the Work, and to protect people



and property. Keep fire hydrants on or adjacent to the Work accessible to fire fighting equipment at all times.

- f. Make temporary provisions for the use of sidewalks and maintain functioning gutters, stormwater systems, drainage ditches, and culverts.
- g. Maintain public access to businesses and residences including driveways and parking lots at all times during the Work.

## PART 2 PRODUCTS

### 2.1 MATERIALS FURNISHED BY OWNER

- A. The Owner will not furnish any materials, labor or equipment under this Contract.

## PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01 14 00

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Work Schedule
2. Construction Constraints
3. Vehicle Access
4. Available Work Area
5. Site Usage Plan

B. Related Requirements

1. Section 01 31 00 - Coordination
2. Section 01 32 13 - Scheduling of Construction

1.2 SUBMITTALS

- A. Incorporate the requirements of this Section in the project schedule submitted under Section 01 32 13.
- B. Action Submittals
  1. Submit site usage plan within 30 days of the Notice to Proceed.

1.3 WORK SCHEDULE

- A. Conduct the Work during daylight hours on Monday through Friday, and within the time between 7:00 a.m. and 3:30 p.m. No work is to be done on Owner's holidays, Saturdays, Sundays or outside of the work hours described above. No equipment or machinery may be started at the sites before 7:00 a.m. and all equipment must be shut off by 3:30 p.m.
- B. The Contractor shall not work more than 40 hours per week as described in paragraph 1.3.A without prior authorization from the Owner. Should the Contractor work more than 40 hours per week, they will be required to reimburse the Owner at the rate of \$150 per hour for the overtime rate of the Owner's Project Manager's Clerk of the Works.
- C. Cutting of paved surfaces, excavation within any paved roadway, or pavement resurfacing activities is not allowed from November 15<sup>th</sup> to April 1<sup>st</sup>.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION CONSTRAINTS

- A. The following are constraints for the Work. Incorporate these constraints into the schedule required to be submitted under Section 01 32 13.
  - 1. All components of the existing facility must remain in operation throughout construction of the new facility unless otherwise specified herein or in Section 01 31 00. Contractor to coordinate with Owner to provide uninterrupted access to the Central Garage, Tip Floor, Incinerator, and Office Building throughout construction.
- B. Adhere to the limits of Work as indicated, to minimize obstruction to traffic and inconvenience to the Owner, general public, and residents in the vicinity of the Work, and to protect people and property. Keep fire hydrants on or adjacent to the Work accessible to firefighting equipment at all times.
- C. Maintain public access to businesses and residences including driveways and parking lots at all times during the Work.
- D. Arrange construction activity so that all streets shall remain open to unimpeded two-way traffic during non-work hours except during night work.
- E. The project must be substantially complete on or before November 3, 2025 and reach final completion by December 1, 2025.

### 3.2 AVAILABLE WORK AREA

- A. Limits of construction are defined on the Drawings. No work will be permitted to be performed outside these boundaries.

### 3.3 SITE USAGE PLAN

- A. Locations of available staging areas are shown on the Drawings.
- B. Submit a site usage plan showing all proposed staging areas, locations of all office and storage trailers, and material laydown areas. The site usage plan should be a drawing showing the proposed locations and shall include on-site traffic modifications and temporary utilities as may be applicable. Submit plan to Owner for review. Modify plan per Owner comments.

END OF SECTION

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SECTION 01 22 00  
UNIT PRICES

1.01 GENERAL PROVISIONS

- A. The Unit Prices for items set forth in the Schedule of Unit Prices shall be used to determine adjustments to the Contract Sum when changes in the Work involving said items are made in accordance with Article 7 of the General Conditions and other sections of the Contract Documents.

The unit prices are not part of the rule for award, will not be used to determine the low bidder (unless explicitly noted otherwise), and may be the basis for negotiations for future applicable additions and deducts.

- B. Definition: A unit price is the payment amount assigned to the Contractor in the Contract Document for a per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification. If unit prices are specified, the Contract will be modified for quantities above or below the designated quantity in the Base Bid.

1.02 UNIT PRICES

- A. Unit Prices listed under ADDITIONS shall be or have been (if pre-determined) computed to include net cost plus overhead, profit, and bond and all other charges required to complete the work item. Mark-ups will not be allowed on unit prices.
- B. Unit Prices listed under DEDUCTIONS have been computed at the net cost alone.
- C. Unit Prices net cost include the cost of all labor, materials, equipment, disposal, and all other costs required to complete the work item.
- D. Unit Prices shall apply until the date of Contract Completion established at the time of the Notice to Proceed. If the date of Contract Completion has been modified by Change Order, Unit Prices may be adjusted at the discretion of the Awarding Authority.
- E. Unit Prices for excavation include the costs of sheeting and bracing, pumping and dewatering, and all other related costs. Excavation quantities shall be measured as compacted in place at maximum dry density.

- F. Materials, methods of installation, and definitions of terms set forth under the various Unit Price items in the Schedule of Unit Prices shall be as indicated in the Contract Documents.

### 1.03 APPLICABILITY OF UNIT PRICES

- A. The payment lines shall be as indicated in the Contract Documents.
- B. Prior to commencing removal or placement of materials set forth in the Schedule of Unit Prices, the Contractor shall notify the Awarding Authority and the Prime Designer in sufficient time (not less than 24 hours in advance) to permit proper measurements to be taken on behalf of the Awarding Authority. Only quantities which have been approved in writing by the Prime Designer will be considered in the determination of adjustments to the Contract Sum.
  - 1. The Awarding Authority reserves the right to monitor the unit price Work being performed. If the Awarding Authority elects to monitor the Work, the Contractor shall not commence the unit price Work until the designated monitor is present.
  - 2. In order to be considered for payment, the Contractor shall document in writing all unit price Work performed to include the trade, type, quantity and location. The unit price Work performed shall be documented at the completion of each workday, verified and signed by the Contractor's superintendent.
  - 3. At the Awarding Authority's expense and if quantities of unit price Work are in dispute, the Awarding Authority may elect to retain an independent party to verify the Contractor's measurement of unit price Work performed.
- C. Performance of Work which is not required under the Contract Documents or which is not authorized by Change Order, whether or not such Work item is set forth hereunder as a Unit Price item, shall not be considered cause for extra payment. The Contractor will be held fully responsible for such unauthorized work, including the performance of all corrective measures required by the Prime Designer.

### 1.04 SCHEDULE OF UNIT PRICES

Values provided by Bidder.

**UNIT PRICE NO. 1:** Unclassified Excavation

**Base Bid Quantity:** 4,500 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Unclassified excavation will be full compensation for all excavation, removal, and proper off-site disposal of concrete, bituminous concrete, soils, and other materials not otherwise specifically included in other items. Such payment will include the furnishing of all labor, equipment, and materials required for or incidental to the Work. See Section 01 29 76

**UNIT PRICE NO. 2:** Rock Excavation

**Base Bid Quantity:** 1,400 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Rock excavation will be full compensation for all excavation, backfill, compaction, removal and proper off-site disposal of the material, and all labor, equipment and materials required for or incidental to the work. See Section 01 29 76

**UNIT PRICE NO. 3:** Type D4 Contaminated Soil Excavation and Disposal

**Base Bid Quantity:** 7,800 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Type D1 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.

**UNIT PRICE NO. 4:** Type D1 Contaminated Soil Excavation and Disposal

**Base Bid Quantity:** 12,700 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Type D1 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.

**UNIT PRICE NO. 5:** Type C2 Contaminated Soil Excavation and Disposal

**Base Bid Quantity:** 2,200 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Type C2 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site. See Section 01 29 76

**UNIT PRICE NO. 6:** Type E3 Contaminated Soil Excavation and Disposal

**Base Bid Quantity:** 25 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Type E3 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site. See Section 01 29 763

**UNIT PRICE NO. 7:** Stockpiled granite removal and disposal

**Base Bid Quantity:** 1,100 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** stockpiled granite removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work. See Section 01 29 76

**UNIT PRICE NO. 8:** Stockpiled Reinforced Concrete Removal and Disposal

**Base Bid Quantity:** 1,500 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** stockpiled reinforced concrete removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work. See Section 01 29 76

**UNIT PRICE NO. 9:** Stockpiled Yard Waste and Mulch Removal and Disposal

**Base Bid Quantity:** 750 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY

**Description:** Stockpiled yard waste removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work. See Section 01 29 76

**UNIT PRICE NO. 10:** Test Pits

**Base Bid Quantity:** 150 Cubic Yard (CY)

**Add:** \$ \_\_\_\_\_ / CY

**Deduct:** \$ \_\_\_\_\_ / CY



**Description:** Test pits will be full compensation for all cutting of surfaces, excavation, backfill, compaction, dewatering, sheeting and bracing, required measurements, and all labor, equipment and materials required for incidental to the Work. See section 01 29 73

**UNIT PRICE NO. 11:** Uniformed Traffic Police

**Base Bid Quantity:** 1 Unit (UNIT)

**Add:** \$ \_\_\_\_\_ / UNIT

**Deduct:** \$ \_\_\_\_\_ / UNIT

**Description:** Payment will be made upon receipt of a copy of the Police Department invoices and a copy of the Contractor's check to the Police Department. See Section 01 29 76

**UNIT PRICE NO. 12:** Gas Service Relocation

**Base Bid Quantity:** 1 Unit (UNIT)

**Add:** \$ \_\_\_\_\_ / UNIT

**Deduct:** \$ \_\_\_\_\_ / UNIT

**Description:** Gas Service Alterations will be on a fixed allowance value basis. The contractor shall retain Liberty Utilities to perform the installation of the new gas service. See Section 01 29 76

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## SECTION 01 25 00

### PRODUCT SUBSTITUTION DURING CONSTRUCTION

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Product substitution procedures

##### 1.2 CONTRACTOR'S OPTIONS

- A. For materials or equipment (hereinafter products) specified only by performance or reference standard, select product meeting that standard, by any Supplier. To the maximum extent possible, provide products of the same generic kind from a single source.
- B. For products specified by naming several products or manufacturers, select any one of the products or Suppliers named, which fully complies with the Drawings and Specifications. Another "or-equal" product can also be considered by the Engineer if it complies with the provisions of Article 7.04, Section 00 72 00. If a product proposed by the Contractor does not qualify as an "or-equal" item, then it can be considered as a proposed substitute item, and the Contractor must comply with the requirements of Article 7.05, Section 00 72 00.
- C. For products specified by naming products or manufacturers and followed by words indicating that no "or-equal" item or substitution is permitted, there is no option and no substitution will be allowed.
- D. Where more than one choice is available as a Contractor's option, select product that is compatible with other products already selected or specified.

##### 1.3 SUBSTITUTIONS

- A. If in the Engineer's sole discretion a product proposed by the Contractor does not qualify as an "or-equal" item under the provisions of Article 7.04 of Section 00 72 00, it can be considered a proposed substitute item. Submit information required under Article 7.05, Section 00 72 00 for proposed substitutes.
- B. The Engineer will consider written requests from the Contractor for substitutions within 30 days after the Notice to Proceed. After this period, requests will be considered only in case of unavailability of product or other conditions beyond control of the Contractor.
- C. Submit 5 copies of request for substitutions. Submit a separate request for each proposed substitution. In addition to the submittal requirements outlined in Article 7.05 of Section 00 72 00, include the following in each substitution request:
  1. For products or Suppliers:
    - a. Product identification, including Supplier & manufacturer's name and address.

- b. Manufacturer's literature with product description, performance and test data, and reference standards.
    - c. Samples, if appropriate.
    - d. Name and address of similar projects on which product was used, and date of installation.
  2. For construction methods (if specified):
    - a. Detailed description of proposed method.
    - b. Drawings illustrating method.
  3. Such other data as the Engineer may require to establish that the proposed substitution is equal to the product, Supplier or method specified.
- D. The substitution request shall include written certification and statements that are outlined in Article 7.05 of Section 00 72 00.
- E. A request constitutes a representation that Contractor:
  1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
  2. Will provide same or better guarantees, warranties or bonds for proposed substitution as for specified product.
  3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  4. Waives all claims for additional costs or time extension which may subsequently become apparent.
  5. Will reimburse Owner for review or redesign services associated with re-approval by authorities having jurisdiction.
- F. A proposed substitution will not be accepted if:
  1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.
  2. It will delay completion of the Work.
  3. It is intended or implied on a Shop Drawing and is not accompanied by a formal request for substitution from the Contractor.
- G. The Contractor is responsible for all costs relating to substitution requests.
- H. Approval of a substitution does not relieve the Contractor from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION – NOT USED**

**END OF SECTION**

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Schedule of Values

1.2 SUBMITTALS

- A. Action Submittals
  - 1. Submit 3 copies of the Schedule of Values for approval within 10 days after the Effective Date of the Agreement.

1.3 SCHEDULE OF VALUES

- A. Schedule of Values shall be a detailed breakdown of the lump sum Work items showing values allocated to the various elements of the Work.
- B. The format of the Schedule of Values shall be a breakdown by Specification Section and content and shall be submitted on EJCDC C-620, Contractor's Application for Payment. The Engineer may require additional detailed documentation to support the values in the form of executed purchase orders, subcontracts, or other agreements.
- C. The Engineer will determine the level of breakdown and detail required. The breakdown shall include materials, installation, and start-up for equipment and controls where applicable. The final document will be the basis of payment requests for the duration of the Contract. No progress payment will be made until the Schedule of Values is approved by the Engineer.
- D. An unbalanced Schedule of Values providing overpayment on items of work performed first will not be accepted.
- E. At the Contractor's option, items for mobilization and demobilization may be included in the Schedule of Values. The combined value shall not exceed 5 percent of the Contract Price, and the values for mobilization and demobilization shall be equal. Payment for mobilization will be included in the first payment request after the Contractor has initiated full-time construction activity. Payment for demobilization will be included in the first payment request after Substantial Completion has been reached and all equipment has been removed from the Site.
- F. At the Contractor's option, an item for bonds and insurance may be included in the Schedule of Values. If included, requests for payment including values for bonds and insurance shall be accompanied by matching invoices.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

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SECTION 01 29 76

APPLICATION AND CERTIFICATE FOR PAYMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Definition and description of measurement and payment to be used for the Work
  - 2. Payment procedures
  - 3. Payment requests for stored materials
- B. Related Requirements
  - 1. Section 01 22 00 – Unit Prices
  - 2. Section 01 29 73 - Schedule of Values

1.2 GENERAL

- A. The following paragraphs describe payment procedures for the work to be done under the respective items in the Bid Form.
- B. Each lump sum and unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.
- C. Except as provided for in Section 01 29 73, no separate measurement or payment will be made for Work called for in Division 0 or Division 1 of the Contract Specifications, unless specifically covered under the Bid items listed below. All costs associated with this Work will be considered incidental to the Contract Bid price.
- D. Division 2 through Division 33 Work will be measured and paid for at the Contractor's unit Bid price or lump sum Bid price as indicated on the Bid form. Those payable Work items, and related prices as Bid, will be the basis for all compensation to the Contractor for Work performed under this Contract. Work not specifically included as a Bid item, but which is required to properly and satisfactorily complete the Work is considered ancillary and incidental to the Bid item Work, and payment for such Work is considered to be included in the values as Bid for payable items. Compensation for all unit Bid price Work will be made based on the measured quantity of Work under the appropriate Bid items.

1.3 LUMP SUM ITEMS

- A. Each lump sum price stated in the Bid form shall constitute full compensation for all labor, equipment and materials necessary and required to complete the work specified under that particular item, and also all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent.
- B. Item 1 – Fall River DCM Facility Improvements Project – Phase 1
  - 1. Measurement

- a. There will be no measurement of quantities for lump sum items. Periodic partial payments for this Work, included under the Agreement, shall be based on the percent completion of each work item listed in the Schedule of Values provided under Section 01 29 73 estimated by the Contractor and approved by the Engineer.

2. Payment

- a. The lump sum payment shall be full compensation for furnishing all labor, materials, tools, equipment, and services necessary for the construction of the Fall River DCM Facility Improvements Project – Phase 1, excluding unit price items, in its entirety as detailed in the Contract Documents.

1.4 UNIT PRICE ITEMS

- A. Each unit price stated in the Bid form shall constitute full compensation for all labor, equipment and materials necessary and required to complete the Work specified under that particular item, and also all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent.
- B. Payment of the unit price items will only be made for the actual quantity of Work performed in accordance with the Contract Documents.
- C. Unit Price #1 – Unclassified Excavation

1. Measurement

- a. Measurement for unclassified excavation will be on a cubic yard basis as measured in the field by the Engineer. Unclassified excavation includes removal of existing cement concrete or asphalt sidewalks, driveways, and parking areas; removal and disposal of concrete pavement; removal of existing loam and vegetated areas, and all other excavation not covered under other payment items.

2. Payment

- a. Payment of the Bid price for unclassified excavation will be full compensation for all excavation, removal, and proper off-site disposal of concrete, bituminous concrete, soils, and other materials not otherwise specifically included in other items. Such payment will include the furnishing of all labor, equipment, and materials required for or incidental to the Work.

D. Unit Price #2– Rock Excavation

1. Measurement

- a. Measurement for rock excavation will be on a cubic yard basis as measured in the field by the Engineer.
- b. Rock with earth overburden shall be stripped of earth and exposed so that the rock can be profiled prior to removal. Excavation between the surface and the top of rock will be paid for under the lump sum item.

2. Payment



- a. Payment of the bid price for rock excavation will be full compensation for all excavation, backfill, compaction, removal and proper off-site disposal of the material, and all labor, equipment and materials required for or incidental to the work.
- b. Boulders less than 1 cubic yard will be paid for as part of the lump sum item and will not be paid for as part of rock excavation.
- c. Payment for rock excavation will be at the bid price regardless of the depth at which it is encountered.

E. Unit Price #3 – Type D4 Contaminated Soil Excavation and Disposal

1. Measurement

- a. Measurement for Type D4 contaminated soil excavation and disposal will be on a cubic yard basis as measured in the field by the Engineer.

2. Payment

- a. Payment of the bid price for Type D4 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.
- b. No separate measurement or payment will be made for on-site handling, re-handling, screening and segregation of materials and soils by hand or mechanical means, reuse, filling, construction vehicle wheel wash, management, stockpiling, emission control measures, equipment, police details, dust monitoring, dust control, surveying, work listed in other specification sections or other associated items or work considered incidental to the work of this item.
- c. No separate measurement and payment will be made for removal and disposal of existing asphalt and concrete. Removal and disposal of these materials shall be part of the base bid lump sum Contract Price.
- d. No separate measurement and payment will be made for facility requirements for field monitoring (e.g. PID monitoring for Type A/B soil).
- e. No claim for delay will be considered based upon Contractor's facility failing to meet Contractor's production schedule. No payments will be made for rejected loads.

F. Unit Price #4 – Type D1 Contaminated Soil Excavation and Disposal

1. Measurement

- a. Measurement for Type D1 contaminated soil excavation and disposal will be on a cubic yard basis as measured in the field by the Engineer.

2. Payment

- a. Payment of the bid price for Type D1 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.
- b. No separate measurement or payment will be made for on-site handling, re-handling, screening and segregation of materials and soils by hand or mechanical means, reuse, filling, construction vehicle wheel wash, management, stockpiling, emission control measures, equipment, police details, dust monitoring, dust control, surveying, work listed in other specification sections or other associated items or work considered incidental to the work of this item.
- c. No separate measurement and payment will be made for removal and disposal of existing asphalt and concrete. Removal and disposal of these materials shall be part of the base bid lump sum Contract Price.
- d. No separate measurement and payment will be made for facility requirements for field monitoring (e.g. PID monitoring for Type A/B soil).
- e. No claim for delay will be considered based upon Contractor's facility failing to meet Contractor's production schedule. No payments will be made for rejected loads.

G. Unit Price #5- Type C2 Contaminated Soil Excavation and Disposal

1. Measurement

- a. Measurement for Type C2 contaminated soil excavation and disposal will be on a cubic yard basis as measured in the field by the Engineer.

2. Payment

- a. Payment of the bid price for Type C2 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.
- b. No separate measurement or payment will be made for on-site handling, re-handling, screening and segregation of materials and soils by hand or mechanical means, reuse, filling, construction vehicle wheel wash, management, stockpiling, emission control measures, equipment, police details, dust monitoring, dust control, surveying, work listed in other specification sections or other associated items or work considered incidental to the work of this item.
- c. No separate measurement and payment will be made for removal and disposal of existing asphalt and concrete. Removal and disposal of these materials shall be part of the base bid lump sum Contract Price.

- d. No separate measurement and payment will be made for facility requirements for field monitoring (e.g. PID monitoring for Type A/B soil).
- e. No claim for delay will be considered based upon Contractor's facility failing to meet Contractor's production schedule. No payments will be made for rejected loads.

H. Unit Price #6 – Type E3 Contaminated Soil Excavation and Disposal

1. Measurement

- a. Measurement for Type E3 contaminated soil excavation and disposal will be on a cubic yard basis as measured in the field by the Engineer.

2. Payment

- a. Payment of the bid price for Type E3 contaminated soil excavation and disposal shall include all costs for excavation, backfill, compaction, temporary stockpiling, live loading, transporting, treatment, disposal, coordination with the Owner and the Owner's LSP, and other incidental work to remove contaminated soils from the site.
- b. No separate measurement or payment will be made for on-site handling, re-handling, screening and segregation of materials and soils by hand or mechanical means, reuse, filling, construction vehicle wheel wash, management, stockpiling, emission control measures, equipment, police details, dust monitoring, dust control, surveying, work listed in other specification sections or other associated items or work considered incidental to the work of this item.
- c. No separate measurement and payment will be made for removal and disposal of existing asphalt and concrete. Removal and disposal of these materials shall be part of the base bid lump sum Contract Price.
- d. No separate measurement and payment will be made for facility requirements for field monitoring (e.g. PID monitoring for Type A/B soil).
- e. No claim for delay will be considered based upon Contractor's facility failing to meet Contractor's production schedule. No payments will be made for rejected loads.

I. Unit Price #7– Stockpiled Granite Removal and Disposal

1. Measurement

- a. Measurement for stockpiled granite removal and disposal will be on a cubic yard basis as measured in the field by the Engineer.
- b. Stockpiled granite shall include existing granite curbing, slabs, and debris stockpiled on site. It shall not include construction and demolition debris generated through the execution of this project.

2. Payment

- a. Payment of the bid price for stockpiled granite removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work.

J. Unit Price #8 – Stockpiled Reinforced Concrete Removal and Disposal

1. Measurement

- a. Measurement for stockpiled reinforced concrete removal and disposal will be on a cubic yard basis as measured in the field by the Engineer.
- b. Stockpiled reinforced concrete shall include existing reinforced concrete structures, slabs, and debris stockpiled on site. It shall not include construction and demolition debris generated through the execution of this project.

2. Payment

- a. Payment of the bid price for stockpiled reinforced concrete removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work.

K. Unit Price #9 – Stockpiled Yard Waste and Mulch Removal and Disposal

1. Measurement

- a. Measurement for stockpiled yard waste and mulch removal and disposal will be on a cubic yard basis as measured in the field by the Engineer.
- b. Stockpiled yard waste and mulch shall include existing yard waste, wood waste, mulch, and similar organic materials stockpiled on site. It shall not include clearing and grubbing debris generated through the execution of this project.

2. Payment

- a. Payment of the bid price for stockpiled yard waste removal and disposal will be full compensation for the removal, temporary stockpiling, transportation, and proper off-site disposal of the materials, including all work required by the disposal facility to accept the material, including work to reduce the size and volume of the debris and screening, and all labor, equipment and materials required for or incidental to the work.

L. Unit Price #10– Test Pits

1. Measurement

- a. Measurement for test pits will be on a cubic yard basis as approved and measured in the field by the Engineer.

2. Payment

- a. Payment of the Bid price for test pits will be full compensation for all cutting of surfaces, excavation, backfill, compaction, dewatering, sheeting and bracing, required measurements, and all labor, equipment and materials required for incidental to the Work.

M. Unit Price #11– Uniformed Traffic Police

1. Measurement

- a. Measurement for uniformed traffic police will be on an hourly basis using the Police Department invoices.

2. Payment

- a. Payment will be made upon receipt of a copy of the Police Department invoices and a copy of the Contractor’s check to the Police Department.
- b. The Police Department invoices shall include the officer’s name, date, location, hours worked, and wage rate.

N. Unit Price #12 – Gas Service Relocation

Measurement

1. Measurement for Gas Service Relocation will be on a fixed allowance value basis. The contractor shall retain Liberty Utilities to perform the installation of the new gas service.

Payment

2. Payment will be made upon receipt of a copy of the Liberty Services invoices and a copy of the Contractor’s check to Liberty services.

1.5 PAYMENT PROCEDURES

A. Informal submittal: Unless otherwise directed by the Engineer:

1. Make an informal submittal of request for payment by filling in, with erasable pencil, pertinent portions of EJCDC C-620, Contractor’s Application for Payment, plus continuation sheet or sheets.
2. Make this preliminary submittal to the Engineer at the last regular job meeting of each month.
3. Revise the preliminary submittal as approved by the Engineer and incorporate the approved payments into the formal submittal.

B. Formal submittal: Unless otherwise directed by the Engineer:

1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or electronically on EJCDC C-620, Contractor’s Application for Payment, plus continuation sheet or sheets.
2. Sign and notarize the Application for Payment.

3. Submit the original of the Application for Payment, plus six identical copies of the continuation sheet or sheets, to the Engineer.
4. The Engineer will compare the formal submittal with the approved informal submittal and, if acceptable, will sign the Contractor's Application for Payment, and present the Application to the Owner.
5. Provide a signed and notarized Certificate for Stored Materials and proof of storage in a dry, watertight, heated and insured warehouse facility.

#### 1.6 PAYMENT REQUESTS FOR STORED MATERIALS

- A. Requests for payment for stored materials shall be made in accordance with Section 00 72 00 and shall be accompanied by the attached "Certificate for Stored Materials" form. Payment for stored materials shall not exceed the value actually paid by the Contractor for the stored materials as evidenced by the accompanying bill of sale, invoice, or other documentation.
- B. Partial payment requests for materials stored or so-called "engineering costs" by equipment manufacturers will not be allowed. All such costs shall be distributed proportionately among the various items of equipment/hardware to be furnished.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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CERTIFICATE FOR STORED MATERIALS

\_\_\_\_\_  
Tighe & Bond Project No.

We, \_\_\_\_\_, request payment for materials and/or equipment not incorporated in the work included under our firm's contract with \_\_\_\_\_ as listed below.

We hereby certify under penalty of perjury, that the materials not incorporated in the work have been delivered and are securely stored at the site or at \_\_\_\_\_ and that we have title to said materials free and clear of all Liens, as evidenced by the attached bill of sale, invoice, or other documentation.

We also certify that an inventory of said materials and/or equipment has been compiled for the purposes of this monthly partial payment request. This list of materials and/or equipment, including unit prices for said material not incorporated in the work for which payment is hereby requested, consisting of \_\_\_\_\_ pages and dated \_\_\_\_\_, is signed and attached hereto.

We acknowledge that payments made based on this request for materials and/or equipment not incorporated in the work does not relieve the contractor of its responsibility for furnishing all materials and equipment required for the satisfactory completion of the project pursuant to the contractual requirements.

We further certify that we can and will adequately protect said materials and/or equipment until they are incorporated in the work; that they meet the requirements of the specifications, and that they will be needed for incorporation in the work in the near future.

IN WITNESS WHEREOF, we, the said \_\_\_\_\_ h-  
ereunto set our hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Contractor's Firm Name

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Notary Public

SCHEDULE OF STORED MATERIALS

Job No. \_\_\_\_\_  
 Contract No. \_\_\_\_\_  
 Contractor: \_\_\_\_\_  
 Location: \_\_\_\_\_

Date \_\_\_\_\_  
 Pay Estimate \_\_\_\_\_

Item	Description	Supplier/Manufacturer	Quantity Stored and not Incorporated	Unit \$	Certified Value

Signature: \_\_\_\_\_  
 Contractor's Principal

Total Amount Due for Stored Materials \_\_\_\_\_

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



SECTION 01 31 00

COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Project Management
2. General Coordination Procedures
3. Requests for Information (RFIs)
4. Coordination Drawings
5. Project Meetings

B. Related Requirements

1. Section 01 14 00 - Work Restrictions
2. Section 01 32 13 - Scheduling of Construction

C. Related Work Not Included

1. Operation of existing facilities will be performed by the Owner unless otherwise specified. The Owner will assist in arranging operation of any existing facilities or equipment required by the Contractor to connect to existing facilities, and the Contractor shall not operate existing valves or equipment. Only the Owner will operate Owner valves.

1.2 SUBMITTALS

A. Incorporate the requirements of this Section, as well as Work which may impact the existing system operation, or the operations of any adjacent utility, in the project schedule submitted under Section 01 32 13.

B. Informational Submittals

1. Submit to the affected utility company, the Owner, and the Engineer, in writing, all requests for temporary shutdowns of facilities or interruption of operations. No shutdowns of the water system or interruptions to existing operations will be permitted except as outlined in this Section. Submit requests at least 2 weeks prior to the beginning of the Work requiring shutdown or interruption. No shutdown shall occur without the approval of the utility company or the Owner.
2. RFI Log
3. Coordination drawings
4. At the pre-construction conference, supply to the Owner the cell phone number of a responsible person who may be contacted during off-hours for emergencies 24 hours a day, seven days a week.

5. Prepare a contact list of phone numbers, including cell phone numbers, and emails for all Project personnel and submit to the Engineer within one week after the pre-construction conference. Include Contractor, Owner, Engineer, and City personnel including police, fire, and ambulance.
6. Submit to the Owner and Engineer, in writing, all requests for valve operations at least 2 weeks prior to commencing operation.

### 1.3 PROJECT MANAGEMENT

- A. Retain a full-time Superintendent, satisfactory to the Owner and Engineer. The Superintendent shall not be changed except with the consent of the Owner and Engineer. The Superintendent shall be in full charge of the Work.
- B. Complete the Work in a continuous uninterrupted operation. Use sufficient personnel and adequate equipment to complete the Work within the Contract Time.

### 1.4 GENERAL COORDINATION PROCEDURES

- A. Do not interfere with the operation of the existing facilities.
- B. Perform all coordination necessary to complete connections to the existing pipelines.
- C. Coordinate with appropriate utility companies, as well as with the Owner, where the Work crosses or is adjacent to existing utilities.
- D. Coordinate with Owner and other contractors completing the concurrent Phase II and Phase III projects related to the construction of the proposed salt shed and the building improvements at the former incinerator building, respectively.

### 1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Engineer will return without response those RFIs submitted to Engineer by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name
  2. Project number
  3. Date
  4. Name of Contractor
  5. Name of Engineer and Construction Manager
  6. RFI number, numbered sequentially
  7. RFI subject

8. Specification Section number and title and related paragraphs, as appropriate
  9. Drawing number and detail references, as appropriate
  10. Field dimensions and conditions, as appropriate
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. Engineer's Action: 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.

#### 1.6 PROJECT MEETINGS

##### A. Pre-Construction Conference

1. The Contractor shall be prepared to discuss the following subjects at the Pre-Construction Conference. Documentation for these items is required to be submitted within the time frames included in individual specification sections.
  - a. Project scheduling
  - b. Sequencing of critical path Work items
  - c. Shop Drawing procedures
  - d. Project changes and clarification procedures
  - e. Use of sites, access to Work areas, office and storage areas, security and temporary facilities
  - f. Contractor safety plan and representative
  - g. Progress payments and procedures
  - h. Required documentation
  - i. Project personnel contact list

##### B. Progress Meetings

1. Progress meetings will be held every week and at other times as requested by the Owner or as required by the Progress of the Work.
2. The Contractor's Superintendent shall attend all progress meetings.
3. At a minimum, progress meetings will review Work progress, schedule, Shop Drawing submission schedule, Applications for Payment, and other matters needing discussion and resolution.

4. Review the schedule with all parties to be affected by upcoming work.
5. Review the monthly construction report required under Section 01 32 13.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Notify DIGSAFE at 1-888-344-7233 at least 72 hours prior to any digging, trenching, rock removal, demolition, borings, backfill, grading, landscaping, or any other earth moving operations.

### 3.2 COORDINATION WITH THE OWNER'S OPERATIONS

- A. Notify the Owner and Engineer, in writing, a minimum of 1 week in advance of commencing Work on site. Work on site shall not occur until all permits are obtained.
- B. Notify the Owner and Engineer, in writing, a minimum of 1 week before commencing any work which may affect the Owner's operations.
- C. Perform all construction activities so as to avoid interference with operations of the facility and the work of others.
- D. Coordinate the following operations with the Owner and the Engineer:
  1. Operation of existing valves. The opening and closing of existing valves will be performed by the Owner.
  2. Refilling, disinfection, flushing and re-activation of the existing pipeline and new water mains.
  3. Access of workers and municipal vehicles to the existing DCM Facility
- E. The Owner has the authority to order Work stopped which could unreasonably result in stopping the necessary functions of the facility. Any costs and/or delays associated with these work stoppages due to the Contractor's operation shall be borne by the Contractor.

### 3.3 SEQUENCE OF CONSTRUCTION

- A. Constructing the proposed improvements while maintaining existing operations will require a specific sequence of construction. The Contractor will be allowed reasonable flexibility in scheduling the construction activities. Provide a detailed construction schedule as required in Section 01 32 13.

### 3.4 SHUTDOWNS

- A. Water service shutdowns as a result of construction activities are not permitted, unless otherwise noted in this Section. Existing water mains owned by other utilities shall not be shut down unless authorized by the appropriate utility company and the Owner. Notify water system customers regarding interruptions in service at least one week in advance. Coordinate with the Owner regarding scheduling such notifications. An existing main shall not be shut off for more than 6 hours.
- B. Rescheduling or reactivation of any temporary shutdowns may be required if an emergency occurs in the distribution system, such as a major pipeline break or fire.

- C. Test all pipelines, valves and appurtenances and place in operating condition before the final tie-ins are made to connect new equipment to the existing facility.

END OF SECTION

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SECTION 01 32 13

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Progress Schedule
- B. Related Requirements
  - 1. Section 01 14 00 - Work Restrictions
  - 2. Section 01 31 00 - Coordination

1.2 REFERENCES

- A. The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry, an Associated General Contractors (AGC) of America publication.

1.3 PROGRESS SCHEDULE

- A. Network Analysis
  - 1. Prepare an electronic network analysis using the critical path method under concepts and methods outlined in the current edition of AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry."
- B. Graphically show the order and interdependence of activities, sequence of Work, how the start of a given activity depends on completion of preceding activities, and how completion of an activity may restrain the start of subsequent activities.
- C. The Work shall be planned by the Contractor and his Project field superintendent in coordination with all Subcontractors and Suppliers whose Work is shown on the Progress Schedule.
- D. Include, at a minimum, the following activities on the Progress Schedule:
  - 1. Project mobilization
  - 2. Submittal and approval of Shop Drawings
  - 3. Procurement of equipment and critical materials
  - 4. Installation of equipment and critical materials
  - 5. Fabrication of special equipment and material, and its installation and testing
  - 6. Final inspecting and testing
  - 7. Punchlist
  - 8. Final cleanup
  - 9. Other activities that may be critical to the Progress Schedule

10. All activities of the Owner and the Engineer which affect progress and/or affect required dates for completion of the Work
- E. Take into consideration Shop Drawing submittal and approval time, the delivery times of equipment and materials, Subcontractors' Work, availability and abilities of workmen, weather conditions, any restrictions in operations at the Work site, and all other items that may affect completion of the Work within the Contract Time.
- F. The Progress Schedule shall reflect the requirements and constraints outlined in Section 01 31 00, Coordination.
- G. The Progress Schedule shall reflect Work restrictions outlined in Section 01 14 00.
- H. Show information in such detail that duration times of activities will range from one to 15 days. The selection and number of activities shall be subject to the approval of the Owner and Engineer.
- I. The Progress Schedule should show preceding and following event numbers for each activity, description of each activity, and activity duration in calendar days.
- J. Submit the Progress Schedule on maximum sheet size 30-inches high by the width required.

#### 1.4 SUBMITTALS

##### A. Informational Submittals

1. Submit four prints of the preliminary Progress Schedule prepared in accordance with Article 2.05 of Section 00 72 00 and the requirements of this section. Progress schedule must be submitted within 10 days after the Effective Date of the Agreement. Progress Schedule must be approved by the Owner and Engineer before the first progress payment will be made.
2. Revised analyses - Within 10 days after receipt of the review comments, submit four prints of the Progress Schedule revised in accordance with those comments.
3. Periodic reports - On the first progress meeting of each month, submit four prints of the updated Progress Schedule, as well as a report of construction activities in the prior month.
4. Before initiating the Work, submit an estimated monthly rate of Contractor payments for the project. If the payment schedule deviates from the original projection, submit a revised rate of expenditure schedule.

#### 1.5 PERIODIC REPORTS

- A. At the first scheduled progress meeting of each month, present four copies of a construction report which details the Work performed during the preceding period. The report shall include the following at a minimum:
  1. Actual progress of Work. Update the Progress Schedule accordingly.
  2. The Progress Schedule, or revised Progress Schedule, should show the portions of the Progress Schedule impacted by the Work progress.
  3. Activities or portions of activities completed during the reporting period, and their total value as basis for Contractor's periodic request for payment.



Payment made will be based on the total value of such activities completed or partially completed after verification by the Engineer.

4. State the percentage of the Work actually completed and scheduled as of the report date, and the progress along the critical path in terms of days ahead of or behind the dates defined in the Progress Schedule.
5. If the Work is behind the dates set forth in the Progress Schedule, also report progress along other paths with negative slack.
6. Include a narrative which includes:
  - a. A description of problem areas, anticipated and current
  - b. Delaying factors and their impact
  - c. An explanation of corrective actions taken or proposed
7. Show the date of latest revision.

**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION – NOT USED**

**END OF SECTION**

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SECTION 01 32 33

CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Photographs taken at specified intervals before, during and after construction.

1.2 SUBMITTALS

A. Informational Submittals

1. Submit electronic files of each photograph on a CD or USB flash drive.

PART 2 PRODUCTS

2.1 CONSTRUCTION PHOTOGRAPHS

- A. Electronic files shall be in .jpg format.

PART 3 EXECUTION

3.1 PRE-CONSTRUCTION PHOTOGRAPHY

- A. Prior to the commencement of any Work under this Contract, take photographs throughout the proposed limit of work. The photographs will serve as a record of the original conditions where construction activities will occur.
- B. The area to be photographed shall include, but not be limited to, the area within and adjacent to the proposed construction, including roadways, utilities, driveways, landscaping, trees, structures and buildings.

3.2 PROGRESS PHOTOGRAPHY

- A. Take construction photographs of active work areas at least every 2 weeks throughout the life of the Contract. The photographs shall be indicative of the work that is currently in progress. A minimum of 3 photographs shall be taken at each scheduled interval at each location where Work is in progress.
- B. Take photographs of each building site after removal of foundations and building debris and prior to backfilling and grading. The photographs shall show the entire foundation area.
- C. Take photographs of all utility abandonments.
- D. Take photographs of all relocated utility connections.

3.3 POST-CONSTRUCTION PHOTOGRAPHY

- A. Provide post construction photography after all Work has been completed at each location. The locations to be photographed and the number of photographs required shall be as specified in Paragraph 3.1 for the preconstruction photography.

END OF SECTION

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Action Submittals
  - 2. Informational Submittals

1.2 DEFINITIONS

- A. Action Submittals – includes written and graphic information submitted by Contractor that requires Engineer’s approval.
- B. Informational Submittals – includes information submitted by Contractor that does not require Engineer’s approval. The Engineer will acknowledge receipt of such documents and provide comments when the submittals lack the detail required by the Contract Documents.

1.3 ACTION SUBMITTALS

- A. Shop Drawings
  - 1. Shop Drawings as defined in the General Conditions, and as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shop work manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as applicable to the Work.
  - 2. Shop Drawings shall be of standardized sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard size drawings shall be
    - a. 24 inches by 36 inches
    - b. 22 inches by 34 inches
    - c. 11 inches by 17 inches
    - d. 8.5 inches by 11 inches
  - 3. Submit Shop Drawings at the proper time to prevent delays in delivery of materials. Coordinate submittals for related or interdependent equipment.
  - 4. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.
  - 5. Check all Shop Drawings regarding measurements, size of members, materials, and details to determine if they conform to the Contract Documents. Shop Drawings found to be inaccurate, not in compliance, or otherwise in error shall

be returned to the Subcontractors or Suppliers for correction before submission to the Engineer. Drawings that are current shall be marked with the date, name, and approval stamp of the Contractor.

6. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the Shop Drawings before being submitted for approval.
  7. Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be drawn to scale and fully dimensioned.
  8. No material or equipment shall be purchased or fabricated until the required Shop Drawings have been submitted and approved. Materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by the Shop Drawings.
  9. Until the necessary approval has been given, do not proceed with any portion of the work, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.
  10. If submitted equipment requires modifications to the structures, piping, layout, or other details shown on the Drawings, details of the proposed modifications must also be submitted for approval. If such equipment and modifications are approved, perform all Work necessary to make such modifications at no additional cost to the Owner.
- B. Product Data: Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing, and printed product warranties, as applicable to the Work.
- C. Samples and color selection charts: Provide sample, when requested by individual Specification to establish conformance with the Specifications, and as necessary to define color, texture and pattern selections available.
- D. Product Substitutions: In accordance with Section 01 25 00.
- E. Operation and Maintenance Manuals: In accordance with Section 01 77 00.
- F. Schedule of Values: In accordance with Section 01 29 73.
- G. Site Usage Plan: In accordance with Section 01 14 00.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Schedule of Submittals
  - 1. Submit a preliminary Schedule of Submittals within 10 days of the Effective Date of the Agreement in accordance with Article 2.05 of Section 00 72 00.
- B. Schedule of Manufacturers and Suppliers
  - 1. Submit a schedule of manufacturers and Suppliers within 7 days after Notice to Proceed including the names and addresses of the manufacturers and Suppliers of materials and equipment to be incorporated into the Work.
- C. Schedule of Major Products
  - 1. Submit a schedule of major products within 30 days after Notice to Proceed including a complete list of major products proposed for use, with specification section number, name of manufacturer, trade name, and model number of each product.
- D. Product Listing and Manufacturers Qualifications
  - 1. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards. Specifically identify the products, the anticipated schedule for delivery and storage, and the estimated value thereof for materials which the Contractor intends to request approval for off-site storage.
- E. Certificates of Compliance
  - 1. General:
    - a. Submit sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the Specification section conform with the Contract Documents.
    - b. Certificates shall be signed by an officer of the manufacturer's corporation and witnessed by a Notary Public.
  - 2. Welding: Submit in accordance with individual Specification sections.
  - 3. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.
  - 4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
  - 5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency, or when specified in individual Specification sections.
  - 6. Manufacturer's Certificate of Compliance: In accordance with individual Specification sections.
- F. Application for Payment

1. Submit applications for payment in accordance with Section 01 22 00, Measurement and Payment or Section 01 29 76, Application and Certificate for Payment.
  2. Submit schedule of stored materials when requesting payment for materials not yet installed.
- G. Construction Photography and Videography: Provide preconstruction, progress, and post-construction photography and videography in accordance with Sections 01 32 33 and 01 32 36.
- H. Contract Closeout Submittals: In accordance with Section 01 77 00.
- I. Contractor Design Data
1. Written and graphic information
  2. List of assumptions
  3. List of performance and design criteria
  4. Summary of loads or load diagram
  5. Calculations
  6. List of applicable codes and regulations
  7. Name and version of software
  8. Information requested in individual Specification section
- J. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.
- K. Schedules - Submit construction progress schedules and schedule updates in accordance with Section 01 32 13.
- L. Statement of Qualifications: Submit evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty subcontractor, trade, specialist, consultant, installer, and other professionals.
- M. Submittals Required by Laws, Regulations, and Governing Agencies
1. Submit promptly notifications, reports, certifications, payrolls, and other required information as may be required, directly to the applicable federal, state, or local governing agency or their representative.
  2. Transmit to Engineer for Owner's records, one copy of correspondence and transmittals (including enclosures and attachments) between Contractor and governing agency.
- N. Test and Inspection Reports
1. Submit test and inspection reports as required by individual Specification sections.



2. Test and inspection reports shall contain signature of person responsible for test or report.
  3. Reports shall include identification of product and Specification, project name, date and time of test, type of test, location, test results, corrective action required if report indicates test is not in compliance with Contract Documents, interpretation of test results, and other information as required in individual Specification sections.
- O. Equipment Data: Submit information on equipment to be used in the performance of the Work as required by individual Specification sections.
  - P. Testing and Start-up Data: Prepare and submit testing procedures proposed to perform testing required by individual Specification sections.
  - Q. Vendor Training Plan: At least two weeks prior to scheduling training of Owner's personnel, submit lesson plans for vendor training in accordance with individual Specification section and manufacturer's Operations and Maintenance Manuals.
  - R. Health & Safety Plans: When specified in individual Specification sections, prepare and submit a Health and Safety Plan modified or supplemented to include job-specific considerations.
  - S. Submittals stamped by another Professional Engineer: When specified in individual Specification sections, prepare and submit calculations and/or drawings stamped by a Professional Engineer licensed in the State where the work is being performed.
  - T. Coordination Drawings: When specified in individual Specification sections, prepare and submit drawings to show how multiple system and interdisciplinary work will be coordinated. Examples are conduit routing diagrams, duct layouts, utility coordination drawings, sprinkler plans etc.
  - U. Work Plans: When specified in individual Specification sections, prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities.
  - V. Erosion Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of erosion control plans.
  - W. Traffic Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of traffic control plans.
  - X. Shutdown Requests: Submit notification of any outages required (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless otherwise specified, provide outage requests a minimum of 7 days' notice shall be provided.
  - Y. Equipment Data: When specified in other Specification sections, information on equipment used by the Contractor to complete the Work, such as compaction equipment and closed-circuit television inspection equipment.

## 1.5 PROCEDURES

### A. Coordination

1. Prepare and submit documentation in advance of fabrication and product manufacturer, so that the installation will not be delayed, other related work can be properly coordinated, and there is adequate time for review and resubmission, if required.
  2. Provide no less than 30 days for review of submittals from the time received by the Engineer. For submittals of major equipment, that require more than 30 days to review, due to complexity and detail or those requiring review by multiple engineering disciplines, Engineer will notify Contractor of the circumstances and identify the anticipated date when the submittal will be returned.
  3. Re-submittals will be subject to same review time.
  4. No extension of time will be authorized due to failure to provide approvable submittals sufficiently in advance of the Work.
- B. Review Shop Drawings, product data, and samples prior to submission and verify and determine:
1. Field measurements
  2. Conformance with the Contract Documents. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.
  3. Delete or strike out information that is not applicable to the Work.
- C. Upload the electronic submittal files via Procore. Access to Procore will be provided by the Engineer. Files must be in .pdf format. The submittals will be returned in electronic .pdf format via Procore.
- D. Numbering: Submissions shall be accompanied by a transmittal form referencing the project name and applicable Specification section. Submittals shall be numbered sequentially, with the applicable Specification section and a hyphen preceding the number. (*e.g.* Submittal number 11 33 00-01). Resubmittals shall bear the same transmittal number with a revision number commencing with "1" (*e.g.* Submittal number 11 33 00-01-1).
- E. Provide a copy of the Submittal Certification Form (copy attached at the end of this section) which shall be attached to every copy of each submittal as required under Article 7.16 A.2 of Section 00 72 00. Apply the Contractor's stamp and initials or signature certifying that the submission has been thoroughly reviewed for completeness, compliance with the Contract Documents, coordination with adjacent construction and dimensional compatibility. Items submitted without the stamp or that are incomplete will be returned by the Engineer for rework and resubmission.
- F. Provide a copy of the PE Certification Form (copy attached at the end of this section) which shall be attached to every copy of each submittal stamped by another Professional Engineer. Items submitted without the completed certification form will be returned by the Engineer for resubmission.
- G. Distribute copies of reviewed submittals along with the Engineer's transmittal to concerned parties with instructions to promptly report any inability to comply with the provisions or integrate the requirements with interfacing work.

H. Partial and Incomplete Submittals

1. Shop Drawings shall be submitted as a complete package by Specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials, and samples associated with each Specification section be included as a single submittal for the Engineer's review.
2. Engineer will return entire submittals if preliminary review deems it incomplete including:
  - a. Missing or incomplete Submittal Certification Form
  - b. Insufficient number of copies
  - c. Missing content
3. Partial submittals may be considered, at Engineer's option, only when necessary to expedite the Project.
4. Partial submittals shall be clearly identified as such on the transmittal to identify missing components.

I. Submittals not required by the Specification will be returned without review or action code.

J. Resubmission

1. Make corrections and modifications required by the Engineer and resubmit until approved.
2. Clearly identify changes made to submittals and indicate other changes that have been made other than those requested by the Engineer.
3. A maximum of two re-submissions of each shop drawing will be reviewed, checked and commented upon without charge to the Contractor (total of 3 submittals). Any additional submissions which are required by the Engineer to fulfill the stipulations of the Contract Documents will be charged to the Contractor as described in paragraph 7.16.E.2 of Section 00 72 00.

K. Distribution

1. Distribute approved Shop Drawings and approved product data to the Project Site and elsewhere as required to communicate the information to Suppliers, Subcontractors, and field personnel.

1.6 ENGINEER'S REVIEW

- A. The Engineer will review submittals for design, general methods of construction and detailing. The Engineer's review and approval of submittals shall not be construed as a complete check nor does it relieve the Contractor from responsibility for any departures or deviations from the requirements of the Contract Documents unless he has, in writing, called the Engineer's attention to such deviations at the time of submission. It will not extend to means, methods, technique, sequences, or procedures of construction (except where specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto.

- B. The Engineer's review of the submittals shall not relieve the Contractor from the responsibility for proper fitting of the Work, or the responsibility of furnishing any work required by the Contract Documents which may not be indicated on the submittals. The Contractor shall be solely responsible for any quantities shown on the submittals.
- C. If the Contractor considers any correction indicated on the submittals to constitute a change to the Contract Documents, the Contractor shall provide written notice to the Engineer at least 7 working days prior to release for manufacture.
- D. When the submittals have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- E. Action submittals as defined in paragraph 1.2 will be reviewed and returned under one of the following codes:
  - 1. Approved (Action Code 1) is assigned when there are no notations or comments on the submittal. Equipment or materials may be released for manufacture, provided that it complies with requirements of the Contract Documents.
  - 2. Approved as Noted (Action Code 2) is assigned when there are notations or comments on the submittal, but the equipment or materials may still be released for manufacture. All notations and comments must be incorporated in the final product. Resubmission is not necessary.
  - 3. Revise and Resubmit (Action Code 3) is assigned when there are notations and comments requiring a resubmittal of the package. Work cannot proceed until the submittal is revised and resubmitted for review.
  - 4. Not Approved (Action Code 4) is assigned when the submittal contains non-specified items or does not meet the requirements of the Contract Documents. It may also be assigned when there is a significant amount of missing material required for the Engineer to perform a complete review. The entire package must be resubmitted, revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.
- F. Informational submittals as defined in paragraph 1.2 do not require approval by the Engineer. Such submittals will be returned under one of the following codes:
  - 1. Receipt Acknowledged (Action Code 5) is assigned when the submittal is provided for documentation purposes and is acknowledged as received. Comments may be noted using this action code.
  - 2. Revise and Resubmit (Action Code 6) is assigned when there are notations and comments requiring a resubmittal of the package.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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**SUBMITTAL CERTIFICATION FORM**

PROJECT: \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ENGINEER'S PROJECT NO.: \_\_\_\_\_  
CONTRACTOR: \_\_\_\_\_ CONTRACTOR'S PROJECT  
NO.: \_\_\_\_\_

TRANSMITTAL NO.: \_\_\_\_\_ SUBMITTAL NO.: \_\_\_\_\_  
SPECIFICATION NO.: \_\_\_\_\_ DRAWING NO: \_\_\_\_\_  
DESCRIPTION: \_\_\_\_\_  
MANUFACTURER: \_\_\_\_\_

The above referenced submittal has been reviewed by the undersigned and I/we certify that the materials and/or equipment meets or exceeds the project specification requirements; that field measurements, dimensions, quantities, specified performance criteria, installation requirements, materials, catalog numbers and related materials have been verified; that all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the work has been determined and verified; that review includes all information related to the contractor's sole responsibility for means, methods, techniques, sequences, and procedures of construction and safety; and item has been coordinated with the overall project with:

- NO DEVIATIONS
  
- A COMPLETE LIST OF DEVIATIONS AS FOLLOWS:

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

SUBMITTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

GENERAL CONTRACTOR'S STAMP
----------------------------

**PE CERTIFICATION FORM**

The undersigned hereby certifies that he/she is a Professional Engineer registered in the Commonwealth of Massachusetts and that he/she has been employed by

\_\_\_\_\_ to design  
(Name of Contractor)

\_\_\_\_\_  
(Insert PE Responsibilities)

In accordance with Specification section \_\_\_\_\_ for the

\_\_\_\_\_  
(Name of Project)

The undersigned further certifies that he/she has performed the said design in conformance with all applicable local, state and federal codes, rules and regulations; and, that his/her signature and PE stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the

\_\_\_\_\_  
(Insert Name of Owner)

or Owner's representative within seven days following written request therefor by the Owner.

\_\_\_\_\_  
PE Name

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

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SECTION 01 35 29

HEALTH & SAFETY PLAN

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor shall:

1. develop a site-specific Health and Safety Plan (HASP) specifically addressing the potential hazards that may be encountered at the work site. The HASP shall include the information described in this specification (as applicable) and meet all applicable OSHA requirements.
2. furnish all labor, equipment, materials, and employee training for effective implementation of the HASP and worker health and safety protection of all Contractor personnel.
3. furnish all labor, equipment, materials, and employee training to effectively complete any required air monitoring and/or decontamination.
4. review the requirements and data provided for the project and supplement the HASP with any additional measures deemed necessary to fully comply with applicable regulatory requirements and to adequately protect personnel on the site.
5. maintain a copy of the HASP at the worksite, accessible to employees working at the site.
6. post the emergency response plan section of the HASP, inclusive of emergency alerting and response procedures and directions to the nearest hospital, in a visible location for all workers to see.

B. Related Sections

1. 02 81 00 – Contaminated Soil Excavation
2. 02 41 00 – Demolition
3. 02 80 00– Hazardous Materials/ Universal Waste Management

1.2 SITE-SPECIFIC PROJECT CONDITIONS

- A. The Contractor shall review and understand all existing information as it relates to potential exposure to subsurface site contaminants, environmental data and reports. Reference Section 00 73 00 for copies of applicable environmental data.
- B. The Contractor shall review and understand all existing information as it relates to potential exposure to hazardous structure/building materials (i.e., asbestos, polychlorinated biphenyls (PCBs), lead paint, and oil/hazardous materials containers). Site-specific information with respect to potential exposures to hazardous structure/building materials are included in applicable technical specifications contained herein. See applicable Sections 02 81 00, 02 41 00, 02 80 00 for applicable environmental data.

- C. The nature of the materials present at the site may require use of special protective clothing and the possible use of respiratory protective equipment, which is intended to help minimize worker exposure to known or suspected site hazards.
  - 1. Levels of personal protection are established in reference standards and generally described for Levels C and D herein. It is anticipated that a majority of the Work to be performed on this project may be performed at Personnel Protection Level D.
  - 2. The Contractor shall be responsible for determining if a higher level of personnel protection is required based on the criteria outlined in the Contractor's HASP. In the event that the Contractor determines that a level of protection higher than Level D is required, the Contractor's personnel shall take the necessary steps outlined in the Contractor's HASP.
  - 3. The Contractor shall notify the Engineer and Owner in writing prior to implementing any upgrades in personal protection. The Engineer will review the Contractor's notification and determine the need to notify other applicable agencies.

### 1.3 REFERENCES

- A. OSHA 29 CFR Part 1910 (General Industry standards)
- B. OSHA 29 CFR Part 1926 (Construction Standards)
- C. OSHA Regulation 29 CFR §1926.62 (Lead)

### 1.4 DEFINITIONS

- A. CHMM: Certified Hazardous Materials Manager, as certified by the Institute of Hazardous Materials Management.
- B. CIH: Certified Industrial Hygienist, as certified by the American Board of Industrial Hygiene®.
- C. CSP: Certified Safety Professional, as certified by the Board of Certified Safety Professionals.
- D. Site Safety and Health Official (SSHO): The individual located at a job site who is responsible to the Contractor and has the authority and knowledge necessary to implement the HASP and verify compliance with applicable safety and health requirements.
- E. HAZWOPER: Hazardous waste operations and emergency response (HAZWOPER) standards, per the Occupational Safety and Health Administration's (OSHA's) 29 CFR §1910.120 and 29 CFR §1926.65 regulations.
- F. Regulated clean-up site: A site regulated under OSHA's HAZWOPER standards contained in 29 CFR §1910.120 and 29 CFR §1926.65, inclusive of the following:
  - 1. clean-up operations required by a governmental body, whether federal, state, local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites,

2. corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA), and
  3. voluntary clean-up operations at sites recognized by federal, state, local or other governmental bodies as uncontrolled hazardous waste sites.
- G. Uncontrolled Hazardous Waste Site: An area identified as an uncontrolled hazardous waste site by a governmental body, whether federal, state, local or other where an accumulation of hazardous substances creates a potential threat to the health and safety of individuals or the environment or both.

#### 1.5 SUBMITTALS

- A. On-site Work shall not begin until the HASP has been submitted by the Contractor and accepted by the Owner/Engineer.
- B. Informational Submittals
1. Submit the following within thirty (30) days after the Effective Date of the Agreement.
    - a. A site-specific HASP, including the information described in this Specification as applicable.
      - 1) The HASP must be reviewed, approved, and signed by a CSP, CIH, or CHMM.
      - 2) The Engineer's review is only to determine if the HASP is consistent with the minimum requirements of this specification. Engineer has no control over contractor's health & safety and the means and methods of health & safety implementation. Engineer also does not perform health & safety monitoring of Contractor's Work.
      - 3) The review will not determine the adequacy of the HASP to address all potential hazards, as that remains the sole responsibility of the Contractor.
    - b. Documentation of qualifications and experience of the SSHO.
    - c. Applicable health and safety training records.
  2. Submit health and safety certification and training records, including:
    - a. current certifications of employee's HAZWOPER training, and
    - b. current certification of HAZWOPER supervisor training for project supervisors.
  3. Contractor shall prepare and submit to Engineer for submittal to the EPA a Decontamination Plan detailing specific methods for decontamination of equipment and transport vehicles leaving the site.

#### 1.6 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor is solely responsible for the health and safety of workers employed by the Contractor, any subcontractor, vendors/manufacturers, site visitors and anyone directly or indirectly employed by any of them.
- B. Provide a designated SSHO for the project.
- C. Pre-arrange emergency medical care services at a nearby hospital or medical clinic, including establishment of an emergency notification process and emergency routes of travel.
- D. Conduct pre-entry and weekly safety meetings with all site personnel, documenting attendance and topics covered.
- E. Develop and implement the site-specific HASP, inclusive of the elements in contained in this specification.
- F. For projects where contaminated media are known, likely, or suspected to be encountered:
  - 1. monitor air quality in and around the work area using appropriate air monitoring equipment.
  - 2. develop and implement a respiratory protection program per 29 CFR §1910.134 and 29 CFR §1926.103 for all workers authorized to wear respirators.
  - 3. record all air quality readings and maintain records on site.
  - 4. stop work and/or upgrade respiratory protection or personal protective equipment levels if action levels established in the HASP are exceeded.
  - 5. ensure that the degree and type of respiratory protection provided is protective for the monitored concentrations and individual chemical parameters.
  - 6. lawfully dispose of all personal protective equipment that cannot be decontaminated.
- G. Work under this contract is being performed on a “Regulated clean-up site”, as defined in 29 CFR §1910.120, 29 CFR §1926.65, and Article 1.4 F, above.
- H. The site-specific HASP must include all elements required by OSHA’s HAZWOPER standard, as contained in 29 CFR §1910.120(b) and 29 CFR §1926.65(b) and the elements in this specification.
- I. Train all workers assigned to areas where contaminated media are likely to be encountered in accordance with 29 CFR §1910.120(e) and 29 CFR §1926.65(e).
- J. Develop and implement a medical surveillance program per 29 CFR §1910.120(f) and 29 CFR §1926.65(f) for applicable employees.

#### 1.7 HEALTH & SAFETY PLAN (HASP) REQUIREMENTS

- A. The HASP shall comply with the requirements of 29 CFR §1910.120(b)(4) and 29 CFR §1926.65(b)(4).
- B. The following items shall be included/addressed in the HASP:

1. a safety and health risk or hazard analysis for each site task and operation in the workplan;
  - a. a physical hazard evaluation and hazard control plan shall be included covering, but not limited to the following, as applicable:
    - 1) equipment operation;
    - 2) confined space entry;
    - 3) slips, trips, and falls;
    - 4) building collapse;
    - 5) falling debris;
    - 6) encountering unmarked utilities;
    - 7) cold and heat stress;
    - 8) hot work (cutting and welding);
    - 9) drum and container handling;
    - 10) trench and/or excavation entry.
2. employee training assignments to assure compliance with 29 CFR §1910.120(e) and 29 CFR §1926.65(e).
3. personal protective equipment to be used for each site task and operation in the workplan;
  - a. inclusive of a personal protective equipment program to comply with 29 CFR §1910.120(g)(5) and 29 CFR §1926.65(g)(5).
4. medical surveillance requirements to comply with 29 CFR §1910.120(f) and 29 CFR §1926.65(f).
5. the 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 to be used.
  - a. The action level (AL) and Permissible Exposure Limit (PEL) for each contaminant must be listed along with the type of monitoring instrument that will be used.
  - b. The frequency of the monitoring must also be included (i.e. continuous, daily, weekly, monthly).
6. site control measures to comply with 29 CFR §1910.120(d) and 29 CFR §1926.65(d).
7. decontamination procedures to comply with 29 CFR §1910.120(k) and 29 CFR §1926.65(k).

8. an emergency response plan for the safe and effective response to emergencies, including the necessary PPE and other equipment to comply with 29 CFR §1910.120(l) and 29 CFR §1926.65(l);
  - a. including, but not limited to the following:
    - 1) a map indicating the route to a nearby hospital or medical clinic for emergency medical care;
    - 2) procedures for emergency medical treatment and first aid;
    - 3) the names of three (3) Emergency Response Contractors, experienced in the removal and disposal of oils and hazardous chemicals, that the Contractor intends to use in the event of an emergency;
    - 4) site evacuation routes and procedures;
    - 5) emergency alerting and response procedures.
9. confined space entry procedures to comply with 29 CFR §1910.146 and 29 CFR 1926, Subpart AA.
10. a spill containment program to comply with 29 CFR §1910.120(j) and 29 CFR §1926.65(j).

## PART 2 PRODUCTS

### 2.1 AIR MONITORING EQUIPMENT

- A. If organic vapors or total hydrocarbons are known, likely, or suspected to be encountered during the work:
  1. provide and maintain a portable photo-ionization detector (PID) or flame-ionization detector (FID) capable of detecting organic vapors or total hydrocarbons. Equipment shall be sensitive to the 0.5 parts per million (PPM) level.
- B. If hazardous atmospheres (oxygen, hydrogen sulfide, carbon monoxide, methane, etc.) are known, likely, or suspected to be encountered during the work:
  1. provide and maintain an applicable multi-gas analyzer to measure concentrations in applicable work environments (i.e. confined spaces, trenches, tunnels, buildings, etc.).
- C. If there is a potential for the accumulation of explosive gas:
  1. provide and maintain an explosimeter (LEL meter).
- D. If there is a potential for visible dust emissions or the site, dust monitoring must be considered.
  1. The Contractor is responsible for monitoring fugitive dust emissions in accordance with applicable local, state, and federal regulations.
  2. Equipment shall be sensitive to particulate matter less than 10 micrometer in size (PM<sub>10</sub>) at a level of 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

3. Contractor shall outline the dust monitoring program in their HASP, including applicable action levels.
- E. All air monitoring equipment shall remain the property of the Contractor.
- F. All air monitoring equipment readings must be recorded and be available for federal, state, and/or local regulatory personnel to review.

## 2.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. All PPE must conform to the OSHA requirements, as indicated in the previous Reference Standards Section. Various PPE to be furnished by the Contractor under different levels of protection for their own personnel and subcontractor's personnel include, but are not limited to, the following:
  1. Level D Protection:
    - a. Coveralls or Tyvek
    - b. Gloves
    - c. Safety boots/shoes
    - d. Safety glasses
    - e. Hearing protection (for high noise operations)
    - f. Hard hat with optional face shield
  2. Level C Protection:
    - a. Air-purifying respirator
    - b. Chemical protective overalls or Coveralls (e.g., Saran coated Tyvek)
    - c. Gloves, inner (disposable, surgical type)
    - d. Gloves, outer (Neoprene, Nitrile, Viton or Butyl)
    - e. Boots, chemical protective, steel toe and shank (Neoprene or Nitrile)
    - f. Booties, chemical protective (disposable PVC)
    - g. Hard hat
    - h. Face shield (if necessary)
  3. Levels B and A represent increased levels of personal protection and are described in the Reference Standards.
  4. Contractor is fully responsible for all PPE selection (including the various stages of protection), proper use, maintenance, and continuous monitoring.

## PART 3 EXECUTION

### 3.1 HEALTH AND SAFETY PLANNING AND IMPLEMENTATION

- A. Implement the HASP throughout the execution of all applicable work.
- B. The Contractor shall perform all monitoring as detailed in the HASP.

- C. Contractor(s) shall implement routine health and safety meetings and any follow-up supplemental briefings.
- D. Provide applicable health and safety training for all personnel who may come in contact with or be exposed to various dangerous, hazardous, or changing site conditions.
- E. Personnel who have not received applicable training and who are not equipped with the required PPE, shall not be permitted access to the site by the Contractor during the course of the work that may result in potential exposures to unsafe or hazardous site conditions.
- F. All personnel, including personnel for subcontractors, who must maintain 40-hour OSHA training, shall provide certificates of completion for the applicable 8-hour OSHA refresher course.

### 3.2 DUST CONTROL AND MONITORING

- A. Implement fugitive dust suppression to prevent unacceptable levels of dust resulting from contaminated soil excavation work. Dust suppression methods shall be subject to review by the Engineer. Supervise fugitive dust control measures and monitor airborne particulate matter as required.

### 3.3 PERSONNEL AND EQUIPMENT DECONTAMINATION

- A. All equipment shall be provided to the work site free of contamination. Engineer may prohibit from the site any equipment which in his opinion has not been thoroughly decontaminated prior to arrival. Any decontamination of Contractor's equipment prior to arrival at the site shall be at the expense of Contractor. Contractor is prohibited from decontaminating equipment on the project site which is not thoroughly decontaminated prior to arrival.
- B. Contractor shall furnish labor, materials, tools, and equipment for decontamination of all personnel, equipment and supplies which are used to handle contaminated materials.
- C. Properly store and dispose of contaminated PPE and all other generated decontamination waste.

### 3.4 INCIDENT REPORTING

- A. The Contractor shall comply with all accident and/or incident reporting requirements, including the following:
  - 1. Should any unforeseen safety-related factor, hazard, or condition become evident during the course of the work, the Contractor must immediately take action to establish, maintain, and secure the site and working conditions. This shall be followed by immediate notice to the Owner and Engineer.
  - 2. If injury to any person on-site occurs, the Contractor shall immediately report the incident to the Owner and Engineer. Corrective actions shall be implemented.



END OF SECTION

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SECTION 01 45 00

QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Quality assurance and control of the Work
2. Testing and inspection services
3. Product test reports
4. Manufacturer's field service

B. Related Requirements

1. Section 01 45 29 - Independent Testing Services
2. Testing requirements are described in various Sections of the Project Manual.

1.2 SUBMITTALS

A. Informational Submittals

1. Product test reports

1.3 QUALITY ASSURANCE

- A. Monitor quality control over Suppliers, products, services, site conditions, and workmanship to produce Work of specified quality.
- B. Comply fully with manufacturer's instructions. Should these instructions conflict with the Specifications, request clarification from the Owner before proceeding.
- C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or requirements indicate higher standards or more precise workmanship.

1.4 TESTING SERVICES FURNISHED BY CONTRACTOR

- A. Furnish all testing services required for materials and equipment proposed to be used in the Work, and quality control tests made in the field including:
  1. Concrete materials and mix designs
  2. Concrete in place
  3. Modified proctor analyses for all borrow materials used on the Project
  4. Modified proctor analysis of all subgrade material to be compacted during surface preparation and fine grading and compaction work
  5. Sieve analyses for all borrow materials used on the Project
  6. Soil structure and nutrient analyses for all loam and topsoil used on the Project

7. Compaction tests performed during trench backfilling and compaction, rough grading and site preparation, fine grading and compaction of roadway and sidewalk subgrades, and placement of roadway and sidewalk subbase materials
  8. Design of asphalt mixtures
  9. Asphalt in place
  10. Field welded joints
  11. All other tests and engineering data as required in the Contract Documents.
- B. Testing agencies must meet the requirements of Section 01 45 29.
  - C. An independent commercial testing laboratory, with current Massachusetts certification, shall perform all tests that require the services of a laboratory to determine compliance with the Contract Documents. Independent testing laboratory requirements are defined under Section 01 45 29.
  - D. Secure and deliver the required number of samples to the laboratory as required by the Contract Documents.
  - E. Notify Owner and Engineer of time, location and material being sampled.
  - F. Schedule necessary testing laboratory services.
  - G. Furnish written reports of each test within 48 hours of completion of testing.
  - H. Notify the Engineer 48 hours prior to operations requiring inspections and laboratory testing services so the Engineer may witness testing. All failed test areas shall be re-worked and re-tested until passing results are obtained.
  - I. The Owner may hire its own independent testing laboratory for quality control tests made in the field or laboratory on materials and equipment during and after their incorporation in the Work. Cooperate with the Owner and independent testing laboratory and furnish samples of materials, design, mix, equipment, tools, storage, and assistance as requested.
  - J. Re-work all failed test areas until passing results are obtained. All re-tests required as a result of the Contractor's failure to perform the work in accordance with the Contract Documents shall be at the Contractor's expense.
- 1.5 CODE COMPLIANCE TESTING
- A. Provide inspections and tests required by codes or ordinances, or by a legally constituted authority having jurisdiction over the Work.
- 1.6 PRODUCT TEST REPORTS
- A. Submit 2 copies of product test reports where required by the Contract Documents.
- 1.7 SUPPLIERS' FIELD SERVICE
- A. Provide qualified field service and installation personnel from material and equipment Suppliers to observe site conditions, installation techniques, quality of workmanship, equipment start-up, adjustment, and performance test where required by the Contract

Documents. Observations are to be reported and incorporated in the Work procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 45 29

INDEPENDENT TESTING SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Independent testing services including geotechnical, concrete, grout and mortar, and welding inspection and testing
2. Testing laboratory services

B. Related Requirements

1. Section 01 45 00 - Quality Control
2. Section 31 23 00 - Excavation, Backfill, Compaction and Dewatering
3. Section 31 05 13 - Borrow Material
4. Section 32 12 16 - Bituminous Concrete Pavement
5. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

A. General

1. ASTM E329 – Standard Specifications for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction

B. Soil Testing

1. American Association of State Highway and Transportation Officials (AASHTO)

C. Concrete Testing

1. Cement and Concrete Reference Laboratory (CCRL)

D. Welding Inspection

1. AWWA D-100-96 or latest version - AWWA Standard for Welded Steel Tanks for Water Storage
2. American Welding Society (AWS) B1.11 - Guide for the Nondestructive Examination of Welds
3. AWS B5.1 - Specifications for the Qualifications of Welding Inspectors
4. AWS B5.15 - Specifications for the Qualifications of Radiographic Interpreters
5. AWS ARE - 6 Test Methods for Evaluating Welded Joints
6. AWS ARE - 10 Monitoring and Control of Welding and Joining Processes

E. Coating Inspection

1. National Association of Corrosion Engineers (NACE)
2. SSPC – The Society for Protective Coatings

F. Masonry Inspection

1. ACI 530-02/ASCE 5-02 TMS 402-02 – Building Code Requirements for Masonry Structures
2. ACI 530.1-02/ASCE 6-02 TMS 602 – Specifications for Masonry Structures
3. ASTM C780 – Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Masonry
4. ASTM C1019 – Standard Test Methods for Sampling and Testing Grout

1.3 SUBMITTALS

A. Informational Submittals

1. Qualifications, experience, and certifications of each proposed testing service
2. Certificate of calibration for testing equipment
3. Inspection and test reports

1.4 QUALITY ASSURANCE

A. General

1. Comply with the requirements of Section 01 45 00, Quality Control, for testing and inspection requirements.
2. Testing services shall have the following general qualifications:
  - a. Minimum five years as a firm with the type of testing specified.
  - b. Ability to provide timely field testing services to minimize the impact of the testing requirements on construction progress.
  - c. Certification to perform the specified services in the state in which the Work is to be performed.
3. Testing services proposed by the Contractor shall be subject to review by the Owner and Engineer. Any testing firm not acceptable to the Owner or Engineer will be rejected.

B. All testing agencies and laboratories must meet the requirements of ASTM E329.

C. Testing company shall have been in business for a minimum of the last 5 years providing applicable testing services.

D. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to National Bureau of Standards. Submit copy of certificate of calibration made by accredited calibration agency.

E. Testing shall be in accordance with applicable codes and regulations referenced in individual Specification Sections, and with selected standards of the American Society for Testing and Materials.



PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING SERVICES – GENERAL

A. Provide testing services meeting the following:

1. Provide qualified personnel promptly on notice.
2. Perform inspections required by the Contract Documents. Sample and test materials and observe methods of construction to determine compliance with applicable standards and with the requirements of the Contract Documents.
3. Take specimens and samples for testing, as required in individual Specification Sections. Provide all sampling equipment and deliver all specimens and Samples.
4. Promptly notify the Owner and the Engineer of irregularities or deficiencies in the Work which are observed during performance of services.
5. Promptly submit 2 copies of reports of inspections and tests to the Owner, and one copy to the Engineer including:
  - a. Date issued
  - b. Project title and number
  - c. Testing laboratory or agency name and address
  - d. Name and signature of inspector
  - e. Date of inspection or sampling
  - f. Record of temperature and weather
  - g. Date of test
  - h. Identification of product and Specification Section
  - i. Location of Project
  - j. Type of inspection or test
  - k. Results of tests and observations regarding compliance with Contract Documents

B. Perform additional tests and services as required to assure compliance with the Contract Documents.

C. Obtain Owner’s approval of testing laboratory before performing testing services.

D. Coordinate with testing laboratory.

3.2 GEOTECHNICAL TESTING

A. Provide field testing and laboratory services for geotechnical soil testing required in Sections 31 23 00 and 31 05 13.

3.3 CONCRETE TESTING

- A. Provide qualified independent field and laboratory testing service to perform the concrete testing required in Division 3 of the specifications.
- B. The concrete testing laboratory shall have been inspected by the CCRL within the past five years.
- C. The testing laboratory shall be licensed by the Commonwealth of Massachusetts.
- D. Field testing technicians shall have a Grade 1 concrete field technician license as issued by the American Concrete Institute (ACI).

#### 3.4 WELDING INSPECTION AND TESTING SERVICES

- A. Provide qualified independent welding inspection services as required in Section 01 32 33 of the specifications.
- B. The welding inspector(s) shall be qualified under the requirements of AWS B5.1. Radiographic interpretation shall be performed by persons qualified under AWS B5.15.

#### 3.5 COORDINATION WITH TESTING LABORATORY

- A. Provide testing laboratory personnel access to site and manufacturer's operations.
- B. Provide laboratory with representative samples of materials to be tested in required quantities.
- C. Furnish labor and facilities:
  - 1. To provide access to Work to be tested.
  - 2. To facilitate inspections and tests.
  - 3. For laboratory's exclusive use for storage and curing of test samples.
  - 4. to provide forms for preparing concrete test beams and cylinders.
- D. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- E. Arrange with laboratory and pay for additional inspections, samples, and tests required for Contractor's convenience.

END OF SECTION

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SECTION 01 52 00

CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary sanitary and first-aid facilities

1.2 QUALITY ASSURANCE

- A. Maintain temporary construction facilities in proper and safe condition throughout the progress of the Work.

1.3 TEMPORARY SANITARY AND FIRST AID FACILITIES

- A. Provide suitably enclosed chemical or self-contained toilets for the use of the labor force employed on the Work. Toilets shall be located near the Work sites and secluded from observation insofar as possible. Toilets shall be serviced weekly, kept clean and supplied throughout the course of the Work.
- B. Contractor shall enforce proper use of sanitary facilities.
- C. Use of the Owner's sanitary facilities by the Contractor is prohibited.
- D. Provide a first aid station at the site.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01 57 00

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes.
  - 1. Dust control
  - 2. Drainage and erosion control
  - 3. Haybales and siltation fence
  - 4. Sediment trapping devices.

1.2 SUBMITTALS

- A. Informational Submittals
  - 1. Materials proposed for use in dust control.
  - 2. Haybales, siltation fence, and sediment trapping devices.

PART 2 PRODUCTS

2.1 HAYBALES

- A. Haybales required for siltation control shall be wire tied bales of the type normally used for siltation or erosion control or construction projects.

2.2 FILTER FABRIC

- A. Filter fabric siltation fencing shall be a woven filter fabric having a weight of at least 2.5 ounces per square yard, a thickness of at least seventeen mil, a coefficient of permeability of not less than 0.0009 centimeters per second and allows a water flow rate of a minimum forty gallons per minute per square yard. The material shall have a high sediment filtration capacity, high slurry flow and minimum clogging characteristics. The material shall be equal to Marafi 100X as manufactured by Mirafi, Inc., Charlotte, North Carolina; Amoco 2130 by Nilex, Inc., Centennial, CO; MISF 180 by Mutual Industries, PA; or equal.

2.3 SEDIMENT TRAPPING DEVICES

- A. Sediment trapping devices shall be Siltsack®, Dandy Bag II®, or equal. Install devices in accordance with manufacturers' recommendations.

PART 3 EXECUTION

3.1 DUST CONTROL

- A. Compliance with EPA's National Emission Standards for Hazardous Air Pollutants (NESHAPs) with respect to visible emissions during demolition operations shall be enforced. It is the demolition Contractor's responsibility to maintain constant compliance with this standard.

- B. Dust Control may also include the use of a mechanical street sweeper weekly as necessary.
- C. Prevent dust from becoming a nuisance or hazard. During construction, excavated material and open or stripped areas are to be managed and controlled to prevent spreading of the material.
- D. Control dust during the work on-site using calcium chloride and/or water.
- E. Ensure that the existing equipment, facilities, and occupied buildings/properties adjacent to or nearby areas of the work are not impacted by dust or debris because of demolition or excavation.
- F. Submit for approval materials proposed for use for dust control, prior to start of the Work.

### 3.2 DRAINAGE AND EROSION CONTROL

- A. Control erosion and siltation during the construction through haybales, siltation fencing, diversion and control of storm water run-off, ponding areas, and similar methods.
- B. Provide and maintain sediment trapping systems.
- C. Discharge surface runoff from any disturbances to the site into silt containment basins. Utilize siltation prevention measures including haybale and geotextile fences before discharge to drainage systems.
- D. Control surface waters within the construction area using temporary culverts.
- E. Install sediment trapping devices in catch basins located in existing paved areas with sediment trapping devices to minimize the transport of sediment through the subsurface stormwater collection system.

### 3.3 HAYBALES AND SILTATION FENCE

- A. Place and maintain both haybales and staked filter fabric siltation fence along the entire length of the proposed limit of work between the area of construction and adjacent properties as directed by the General Contractor.
- B. Install haybales by anchoring bales butted together to existing ground with at least two stakes per bale. The stake shall be a minimum of 1-inch square cross section and shall be long enough to penetrate twelve inches into the ground. Replace deteriorated haybales. Haybales shall not be removed until approval from the Engineer.
- C. Install a filter fabric siltation fence in addition to the staked haybales, prior to construction and remove after full surface restoration has been achieved. Install the siltation fence as shown in the Erosion Controls and Site Fence Details appended to this section.

3.4 CLEANING /MAINTENANCE

- A. Remove any sediment that builds up around the silt fence barrier, sediment control devices or catch basins.
- B. Clean sediment trapping devices periodically during the Work. Devices shall be cleaned on a weekly basis, or more frequently if the devices become clogged.
- C. Clean catch basins that collect sediment because of the Work.

END OF SECTION

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## SECTION 01 60 00

### PRODUCT REQUIREMENTS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Products and Materials
  - 2. Product Delivery Requirements
  - 3. Packaging, Handling and Storage Requirements
  - 4. Inspection of Offsite Work

##### 1.2 QUALITY ASSURANCE

- A. Review all contract Drawings and Specifications with respect to specific system characteristics, applicability of materials and equipment for the intended purposes, sizes, orientation, and interface with other systems, both existing and proposed, and certify that the materials and equipment proposed will perform as specified prior to submitting shop drawings.
- B. Provide sworn certificates as to quality and quantity of materials where specified or requested by the Engineer.
- C. Obtain concurrence of the Engineer prior to processing, fabricating, or delivering material or equipment.

##### 1.3 PRODUCTS AND MATERIALS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by a single manufacturer unless specified otherwise.
- B. Use only new and first quality material in the Work. Material shall conform to the requirements of these Specifications and be approved by the Engineer. If, after trial, it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from other approved sources.
- C. Immediately remove defective materials and equipment from the site, at no additional cost to the Owner. The Contractor may be required to furnish sworn certificates as to the quality and quantity of materials before materials are incorporated in the Work.
- D. Engineer has the right to approve the source of supply of all material prior to delivery.

##### 1.4 PRODUCT DELIVERY REQUIREMENTS

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

- D. Progressively deliver materials and equipment to the Site so there will be neither delay in progress of the Work nor an accumulation of material that is not to be used within a reasonable time.
- E. Deliver products to the Site in their manufacturer's original container, with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to the manufacturer, grade, quality, source, and other pertinent information.

#### 1.5 PACKAGING, HANDLING AND STORAGE REQUIREMENTS

- A. Provide storage and handling of all materials and equipment required for the Work.
- B. Except as otherwise indicated in the Contract Documents, determine and comply with the manufacturer's recommendations on product storage, handling, and protection. Provide manufacturer's documentation on recommended storage procedures when requested by the Engineer.
- C. Properly store and protect all equipment immediately upon its arrival. All equipment shall be stored in a clean, dry, heated, secured, and insured indoor facility satisfactory to the Engineer. Equip drive motors with thermostatically controlled strip heaters. Outdoor storage with plastic, canvas, plywood or other cover will not be allowed except where specific approval for designated items not containing electrical components or bearings is obtained from the Engineer. This approval does not relieve the Contractor of responsibility for proper protection of materials.
- D. Familiarize workmen and subcontractors with hazards associated with materials, equipment, and chemicals specified herein and take all necessary safety precautions.
- E. Areas available on the construction site for storage of material and equipment shall be as shown on the Drawings or approved by the Owner.
- F. Materials and equipment to be incorporated in the Work shall be handled and stored by the manufacturer, fabricator, supplier, and Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind to the material or equipment.
- G. Protect finished surfaces including floor surfaces, stairs, joints, and soffits of passageways from damage until accepted by the Engineer.
- H. Promptly remove materials from the site of the Work which have become damaged or are unfit for the use intended or specified. The Contractor will not be compensated for the damaged materials or their removal costs.
- I. Handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required. Provide suitable and adequate storage room for materials and equipment during the progress of the Work, and be responsible for the protection, loss of, or damage to materials and equipment furnished, until the final completion and acceptance of the Work.

- J. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.
- K. All materials and equipment to be incorporated in the Work shall be placed so as to not damage any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Keep materials and equipment neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to the Owner.
- L. No material or equipment will be permitted to be stored in any of the Owner's facilities, unless otherwise approved by the Engineer.
- M. Do not store material or equipment in any wetland or environmentally sensitive area. Stockpile sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands, and stream corridors.
- N. Contractor shall be fully responsible for loss or damage to stored materials and equipment.
- O. No item judged rusty, corroded or otherwise damaged during storage will be accepted. Any electrical or instrumentation item determined by the Engineer to be damaged shall be removed from the Site and replaced by a completely new item in first class condition. Items not properly stored will not be considered for any partial payment.
- P. Provide protective and preventive maintenance during storage consisting of manually exercising equipment where required, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer as necessary for its protection and other precautions as necessary to assure proper protection of equipment stored.
- Q. Treat ferrous surfaces not receiving finish coats of paint with rust preventive coating, and protect non-ferrous metal work and devices with suitable wrappings.

#### 1.6 INSPECTION OF OFFSITE WORK

- A. The Owner and Engineer will inspect Work performed away from the construction site during fabrication, manufacture, or testing, or before shipment. Give 2 weeks written notice regarding the place and time where such fabrication, manufacture, testing, or shipping will be done.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Documentation required for the transfer of the completed Work to the Owner
2. Final Cleaning

1.2 SUBMITTALS

A. Closeout Submittals

1. As-built drawings
2. Operation and maintenance manuals
3. Evidence of payment and release of liens
4. List of Subcontractors, service organizations, and principal vendors

1.3 SUBSTANTIAL COMPLETION

- A. Refer to Article 15.03 in 00 72 00, General Conditions, for procedures relating to obtaining Substantial Completion. Refer to 00 52 00, Agreement, for Contract Times.

1.4 PROJECT CLOSEOUT DOCUMENTS

- A. As-Built Drawings - Submit as-built drawings for review, approval, or comment. The as-built drawings shall show the completed work, including all deviations from the original Drawings. As-built drawings shall depict the location of all piping and valves installed under this Contract, as well as field changes. Take swing ties to all underground work from a minimum of two horizontal locations. Vertical dimensions to all below grade work shall also be obtained. All fittings, bends, valves and other appurtenances shall be shown. At a minimum, the following information shall be shown on the as-built drawings.

1. Ties to all buried fittings (including tees, crosses, bends, reducers, wyes, offsets, adapters, sleeves, caps, plugs), valves, services and structures from two horizontal measurements to permanent surface reference points, and depth below permanent grade. Permanent surface reference points are manholes, catch basins, power poles, and above-grade structures.
2. Ties to all surface structures (including manholes, catch basins, vaults, valve boxes, hydrants, curb stops, cleanouts, wet wells, outlets, etc.) from two horizontal measurements to permanent surface reference points. Re-station surface structures if stationed on Drawings.
3. Ties to other utility crossings, abandoned pipelines, and sewer service stubs, from two horizontal measurements to permanent surface reference points include depth below permanent grade and spacing between crossing utilities.

4. Invert and rim elevation of all gravity pipelines and structures including manholes, catch basins, below-grade structures, wet wells, septic tanks and distribution boxes as appropriate.
  5. Depth of ledge at changes in profile but not more than 25-foot intervals.
  6. Changes to pipe size and materials.
- B. Operation and Maintenance manuals - Provide four copies of operation and maintenance manuals for each type of equipment provided on the project. Manuals shall include as a minimum:
1. The Operations and Maintenance Manual Certification Form (copy attached at the end of this Section) which shall be attached to every copy of each Operations and Maintenance Manual submitted.
  2. Detailed service, maintenance and operation instructions for each item supplied
  3. Special maintenance requirements, along with special calibration and test procedures
  4. Operating instructions
  5. Preventative maintenance instructions
  6. Corrective-maintenance instructions
  7. Complete parts lists with stock numbers and name, address, and telephone number of the local supplier
- C. Provide warranties and bonds for items so listed in pertinent sections of the Project Manual.
- D. Provide evidence of compliance with requirements of governmental agencies having jurisdiction.
- E. As specified in Article 15.06.A of Section 00 72 00, provide evidence that all Work, materials and equipment will pass to Owner free and clear of any Liens or other title defects upon final payment. Such evidence may take the form of receipts or releases from all Subcontractors and Suppliers and an affidavit from Contractor as to the completeness of the receipts and releases as described in Section 00 72 00 Article 15.06.A.3.
- F. Provide list of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

#### 1.5 FINAL PAYMENT

- A. Refer to Article 15.05 and 15.06 in 00 72 00, General Conditions, for procedures relating to final inspection and payment.
- B. The Contract shall be considered complete and final payment made, only when:
  1. All provisions of the Contract Documents have been strictly adhered to.

2. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials.

**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION**

**3.1 CLEANING**

- A. Remove and entirely dispose of material or debris that has washed, flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the Contract work limits. Leave ditches, channels, drains, pipes, structures, and watercourses in a clean and neat condition upon completion of the Work.
- B. Restore or replace any public or private property damaged or removed during the course of the Work. Property shall be returned to a condition at least equal to that existing immediately prior to the beginning of operations. Complete all highway or driveway, walk, and landscaping work using suitable materials, equipment and methods. Perform restoration of existing property, signs or structures promptly as work progresses; do not leave restoration work until the end of the Contract Time.

**END OF SECTION**

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**O&M MANUAL CERTIFICATION FORM**

PROJECT: \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ENGINEER'S PROJECT NO.: \_\_\_\_\_  
CONTRACTOR: \_\_\_\_\_ CONTRACTOR'S PROJECT  
NO.: \_\_\_\_\_

TRANSMITTAL NO.: \_\_\_\_\_ SHOP DRAWING NO.: \_\_\_\_\_  
SPECIFICATION NO.: \_\_\_\_\_ DRAWING NO.: \_\_\_\_\_  
DESCRIPTION: \_\_\_\_\_  
MANUFACTURER: \_\_\_\_\_

The above referenced O&M manual has been reviewed by the undersigned and I/we certify that the manual is customized as needed for this project, and contains the following items, where applicable for the materials or equipment provided:

- |  |   |
|--|---|
| <input type="checkbox"/> 3-ring binder with title on binder and binding edge | <input type="checkbox"/> Complete parts list of equipment supplied      |
| <input type="checkbox"/> Electronic CD, when specified                       | <input type="checkbox"/> Complete specifications/data on each item      |
| <input type="checkbox"/> Comprehensive index broken down into sections       | <input type="checkbox"/> Detailed maintenance & operations instructions |
| <input type="checkbox"/> Dividers for sections and sub-sections              | <input type="checkbox"/> "As constructed" layout & schematic drawings   |
| <input type="checkbox"/> Warranties  | <input type="checkbox"/> Wiring diagrams                                |
| <input type="checkbox"/> Troubleshooting information                         | <input type="checkbox"/> Lubrication & maintenance schedules            |
| <input type="checkbox"/> Startup, operation & shutdown procedures            | <input type="checkbox"/> Equipment performance curves                   |
| <input type="checkbox"/> Safety procedures                                   | <input type="checkbox"/> List of spare parts supplied and current cost  |
| <input type="checkbox"/> Manufacturer's contact information                  | <input type="checkbox"/> Parts & service contact information            |

SUBMITTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

GENERAL CONTRACTOR'S STAMP



## SECTION 02 41 00

### DEMOLITION

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Demolition and removal of the Salt Shed, Attendant Booth, Truck Scale and Scale House including all foundations as identified on the Site Plan, located at the Fall River DPW facility at 10 Lewiston Street, Fall River, Massachusetts.
2. Demolition and removal of ancillary structures as identified on the Site Plan, including but not limited to existing chain link fence along property boundary line, jersey barriers, concrete pit, and concrete stockpile barriers.
3. Removal and relocation utility poles, flag poles, hydrants, and signs as identified on the Site Plan.
4. Clearing and grubbing vegetation as identified on Site Plan
5. Removal of asphalt pavement area as outlined on Site Plan.

###### B. Related Sections

1. Section 01 51 00 – Temporary Utilities
2. Section 01 57 00 – Temporary Controls
3. Section 33 05 29 – Utility Abandonment
4. Section 02 80 00 – Hazardous Materials / Universal Waste Management

##### 1.2 DEFINITIONS

- A. Demolish – To tear down, segregate waste streams and lawfully recycle or dispose of all debris generated in the process including structure contents.
- B. Limit of Work – Area delineated on Drawings that defines the extent of demolition work under the Contract.

##### 1.3 SUBMITTALS

###### A. Informational Submittals

1. Methods of demolition and equipment proposed to demolish structures. This submittal should be sufficient to demonstrate a thorough understanding of the Work to be completed and the means that will be implemented to safely complete the demolition within the Contract Time without damage to surrounding structures or resources.
2. Waste Management Plan to indicate the types of wastes to be generated and the proposed disposal or recycling locations. Include back-up disposal facilities.

3. Copies of any notifications, authorizations and permits required to perform the work, including local demolition permits, MassDEP AQ06 Renovation / Demolition notification and disposal/recycling facility permits.
- B. The following records and disposal documentation must be maintained and kept current throughout the Project. These documents will be maintained in chronological order in a 3-ring binder with appropriate tabbed dividers. The binder will be reviewed for completeness at each progress meeting. Requests for periodic payments may be rejected, in whole or in part, if documentation is not current.
  1. Records of the amounts of waste generated, by waste type.
  2. Evidence of lawful disposal or recycling of all wastes generated.
  3. Documentation of underground structures and utilities.
  4. Copies of any analytical results generated as a result of waste stream characterization.
- C. A final report shall be prepared detailing the major waste streams resulting from demolition, the facilities to which the materials were taken for recycling or disposal, and the weight of materials taken to each recycling or disposal facility.

#### 1.4 REGULATORY REQUIREMENTS

- A. Contractor is solely responsible for obtaining permits or approvals which may be required to perform the work of this section such local permits and the MassDEP AQ06 Construction / Demolition notification which includes all costs, fees and taxes required or levied.
- B. Notify and obtain such permits or approvals from agencies having jurisdiction over demolition prior to starting work.
- C. Comply with all applicable federal, state, and local environmental, safety and health requirements regarding the demolition of structures and other site features and recycling or disposal of demolition debris, as applicable.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION

##### 3.1 PROJECT MANAGEMENT

- A. Provide a full-time Project Superintendent who shall serve as a direct communication among the Contractor, subcontractors, and the Owner.
- B. Require all subcontractors to provide a foreman or superintendent. That individual must be on site at all times that the subcontractor is working.

##### 3.2 GENERAL REQUIREMENTS

- A. Verify site conditions before proceeding with demolition work. Inspect structures and utilities prior to start of work and notify the Engineer in writing, of any hazardous conditions and/or discrepancies. The primary structure and other site features are shown on the Site Plan. Other smaller items, including, but not limited to,

miscellaneous sheds, fencing, signs, lamp posts and railings may not be shown on the Site Plan, but may exist within the Limit of Work and shall be demolished.

1. Unknown Site Conditions - The information provided on the Site Map and in the Specifications is believed to be accurate. Field verify all information. Bear full responsibility for obtaining all locations of underground structures, utilities, and their connections. Maintain services to buildings outside the limits of work, at no additional cost to the Owner.
  2. Interior Elements - Interior features including but not necessarily limited to structural elements, walls, partitions, equipment, piping, or other building facilities may not be shown on the drawings and must be visually inspected. Inspect and appraise all features and facilities to be demolished or removed for salvage. Investigate to assure the condition of the work to be demolished and take all precautions necessary to ensure safety of people and property.
- B. Demolish the building, foundations, slab-on grade, underground utilities, and related appurtenances by methods that will not cause damage to surrounding structures, underground and overhead utilities, or other existing items and structures that are to remain in place.
- C. Promptly and properly manage all debris as the demolition progresses. Construct and/or prepare material staging/stockpile areas at locations approved by the Engineer and Owner.

### 3.3 PREPARATION

- A. Remove and/or stabilize all overhead hazards, prior to commencing work near any building. Where hazards cannot be stabilized, mark and control areas below hazards to prohibit access below the hazards. This shall be performed with caution tape, sawhorses, safety fence or other types of barricades as determined by applicable safety codes.
- B. Remove specified hazardous materials and universal waste materials prior to structure demolition, in accordance with Section 02 80 00.
- C. Terminate and discontinue utilities serving the individual structures to be demolished, prior to demolition. The Owner shall be responsible for terminating and removing any overhead/underground electrical service conductors from the pole to the building and shall make safe the affected utilities.
- D. Plug and abandon all sewer lines and sewer manholes before any plumbing fixtures or traps are removed from buildings.

### 3.4 HAZARDOUS MATERIALS

- A. The structure to be demolished was subject to an asbestos survey as required by the Federal National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations, MassDEP and MADLS state asbestos regulations. Asbestos-containing materials (ACM) were not identified in the proposed demolition work areas.
- B. Hazardous Materials or Universal Waste Materials

1. Hazardous materials and or universal wastes have been identified at the Site and specified for abatement in other sections of the project specifications.
- C. Lead Based Paint (Heavy Metals)
1. Hazardous constituents identified in the paint include lead, barium, and chromium which will be collectively referred to as Lead Paint in this Section. Assume all paint applications contain detectable levels of lead/heavy metals and protect workers and the environment accordingly.
  2. Contractors whose activities may generate leaded dust or impact a painted surface shall be responsible for regulating their work area in accordance with OSHA 29 CFR 1926.62 Lead in Construction Regulations so that dust migration is contained properly within a regulated area. Once the dust generating work is complete, the same Contractor shall be disposal of painted component dusts and painted materials as defined in OSHA 29 CFR 1926.62.
  3. Use of respiratory protection, protective personal equipment and dust generating power tool devices with HEPA filtration attachments (in areas where dust control containments are not constructed) to capture airborne particulate so as to reduce worker exposure to lead is required.
- D. PCB Containing Building Components
1. Testing for PCB containing building components was performed and concentrations of PCBs were reported as “Not Detected” in the components assessed.
  2. Refer to Appendix A for PCBs in building materials results laboratory report.

### 3.5 DEMOLITION

#### A. Building / Structures

1. Demolish the buildings, underground utilities and related appurtenances by methods that will not cause damage to surrounding structures, underground and overhead utilities, or other existing items and structures that are to remain in place. Equipment, piping, and interior facilities not shown on the Site Plan shall also be demolished.
2. Promptly and properly segregate various building materials to facilitate recycling of salvageable materials. All construction and demolition debris to be disposed off-site.
3. Barricade work area as necessary to protect workers from falling debris.
4. Do not leave unstable structures unattended. Plan the workday so that all structures are stable at the end of each workday.

#### B. Concrete Slabs and Footings

1. Demolish all footings and concrete slabs on grade and below grade as identified on the Site Plan.

#### C. Miscellaneous Site Structures and Features

1. Fences and Other Structures – Remove and dispose of existing site fence, jersey barriers, concrete pit and concrete stockpile barriers as identified on the Site Plan.
2. Remove and dispose of asphalt pavement areas as identified on the Site Plan.
3. Remove and dispose or relocate utility poles and hydrants as indicated on the Site Plan. Contractor shall coordinate with the utility companies responsible for service to the poles or hydrants to ensure service has been shut off or terminated.

### 3.6 DISPOSAL

- A. Legally dispose of or recycle all materials from demolition as well as equipment and other materials that are within the buildings. The disposal site shall be permitted to accept the waste stream by the applicable State Agency. Perform the loading of demolition materials in a manner that prevents materials and activities from generating excessive dust and ensures minimum interference with roads, sidewalks, and streets both onsite and offsite.
- B. Provide evidence that the demolition materials have been received at a legal disposal, recycle, reuse or salvage location. Such proof may include truck weigh slips from an approved disposal facility or documentation of transfer of title. Transport of all materials off site shall be in accordance with applicable Department of Transportation Regulations. All materials leaving the site shall become the property of the Contractor.
- C. Toxicity Characteristic Leaching Procedure (TCLP) samples were collected from various painted building materials and building components presumed to be representative of the project's intended construction / demolition waste stream. Composite sample contents included representative quantity of both painted and unpainted building components. Results of testing indicated that the composite samples were well below the TCLP threshold for PCB and heavy metal constituents. Contractor is responsible for any additional waste disposal testing of the waste stream as required by their selected waste disposal facility. Refer to Appendix A for TCLP sampling laboratory report.

END OF SECTION

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### APPENDIX A – HEAVY METALS / PCB PAINT AND BUILDING MATERIAL SAMPLING LABORATORY REPORTS

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*CERTIFICATE OF ANALYSIS*

Frank Rodrigues  
Tighe & Bond  
1 University Ave N. Lobby STE100  
Westwood, MA 02090-1245

**RE: Fall River DPW Improvements (F5033011-03)**  
**ESS Laboratory Work Order Number: 23H1001**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard  
Laboratory Director

**REVIEWED**  
*By ESS Laboratory at 2:37 pm, Sep 07, 2023*

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**SAMPLE RECEIPT**

The following samples were received on August 28, 2023 for the analyses specified on the enclosed Chain of Custody Record.

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<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
23H1001-01	P-1 - White Ext Wall - Scale House	Solid	6010C, 7471B
23H1001-02	P-2 - White Ext Wall - Incinerator Rec Area	Solid	6010C, 7471B
23H1001-03	P-3 - Painted Metal - Incinerator Rec Area	Solid	6010C, 7471B
23H1001-04	P-4 - Red-Yellow Metal Wall - Incinerator Rec Area	Solid	6010C, 7471B
23H1001-05	P-5 - Equipment-Machinery - Incinerator Rec Area	Solid	6010C, 7471B
23H1001-06	P-6 - CMU Wall - Incinerator Rec Area	Solid	6010C, 7471B
23H1001-07	P-7 - Incinerator Equipment - Incinerator Bldg TL	Solid	6010C, 7471B
23H1001-08	P-8 - Steel Columns - Incinerator Bldg TL	Solid	6010C, 7471B
23H1001-09	P-9 - Incinerator Equipment - Incinerator Bldg LL	Solid	6010C, 7471B
23H1001-10	P-10 - Steel Columns - Incinerator Bldg LL	Solid	6010C, 7471B
23H1001-11	P-11 - White Wood Siding - Rear Storage Bldg	Solid	6010C, 7471B
23H1001-12	P-12 Gray-Blue Concrete Floor - Recycling Receiving Bldg-Locker Rm	Solid	6010C, 7471B
23H1001-13	P-13 Gray-Blue Concrete Floor - Recycling Receiving Bldg-Locker Rm	Solid	6010C, 7471B
23H1001-14	P-14 Yellow Metal Rails - Maintenance Garage and Shop	Solid	6010C, 7471B





*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**PROJECT NARRATIVE**

**Total Metals**

23H1001-04

[Elevated Method Reporting Limits due to sample matrix \(EL\).](#)

Arsenic

**No other observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

*To ensure you are viewing the most current version of the documents below, please clear your internet cookies for [www.ESSLaboratory.com](http://www.ESSLaboratory.com). Consult your IT Support personnel for information on how to clear your internet cookies.*

[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

- 1010A - Flashpoint
- 6010C - ICP
- 6020A - ICP MS
- 7010 - Graphite Furnace
- 7196A - Hexavalent Chromium
- 7470A - Aqueous Mercury
- 7471B - Solid Mercury
- 8011 - EDB/DBCP/TCP
- 8015C - GRO/DRO
- 8081B - Pesticides
- 8082A - PCB
- 8100M - TPH
- 8151A - Herbicides
- 8260B - VOA
- 8270D - SVOA
- 8270D SIM - SVOA Low Level
- 9014 - Cyanide
- 9038 - Sulfate
- 9040C - Aqueous pH
- 9045D - Solid pH (Corrosivity)
- 9050A - Specific Conductance
- 9056A - Anions (IC)
- 9060A - TOC
- 9095B - Paint Filter
- MADEP 04-1.1 - EPH
- MADEP 18-2.1 - VPH

**Prep Methods**

- 3005A - Aqueous ICP Digestion
- 3020A - Aqueous Graphite Furnace / ICP MS Digestion
- 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
- 3060A - Solid Hexavalent Chromium Digestion
- 3510C - Separatory Funnel Extraction
- 3520C - Liquid / Liquid Extraction
- 3540C - Manual Soxhlet Extraction
- 3541 - Automated Soxhlet Extraction
- 3546 - Microwave Extraction
- 3580A - Waste Dilution
- 5030B - Aqueous Purge and Trap
- 5030C - Aqueous Purge and Trap
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-1 - White Ext Wall - Scale House  
Date Sampled: 08/17/23 09:05  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-01  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.46)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
<b>Barium</b>	<b>5490</b> (7.46)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
Cadmium	ND (1.49)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
<b>Chromium</b>	<b>10.4</b> (2.99)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
<b>Lead</b>	<b>106</b> (14.9)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
Mercury	ND (0.031)		7471B		1	AFV	08/29/23 15:54	0.64	40	DH32912
Selenium	ND (14.9)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108
Silver	ND (1.49)		6010C		1	CEV	09/01/23 11:23	0.67	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-2 - White Ext Wall - Incinerator Rec Area  
Date Sampled: 08/17/23 09:15  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-02  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.81)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108
Barium	22000 (781)		6010C		100	CEV	09/05/23 11:13	0.64	100	DH33108
Cadmium	3.97 (1.56)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108
Chromium	10.4 (3.12)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108
Lead	3110 (15.6)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108
Mercury	13.8 (3.14)		7471B		100	AFV	08/29/23 18:16	0.63	40	DH32912
Selenium	ND (15.6)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108
Silver	ND (1.56)		6010C		1	CEV	09/01/23 11:25	0.64	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-3 - Painted Metal - Incinerator Rec Area  
Date Sampled: 08/17/23 09:15  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-03  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.35)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108
Barium	25300 (735)		6010C		100	CEV	09/05/23 11:16	0.68	100	DH33108
Cadmium	2.35 (1.47)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108
Chromium	65.9 (2.94)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108
Lead	604 (14.7)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108
Mercury	1.71 (0.330)		7471B		10	AFV	08/29/23 18:18	0.6	40	DH32912
Selenium	ND (14.7)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108
Silver	ND (1.47)		6010C		1	CEV	09/01/23 11:27	0.68	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-4 - Red-Yellow Metal Wall - Incinerator Rec Area  
Date Sampled: 08/17/23 09:20  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-04  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	EL ND (15.4)		6010C		2	CEV	09/05/23 11:18	0.65	100	DH33108
<b>Barium</b>	<b>4050</b> (7.69)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108
Cadmium	ND (1.54)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108
<b>Chromium</b>	<b>1360</b> (3.08)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108
<b>Lead</b>	<b>6330</b> (15.4)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108
<b>Mercury</b>	<b>0.414</b> (0.031)		7471B		1	AFV	08/29/23 16:00	0.63	40	DH32912
Selenium	ND (15.4)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108
<b>Silver</b>	<b>5.53</b> (1.54)		6010C		1	CEV	09/01/23 11:36	0.65	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-5 - Equipment-Machinery - Incinerator Rec Area  
Date Sampled: 08/17/23 09:20  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-05  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Barium	<b>2380</b> (8.33)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Cadmium	<b>10.9</b> (1.67)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Chromium	<b>62.2</b> (3.33)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Lead	<b>592</b> (16.7)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Mercury	<b>0.718</b> (0.152)		7471B		5	AFV	08/29/23 18:20	0.65	40	DH32912
Selenium	ND (16.7)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108
Silver	<b>4.86</b> (1.67)		6010C		1	CEV	09/01/23 11:38	0.6	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-6 - CMU Wall - Incinerator Rec Area  
Date Sampled: 08/17/23 09:30  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-06  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108
<b>Barium</b>	<b>11400</b> (83.3)		6010C		10	CEV	09/05/23 11:20	0.6	100	DH33108
Cadmium	ND (1.67)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108
<b>Chromium</b>	<b>84.7</b> (3.33)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108
<b>Lead</b>	<b>466</b> (16.7)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108
<b>Mercury</b>	<b>0.167</b> (0.032)		7471B		1	AFV	08/29/23 16:04	0.62	40	DH32912
Selenium	ND (16.7)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108
Silver	ND (1.67)		6010C		1	CEV	09/01/23 11:48	0.6	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-7 - Incinerator Equipment - Incinerator Bldg TL  
Date Sampled: 08/17/23 11:00  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-07  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Barium	179 (8.33)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Cadmium	7.90 (1.67)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Chromium	606 (3.33)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Lead	1810 (16.7)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Mercury	51.7 (3.09)		7471B		100	AFV	08/29/23 18:22	0.64	40	DH32912
Selenium	ND (16.7)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108
Silver	3.35 (1.67)		6010C		1	CEV	09/01/23 11:51	0.6	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-8 - Steel Columns - Incinerator Bldg TL  
Date Sampled: 08/17/23 11:15  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-08  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Barium	582 (8.33)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Cadmium	3.87 (1.67)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Chromium	1100 (3.33)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Lead	5750 (16.7)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Mercury	12.1 (3.09)		7471B		100	AFV	08/29/23 18:28	0.64	40	DH32912
Selenium	ND (16.7)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108
Silver	ND (1.67)		6010C		1	CEV	09/01/23 12:09	0.6	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-9 - Incinerator Equipment - Incinerator Bldg LL  
Date Sampled: 08/17/23 11:30  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-09  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.94)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Barium	7130 (7.94)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Cadmium	4.85 (1.59)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Chromium	848 (3.17)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Lead	3870 (15.9)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Mercury	0.529 (0.032)		7471B		1	AFV	08/29/23 16:15	0.62	40	DH32912
Selenium	ND (15.9)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108
Silver	1.94 (1.59)		6010C		1	CEV	09/01/23 12:11	0.63	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-10 - Steel Columns - Incinerator Bldg LL  
Date Sampled: 08/17/23 11:35  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-10  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.69)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
<b>Barium</b>	<b>48.4</b> (7.69)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
Cadmium	ND (1.54)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
<b>Chromium</b>	<b>34.0</b> (3.08)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
<b>Lead</b>	<b>315</b> (15.4)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
<b>Mercury</b>	<b>1.14</b> (0.155)		7471B		5	AFV	08/29/23 18:30	0.64	40	DH32912
Selenium	ND (15.4)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108
Silver	ND (1.54)		6010C		1	CEV	09/01/23 12:13	0.65	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-11 - White Wood Siding - Rear Storage Bldg  
Date Sampled: 08/18/23 13:00  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-11  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.20)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108
Barium	<b>20800</b> (820)		6010C		100	CEV	09/06/23 1:06	0.61	100	DH33108
Cadmium	<b>3.04</b> (1.64)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108
Chromium	<b>89.5</b> (3.28)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108
Lead	<b>2530</b> (16.4)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108
Mercury	<b>1.26</b> (0.287)		7471B		10	AFV	08/29/23 18:41	0.69	40	DH32912
Selenium	ND (16.4)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108
Silver	ND (1.64)		6010C		1	CEV	09/01/23 12:15	0.61	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-12 Gray-Blue Concrete Floor - Recycling  
Date Sampled: 08/18/23  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-12  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Barium	4700 (8.33)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Cadmium	ND (1.67)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Chromium	44.5 (3.33)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Lead	274 (16.7)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Mercury	2.61 (0.325)		7471B		10	AFV	08/29/23 18:43	0.61	40	DH32912
Selenium	ND (16.7)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108
Silver	4.89 (1.67)		6010C		1	CEV	09/01/23 12:18	0.6	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-13 Gray-Blue Concrete Floor - Recycling  
~~Date Sampled: 08/18/2013~~  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-13  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (7.94)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
<b>Barium</b>	<b>904</b> (7.94)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
Cadmium	ND (1.59)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
<b>Chromium</b>	<b>57.6</b> (3.17)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
<b>Lead</b>	<b>39.3</b> (15.9)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
<b>Mercury</b>	<b>14.7</b> (3.25)		7471B		100	AFV	08/29/23 18:45	0.61	40	DH32912
Selenium	ND (15.9)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108
Silver	ND (1.59)		6010C		1	CEV	09/01/23 12:20	0.63	100	DH33108

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P-14 Yellow Metal Rails - Maintenance Garage and  
~~Slab~~ Sampled: 08/18/23 13:45  
Percent Solids: N/A

ESS Laboratory Work Order: 23H1001  
ESS Laboratory Sample ID: 23H1001-14  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (75.8)		6010C		10	CEV	09/05/23 11:23	0.66	100	DH33108
Barium	722 (7.58)		6010C		1	CEV	09/01/23 12:22	0.66	100	DH33108
Cadmium	ND (1.52)		6010C		1	CEV	09/01/23 12:22	0.66	100	DH33108
Chromium	5040 (3.03)		6010C		1	CEV	09/01/23 12:22	0.66	100	DH33108
Lead	29600 (152)		6010C		10	CEV	09/05/23 11:23	0.66	100	DH33108
Mercury	0.138 (0.032)		7471B		1	AFV	08/29/23 16:37	0.61	40	DH32912
Selenium	ND (15.2)		6010C		1	CEV	09/01/23 12:22	0.66	100	DH33108
Silver	4.59 (1.52)		6010C		1	CEV	09/01/23 12:22	0.66	100	DH33108

Last Modified: 02/12/2025 at 8:17PM EST





*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Total Metals</b>										
<b>Batch DH32912 - 7471B</b>										
<b>Blank</b>										
Mercury	ND	0.032	mg/kg wet							
<b>LCS</b>										
Mercury	10.4	3.09	mg/kg wet	17.10		61	33.1-86.55			
<b>LCS Dup</b>										
Mercury	9.32	3.05	mg/kg wet	17.10		55	33.1-86.55	11	30	
<b>Batch DH33108 - 3050B</b>										
<b>Blank</b>										
Arsenic	ND	2.50	mg/kg wet							
Barium	ND	2.50	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.00	mg/kg wet							
Lead	ND	5.00	mg/kg wet							
Selenium	ND	5.00	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
<b>LCS</b>										
Arsenic	254	7.69	mg/kg wet	258.0		99	80-120			
Barium	870	7.69	mg/kg wet	809.0		108	80-120			
Cadmium	316	1.54	mg/kg wet	321.0		98	80-120			
Chromium	132	3.08	mg/kg wet	133.0		99	80-120			
Lead	106	15.4	mg/kg wet	102.0		104	80-120			
Selenium	49.1	15.4	mg/kg wet	49.40		99	80-120			
Silver	24.4	1.54	mg/kg wet	22.70		108	80-120			
<b>LCS Dup</b>										
Arsenic	251	8.06	mg/kg wet	258.0		97	80-120	1	30	
Barium	796	8.06	mg/kg wet	809.0		98	80-120	9	30	
Cadmium	307	1.61	mg/kg wet	321.0		96	80-120	3	30	
Chromium	128	3.23	mg/kg wet	133.0		97	80-120	2	30	
Lead	104	16.1	mg/kg wet	102.0		102	80-120	2	20	
Selenium	50.2	16.1	mg/kg wet	49.40		102	80-120	2	30	
Silver	23.4	1.61	mg/kg wet	22.70		103	80-120	4	30	
<b>Reference</b>										
Lead	3750	14.9	mg/kg wet	4490		83	81-120			



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**Notes and Definitions**

- U Analyte included in the analysis, but not detected
- EL Elevated Method Reporting Limits due to sample matrix (EL).
- D Diluted.
- ND Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- MDL Method Detection Limit
- MRL Method Reporting Limit
- LOD Limit of Detection
- LOQ Limit of Quantitation
- DL Detection Limit
- I/V Initial Volume
- F/V Final Volume
- § Subcontracted analysis; see attached report
- 1 Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
- 2 Range result excludes concentrations of target analytes eluting in that range.
- 3 Range result excludes the concentration of the C9-C10 aromatic range.
- Avg Results reported as a mathematical average.
- NR No Recovery
- [CALC] Calculated Analyte
- SUB Subcontracted analysis; see attached report
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probable Number
- TNTC Too numerous to Count
- CFU Colony Forming Units

Last Modified: 02/12/2025 at 8:17PM EST



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23H1001

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutofStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

[http://datamine2.state.nj.us/DEP\\_OPRA/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752

<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

Last Modified: 02/12/2025 at 8:17PM/EST

## ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KP/B/TB  
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 23H1001  
 Date Received: 8/28/2023  
 Project Due Date: 9/4/2023  
 Days for Project: 5 Day

1. Air bill manifest present?  No  
 Air No.: NA
2. Were custody seals present?  No
3. Is radiation count <100 CPM?  Yes
4. Is a Cooler Present?  Yes  
 Temp: 5.1 Iced with: Ice
5. Was COC signed and dated by client?  Yes

6. Does COC match bottles?  Yes
7. Is COC complete and correct?  Yes
8. Were samples received intact?  Yes
9. Were labs informed about short holds & rushes?  Yes /  No /  NA
10. Were any analyses received outside of hold time?  Yes /  No

11. Any Subcontracting needed? Yes  No   
 ESS Sample IDs: \_\_\_\_\_  
 Analysis: \_\_\_\_\_  
 TAT: \_\_\_\_\_

12. Were VOAs received? Yes  No   
 a. Air bubbles in aqueous VOAs? Yes / No  
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes  No   
 a. If metals preserved upon receipt: Date: \_\_\_\_\_ Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
 b. Low Level VOA vials frozen: Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes  No   
 a. Was there a need to contact the client? Yes  No   
 Who was contacted? \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	467760	Yes	N/A	Yes	4 oz. Jar	NP	
2	467761	Yes	N/A	Yes	4 oz. Jar	NP	
3	467762	Yes	N/A	Yes	4 oz. Jar	NP	
4	467763	Yes	N/A	Yes	4 oz. Jar	NP	
5	467764	Yes	N/A	Yes	4 oz. Jar	NP	
6	467765	Yes	N/A	Yes	4 oz. Jar	NP	
7	467766	Yes	N/A	Yes	4 oz. Jar	NP	
8	467767	Yes	N/A	Yes	4 oz. Jar	NP	
9	467768	Yes	N/A	Yes	4 oz. Jar	NP	
10	467769	Yes	N/A	Yes	4 oz. Jar	NP	
11	467770	Yes	N/A	Yes	4 oz. Jar	NP	
12	467771	Yes	N/A	Yes	4 oz. Jar	NP	
13	467772	Yes	N/A	Yes	4 oz. Jar	NP	
14	467773	Yes	N/A	Yes	4 oz. Jar	NP	

2nd Review

Were all containers scanned into storage/lab?

Initials TB

# ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPBTB

ESS Project ID: 23H1001  
Date Received: 8/28/2023

- Are barcode labels on correct containers?
- Are all Flashpoint stickers attached/container ID # circled?
- Are all Hex Chrome stickers attached?
- Are all QC stickers attached?
- Are VOA stickers attached if bubbles noted?

Yes / No  
Yes / No / NA  
Yes / No / NA  
Yes / No / NA  
Yes / No / NA

Completed

By: 

Date & Time: 1105. 8/28/23

Reviewed

By: 

Date & Time: 8/28/23 1618





185 Frances Avenue  
 Cranston, RI 02921  
 Phone: 401-461-7181  
 Fax: 401-461-4486  
 www.esslaboratory.com

### CHAIN OF CUSTODY

ESS Lab # **23H1001** Page 1 of 2

Turn Time (Days)  > 5  5  4  3  2  1  Same Day

Regulatory State: **MA** Criteria: **NA**

Is this project for any of the following?:  
 CT RCP  MA MCP  RGP  Permit  401 WQ

**ELECTRONIC DELIVERABLES (Final Reports are PDF)**

Limit Checker  State Forms  EQulS  
 Excel  Hard Copy  Enviro Data  
 CLP-Like Package  Other (Specify) →

**CLIENT INFORMATION**

Client: Tighe & Bond  
 Address: One University Ave, Suite 100  
 Westwood, MA 02050  
 Phone: (617) 908-7176  
 Email List: fdriguies@tighebond.com

**PROJECT INFORMATION**

Project Name: Fall River DPW Improvements  
 Project Location: 10 Lewiston St, Fall River, MA  
 Project Number: F5033011-03  
 Project Manager: Frank Rodrigues  
 Bill to: AP@tighebond.com  
 PO#:   
 Quote#:   
 Client acknowledges that sampling is compliant with all EPA / State regulatory programs

**REQUESTED ANALYSES**

Analysis	Requested	Completed
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total RCRA 8 Metals

Total Number of Bottles

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID																		
1	8/17/23	0905	Grab/Composite	Solid	P-1 - White ext wall - Scale House	X															1		
2	8/17/23	0915	Grab/Composite	Solid	P-2 - White ext wall - Incinerator Receiving area	X																1	
3	8/17/23	0915	Grab/Composite	Solid	P-3 - Painted metal - Incinerator Receiving area	X																1	
4	8/17/23	0920	Grab/Composite	Solid	P-4 - Red/Yellow metal wall - Incinerator Receiving area	X																1	
5	8/17/23	0920	Grab/Composite	Solid	P-5 - Equipment/Machinery - Incinerator Receiving area	X																1	
6	8/17/23	0930	Grab/Composite	Solid	P-6 - CMU wall - Incinerator Receiving area	X																1	
7	8/17/23	1100	Grab/Composite	Solid	P-7 - Incinerator Equipment - Incinerator Bldg - Top Level	X																1	
8	8/17/23	1115	Grab/Composite	Solid	P-8 - Steel columns - Incinerator Building - Top Level	X																1	
9	8/17/23	1130	Grab/Composite	Solid	P-9 - Incinerator Equipment - Incinerator Bldg - Lower Level	X																1	
10	8/17/23	1135	Grab/Composite	Solid	P10 - Steel columns - Incinerator Bldg - Lower Level	X																1	
<b>Container Type:</b> AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial						AG																	
<b>Container Volume:</b> 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*						9																	10
<b>Preservation Code:</b> 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*						1																	

Sampled by : Frank Rodrigues **Chain needs to be filled out neatly and completely for on time delivery.**

<b>Laboratory Use Only</b>	<b>Comments:</b> * Please specify "Other" preservative and containers types in this space	All samples submitted are subject to ESS Laboratory's payment terms and conditions.	<b>Dissolved Filtration</b> <input type="checkbox"/> Lab Filter
Cooler Temperature (°C): <u>5.1</u> <u>1e</u>			

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	8/28/23	1000	8/28/23 11:54		8/28/23	15:11	
Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)







*CERTIFICATE OF ANALYSIS*

Frank Rodrigues  
Tighe & Bond  
1 University Ave N. Lobby STE100  
Westwood, MA 02090-1245

**RE: Fall River DPW Improvements (F5033011-03)**  
**ESS Laboratory Work Order Number: 23I0855**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard  
Laboratory Director

**REVIEWED**  
*By ESS Laboratory at 3:22 pm, Oct 04, 2023*

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

Last Modified: 02/12/2025 at 8:17PM EST





*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23I0855

**SAMPLE RECEIPT**

The following samples were received on September 27, 2023 for the analyses specified on the enclosed Chain of Custody Record.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
23I0855-01	P15-LT Blue Paint - Guard Shack	Solid	6010C, 7471B

Last Modified: 02/12/2025 at 8:17PM EST



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23I0855

**PROJECT NARRATIVE**

**Total Metals**

- DI32809-BS1 [Blank Spike recovery is below lower control limit \(B-\).](#)  
Cadmium (79% @ 80-120%)
- DI32809-BSD1 [Blank Spike recovery is below lower control limit \(B-\).](#)  
Barium (63% @ 80-120%), Cadmium (69% @ 80-120%), Chromium (65% @ 71-129%)
- DI32809-BSD1 [Relative percent difference for duplicate is outside of criteria \(D+\).](#)  
Barium (31% @ 30%)

**No other observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

*To ensure you are viewing the most current version of the documents below, please clear your internet cookies for [www.ESSLaboratory.com](http://www.ESSLaboratory.com). Consult your IT Support personnel for information on how to clear your internet cookies.*

- [Definitions of Quality Control Parameters](#)
- [Semivolatile Organics Internal Standard Information](#)
- [Semivolatile Organics Surrogate Information](#)
- [Volatile Organics Internal Standard Information](#)
- [Volatile Organics Surrogate Information](#)
- [EPH and VPH Alkane Lists](#)

Last Modified: 02/12/2025 8:41 PM EST



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 2310855

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

- 1010A - Flashpoint
- 6010C - ICP
- 6020A - ICP MS
- 7010 - Graphite Furnace
- 7196A - Hexavalent Chromium
- 7470A - Aqueous Mercury
- 7471B - Solid Mercury
- 8011 - EDB/DBCP/TCP
- 8015C - GRO/DRO
- 8081B - Pesticides
- 8082A - PCB
- 8100M - TPH
- 8151A - Herbicides
- 8260B - VOA
- 8270D - SVOA
- 8270D SIM - SVOA Low Level
- 9014 - Cyanide
- 9038 - Sulfate
- 9040C - Aqueous pH
- 9045D - Solid pH (Corrosivity)
- 9050A - Specific Conductance
- 9056A - Anions (IC)
- 9060A - TOC
- 9095B - Paint Filter
- MADEP 04-1.1 - EPH
- MADEP 18-2.1 - VPH

**Prep Methods**

- 3005A - Aqueous ICP Digestion
- 3020A - Aqueous Graphite Furnace / ICP MS Digestion
- 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
- 3060A - Solid Hexavalent Chromium Digestion
- 3510C - Separatory Funnel Extraction
- 3520C - Liquid / Liquid Extraction
- 3540C - Manual Soxhlet Extraction
- 3541 - Automated Soxhlet Extraction
- 3546 - Microwave Extraction
- 3580A - Waste Dilution
- 5030B - Aqueous Purge and Trap
- 5030C - Aqueous Purge and Trap
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements  
Client Sample ID: P15-LT Blue Paint - Guard Shack  
Date Sampled: 09/26/23 10:50  
Percent Solids: N/A

ESS Laboratory Work Order: 23I0855  
ESS Laboratory Sample ID: 23I0855-01  
Sample Matrix: Solid  
Units: mg/kg wet

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (8.33)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
<b>Barium</b>	<b>36.1</b> (8.33)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
Cadmium	ND (1.67)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
<b>Chromium</b>	<b>46.5</b> (3.33)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
<b>Lead</b>	<b>24.7</b> (16.7)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
Mercury	ND (0.032)		7471B		1	AFV	09/28/23 16:39	0.61	40	DI32822
Selenium	ND (16.7)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809
Silver	ND (1.67)		6010C		1	CEV	09/28/23 17:42	0.6	100	DI32809

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23I0855

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Total Metals**

**Batch DI32809 - 3050B**

**Blank**

Arsenic	ND	2.50	mg/kg wet
Barium	ND	2.50	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Lead	ND	5.00	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet

**LCS**

Arsenic	210	7.46	mg/kg wet	258.0	81	67-133	
Barium	701	7.46	mg/kg wet	809.0	87	80-120	
Cadmium	255	1.49	mg/kg wet	321.0	79	80-120	B-
Chromium	104	2.99	mg/kg wet	133.0	78	71-129	
Lead	86.9	14.9	mg/kg wet	102.0	85	74-125	
Selenium	38.5	14.9	mg/kg wet	49.40	78	70-130	
Silver	19.0	1.49	mg/kg wet	22.70	84	69-131	

**LCS Dup**

Arsenic	183	7.81	mg/kg wet	258.0	71	67-133	14	30	
Barium	511	7.81	mg/kg wet	809.0	63	80-120	31	30	B-, D+
Cadmium	220	1.56	mg/kg wet	321.0	69	80-120	14	30	B-
Chromium	86.8	3.12	mg/kg wet	133.0	65	71-129	18	30	B-
Lead	75.9	15.6	mg/kg wet	102.0	74	74-125	14	20	
Selenium	36.0	15.6	mg/kg wet	49.40	73	70-130	7	30	
Silver	16.3	1.56	mg/kg wet	22.70	72	69-131	15	30	

**Batch DI32822 - 7471B**

**Blank**

Mercury	ND	0.030	mg/kg wet
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**LCS**

Mercury	11.2	3.05	mg/kg wet	17.10	65	33.1-85.66
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**LCS Dup**

Mercury	10.8	3.09	mg/kg wet	17.10	63	33.1-85.66	3	30
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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 23I0855

**Notes and Definitions**

- U Analyte included in the analysis, but not detected
- D+ Relative percent difference for duplicate is outside of criteria (D+).
- D Diluted.
- B- Blank Spike recovery is below lower control limit (B-).
- ND Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- MDL Method Detection Limit
- MRL Method Reporting Limit
- LOD Limit of Detection
- LOQ Limit of Quantitation
- DL Detection Limit
- I/V Initial Volume
- F/V Final Volume
- § Subcontracted analysis; see attached report
- 1 Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
- 2 Range result excludes concentrations of target analytes eluting in that range.
- 3 Range result excludes the concentration of the C9-C10 aromatic range.
- Avg Results reported as a mathematical average.
- NR No Recovery
- [CALC] Calculated Analyte
- SUB Subcontracted analysis; see attached report
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probable Number
- TNTC Too numerous to Count
- CFU Colony Forming Units

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 2310855

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179  
<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750  
[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutofStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002  
<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002  
<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424  
<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313  
<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006  
[http://datamine2.state.nj.us/DEP\\_OPRA/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752  
<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

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## ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KP/B/TB  
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 2310855  
 Date Received: 9/27/2023  
 Project Due Date: 10/4/2023  
 Days for Project: 5 Day

1. Air bill manifest present?  No  
 Air No.: NA
2. Were custody seals present?  No
3. Is radiation count <100 CPM?  Yes
4. Is a Cooler Present?  Yes  
 Temp: 0.7 Iced with: Ice
5. Was COC signed and dated by client?  Yes

6. Does COC match bottles?  Yes
7. Is COC complete and correct?  Yes
8. Were samples received intact?  Yes
9. Were labs informed about short holds & rushes? Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No  
 ESS Sample IDs: \_\_\_\_\_  
 Analysis: \_\_\_\_\_  
 TAT: \_\_\_\_\_

12. Were VOAs received? Yes / No  
 a. Air bubbles in aqueous VOAs? Yes / No  
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No  
 a. If metals preserved upon receipt: Date: \_\_\_\_\_ Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
 b. Low Level VOA vials frozen: Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No  
 a. Was there a need to contact the client? Yes / No  
 Who was contacted? \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	477660	Yes	N/A	Yes	8 oz jar	NP	

**2nd Review**

- Were all containers scanned into storage/lab? Initials TB
- Are barcode labels on correct containers? Yes / No
- Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
- Are all Hex Chrome stickers attached? Yes / No / NA
- Are all QC stickers attached? Yes / No / NA
- Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: [Signature] Date & Time: 9/27/23 11:08.  
 Reviewed By: [Signature] Date & Time: 9/27/23 1710

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185 Frances Avenue  
 Cranston, RI 02921  
 Phone: 401-461-7181  
 Fax: 401-461-4486  
 www.esslaboratory.com

### CHAIN OF CUSTODY

ESS Lab # 2310855 Page 1 of 1

Turn Time (Days)  > 5  5  4  3  2  1  Same Day

Regulatory State: \_\_\_\_\_ Criteria: \_\_\_\_\_

Is this project for any of the following?:

CT RCP  MA MCP  RGP  Permit  401 WQ

**ELECTRONIC DELIVERABLES (Final Reports are PDF)**

Limit Checker  State Forms  EQuIS  
 Excel  Hard Copy  Enviro Data  
 CLP-Like Package  Other (Specify) →

**CLIENT INFORMATION**

Client: Tighe & Bond  
 Address: One University Ave, Suite 100  
 Westwood, MA 02050  
 Phone: (617) 908-7176  
 Email: fdrodrigues@tighebond.com  
 Distribution List:

**PROJECT INFORMATION**

Project Name: FALLRIVER BDPW  
 Project Location: 10 LEWISTON ST FALL RIVER  
 Project Number: F5033011-03  
 Project Manager: FRANK RODRIGUES  
 Bill to: AP@tighebond.com  
 PO#: \_\_\_\_\_  
 Quote#: \_\_\_\_\_

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

**REQUESTED ANALYSES**

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Total RCRA B	Total Number of Bottles
	9/26/23	1050	GRAB	SOLID	P15 - LT BLUE PAINT - GUARD SHACK	X	1

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Total RCRA B	Total Number of Bottles
	9/26/23	1050	GRAB	SOLID	P15 - LT BLUE PAINT - GUARD SHACK	X	1

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial AG

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other\* 10

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other\* 1

Sampled by : \_\_\_\_\_ Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only

Cooler Temperature (°C): 0.7

Comments: \* Please specify "Other" preservative and containers types in this space

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration  Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	9/27/23	947	AO 9/27/23 947	AO	9/27/23	1554	Clayton Davis

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*CERTIFICATE OF ANALYSIS*

Frank Rodrigues  
Tighe & Bond  
1 University Ave N. Lobby STE100  
Westwood, MA 02090-1245

**RE: Fall River DPW Improvements (F5033011A.03.08)**  
**ESS Laboratory Work Order Number: 24F1116**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard  
Laboratory Director

**REVIEWED**

**By ESS Laboratory at 7:04 pm, Jul 05, 2024**

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

**SAMPLE RECEIPT**

The following samples were received on June 27, 2024 for the analyses specified on the enclosed Chain of Custody Record.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
24F1116-01	TCLP-05 Attendant Booth	Solid	1311, 1311/6010D, 1311/7470A, 1311/8082A
24F1116-02	TCLP-06 Scale House	Solid	1311, 1311/6010D, 1311/7470A, 1311/8082A

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

**PROJECT NARRATIVE**

**No unusual observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

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[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

1010A - Flashpoint  
6010D - ICP  
6020B - ICP MS  
7010 - Graphite Furnace  
7196A - Hexavalent Chromium  
7470A - Aqueous Mercury  
7471B - Solid Mercury  
8011 - EDB/DBCP/TCP  
8015C - GRO/DRO  
8081B - Pesticides  
8082A - PCB  
8100M - TPH  
8151A - Herbicides  
8260D - VOA  
8270E - SVOA  
8270E SIM - SVOA Low Level  
9014 - Cyanide  
9038 - Sulfate  
9040C - Aqueous pH  
9045D - Solid pH (Corrosivity)  
9050A - Specific Conductance  
9056A - Anions (IC)  
9060A - TOC  
9095B - Paint Filter  
MADEP 19-2.1 - EPH  
MADEP 18-2.1 - VPH

**Prep Methods**

3005A - Aqueous ICP Digestion  
3020A - Aqueous Graphite Furnace / ICP MS Digestion  
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion  
3060A - Solid Hexavalent Chromium Digestion  
3510C - Separatory Funnel Extraction  
3520C - Liquid / Liquid Extraction  
3540C - Manual Soxhlet Extraction  
3546 - Microwave Extraction  
3580A - Waste Dilution  
5030B - Aqueous Purge and Trap  
5030C - Aqueous Purge and Trap  
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-05 Attendant Booth  
 Date Sampled: 06/26/24 13:15  
 Percent Solids: 99

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-01  
 Sample Matrix: Solid  
 Units: mg/L

Extraction Method: 3005A TCLP

**1311 TCLP Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	ND (0.05)	---	1311/6010D	5	1	KJB	07/01/24 14:41	50 50	DF42849
<b>Barium</b>	<b>0.31</b> (0.05)	---	1311/6010D	100	1	KJB	07/01/24 14:41	50 50	DF42849
Cadmium	ND (0.005)	---	1311/6010D	1	1	KJB	07/01/24 14:41	50 50	DF42849
Chromium	ND (0.02)	---	1311/6010D	5	1	KJB	07/01/24 14:41	50 50	DF42849
Lead	ND (0.05)	---	1311/6010D	5	1	KJB	07/01/24 14:41	50 50	DF42849
Mercury	ND (0.0002)	---	1311/7470A	0.2	1	AFV	06/28/24 18:21	20 40	DF42850
Selenium	ND (0.05)	---	1311/6010D	1	1	KJB	07/01/24 14:41	50 50	DF42849
Silver	ND (0.01)	---	1311/6010D	5	1	KJB	07/01/24 14:41	50 50	DF42849

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-05 Attendant Booth  
 Date Sampled: 06/26/24 13:15  
 Percent Solids: 99  
 Initial Volume: 1000ml  
 Final Volume: 1ml  
 Extraction Method: 3510C

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-01  
 Sample Matrix: Solid  
 Units: mg/L  
 Analyst: JLG  
 Prepared: 7/2/24 8:40

**1311/8082 Polychlorinated Biphenyls TCLP Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1221	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1232	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1242	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1248	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1254	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1260	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1262	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204
Aroclor 1268	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:15	---	DG40204

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	76 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-05 Attendant Booth  
 Date Sampled: 06/26/24 13:15  
 Percent Solids: 99  
 Initial Volume: 100g  
 Final Volume: 2000ml  
 Extraction Method: 1311

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-01  
 Sample Matrix: Solid  
 Units: °C  
 Analyst: RAP  
 Prepared: 6/27/24 21:04

**TCLP Extraction by 1311**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Temperature (Min C)	20.9 (N/A)	---	1311	---	1	RAP	06/28/24 13:06	---	DF42748
Temperature (Max C)	21.3 (N/A)	---	1311	---	1	RAP	06/28/24 13:06	---	DF42748
Temperature (Range)	Temperature is not within 23 +/-2 °C. (N/A)								

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-06 Scale House  
 Date Sampled: 06/26/24 13:30  
 Percent Solids: 96

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-02  
 Sample Matrix: Solid  
 Units: mg/L

Extraction Method: 3005A TCLP

**1311 TCLP Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	ND (0.05)	---	1311/6010D	5	1	KJB	07/01/24 14:43	50 50	DF42849
<b>Barium</b>	<b>0.05</b> (0.05)	---	1311/6010D	100	1	KJB	07/01/24 14:43	50 50	DF42849
Cadmium	ND (0.005)	---	1311/6010D	1	1	KJB	07/01/24 14:43	50 50	DF42849
<b>Chromium</b>	<b>0.07</b> (0.02)	---	1311/6010D	5	1	KJB	07/01/24 14:43	50 50	DF42849
Lead	ND (0.05)	---	1311/6010D	5	1	KJB	07/01/24 14:43	50 50	DF42849
Mercury	ND (0.0002)	---	1311/7470A	0.2	1	AFV	06/28/24 18:23	20 40	DF42850
Selenium	ND (0.05)	---	1311/6010D	1	1	KJB	07/01/24 14:43	50 50	DF42849
Silver	ND (0.01)	---	1311/6010D	5	1	KJB	07/01/24 14:43	50 50	DF42849

Last Modified: 02/12/2025 at 8:17PM/EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-06 Scale House  
 Date Sampled: 06/26/24 13:30  
 Percent Solids: 96  
 Initial Volume: 1000ml  
 Final Volume: 1ml  
 Extraction Method: 3510C

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-02  
 Sample Matrix: Solid  
 Units: mg/L  
 Analyst: JLG  
 Prepared: 7/2/24 8:40

**1311/8082 Polychlorinated Biphenyls TCLP Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1221	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1232	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1242	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1248	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1254	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1260	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1262	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204
Aroclor 1268	ND (0.0001)	---	1311/8082A	---	1	07/03/24 1:35	---	DG40204

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	82 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	67 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: TCLP-06 Scale House  
 Date Sampled: 06/26/24 13:30  
 Percent Solids: 96  
 Initial Volume: 100g  
 Final Volume: 2000ml  
 Extraction Method: 1311

ESS Laboratory Work Order: 24F1116  
 ESS Laboratory Sample ID: 24F1116-02  
 Sample Matrix: Solid  
 Units: °C  
 Analyst: RAP  
 Prepared: 6/27/24 21:04

**TCLP Extraction by 1311**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Temperature (Min C)	20.9 (N/A)	---	1311	---	1	RAP	06/28/24 13:06	---	DF42748
Temperature (Max C)	21.3 (N/A)	---	1311	---	1	RAP	06/28/24 13:06	---	DF42748
Temperature (Range)	Temperature is not within 23 +/-2 °C. (N/A)								

Last Modified: 02/12/2025 at 8:17PM EST

CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
---------	--------	-----	-------	-------------	---------------	------	-------------	-----	-----------	-----------

1311 TCLP Metals

Batch DF42849 - 3005A\_TCLP

Blank										
Arsenic	ND	0.05	mg/L							
Barium	ND	0.05	mg/L							
Cadmium	ND	0.005	mg/L							
Chromium	ND	0.02	mg/L							
Lead	ND	0.05	mg/L							
Selenium	ND	0.05	mg/L							
Silver	ND	0.01	mg/L							

LCS										
Arsenic	0.50	0.05	mg/L	0.5000		99	80-120			
Barium	0.48	0.05	mg/L	0.5000		96	80-120			
Cadmium	0.23	0.005	mg/L	0.2500		94	80-120			
Chromium	0.47	0.02	mg/L	0.5000		94	80-120			
Lead	0.47	0.05	mg/L	0.5000		93	80-120			
Selenium	0.98	0.05	mg/L	1.000		98	80-120			
Silver	0.24	0.01	mg/L	0.2500		96	80-120			

LCS Dup										
Arsenic	0.50	0.05	mg/L	0.5000		101	80-120	2	20	
Barium	0.48	0.05	mg/L	0.5000		97	80-120	1	20	
Cadmium	0.24	0.005	mg/L	0.2500		95	80-120	1	20	
Chromium	0.47	0.02	mg/L	0.5000		94	80-120	0.2	20	
Lead	0.47	0.05	mg/L	0.5000		94	80-120	0.7	20	
Selenium	1.00	0.05	mg/L	1.000		100	80-120	1	20	
Silver	0.24	0.01	mg/L	0.2500		97	80-120	0.9	20	

Batch DF42850 - 245.1/7470A

Blank										
Mercury	ND	0.0002	mg/L							

LCS										
Mercury	0.0062	0.0002	mg/L	0.006000		104	80-120			

LCS Dup										
Mercury	0.0061	0.0002	mg/L	0.006000		101	80-120	2	20	

1311/8082 Polychlorinated Biphenyls TCLP Compounds

Batch DG40204 - 3510C

Blank										
Aroclor 1016	ND	0.0001	mg/L							
Aroclor 1016 [2C]	ND	0.0001	mg/L							
Aroclor 1221	ND	0.0001	mg/L							
Aroclor 1221 [2C]	ND	0.0001	mg/L							
Aroclor 1232	ND	0.0001	mg/L							
Aroclor 1232 [2C]	ND	0.0001	mg/L							
Aroclor 1242	ND	0.0001	mg/L							

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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>1311/8082 Polychlorinated Biphenyls TCLP Compounds</b>										
<b>Batch DG40204 - 3510C</b>										
Aroclor 1242 [2C]	ND	0.0001	mg/L							
Aroclor 1248	ND	0.0001	mg/L							
Aroclor 1248 [2C]	ND	0.0001	mg/L							
Aroclor 1254	ND	0.0001	mg/L							
Aroclor 1254 [2C]	ND	0.0001	mg/L							
Aroclor 1260	ND	0.0001	mg/L							
Aroclor 1260 [2C]	ND	0.0001	mg/L							
Aroclor 1262	ND	0.0001	mg/L							
Aroclor 1262 [2C]	ND	0.0001	mg/L							
Aroclor 1268	ND	0.0001	mg/L							
Aroclor 1268 [2C]	ND	0.0001	mg/L							
Surrogate: Decachlorobiphenyl	0.0000463		mg/L	0.00005000		93	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0000476		mg/L	0.00005000		95	30-150			
Surrogate: Tetrachloro-m-xylene	0.0000381		mg/L	0.00005000		76	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0000406		mg/L	0.00005000		81	30-150			
<b>LCS</b>										
Aroclor 1016	0.0008	0.0001	mg/L	0.001000		77	40-140			
Aroclor 1016 [2C]	0.0008	0.0001	mg/L	0.001000		78	40-140			
Aroclor 1260	0.0009	0.0001	mg/L	0.001000		88	40-140			
Aroclor 1260 [2C]	0.0009	0.0001	mg/L	0.001000		90	40-140			
Surrogate: Decachlorobiphenyl	0.0000390		mg/L	0.00005000		78	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0000394		mg/L	0.00005000		79	30-150			
Surrogate: Tetrachloro-m-xylene	0.0000364		mg/L	0.00005000		73	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0000362		mg/L	0.00005000		72	30-150			
<b>LCS Dup</b>										
Aroclor 1016	0.0008	0.0001	mg/L	0.001000		81	40-140	4	20	
Aroclor 1016 [2C]	0.0008	0.0001	mg/L	0.001000		83	40-140	7	20	
Aroclor 1260	0.0009	0.0001	mg/L	0.001000		88	40-140	0.09	20	
Aroclor 1260 [2C]	0.0009	0.0001	mg/L	0.001000		90	40-140	0.8	20	
Surrogate: Decachlorobiphenyl	0.0000389		mg/L	0.00005000		78	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0000389		mg/L	0.00005000		78	30-150			
Surrogate: Tetrachloro-m-xylene	0.0000398		mg/L	0.00005000		80	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0000395		mg/L	0.00005000		79	30-150			

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

**Notes and Definitions**

Z18	Temperature is not within 23 +/- 2 °C.
U	Analyte included in the analysis, but not detected
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

Last Modified: 02/12/2025 at 8:17PM EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24F1116

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179  
<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750  
[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutOfStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002  
<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002  
<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424  
<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313  
<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006  
[http://datamine2.state.nj.us/DEP\\_OPRA/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752  
<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

### ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB

ESS Project ID: 24F1116

Shipped/Delivered Via: ESS Courier

Date Received: 6/27/2024

Project Due Date: 7/4/2024

Days for Project: 5 Day

- 1. Air bill manifest present?  No  
Air No.: NA
- 2. Were custody seals present?  No
- 3. Is radiation count <100 CPM?  Yes
- 4. Is a Cooler Present?  Yes  
Temp: 3.9 Iced with: Ice
- 5. Was COC signed and dated by client?  Yes

- 6. Does COC match bottles?  Yes
- 7. Is COC complete and correct?  Yes
- 8. Were samples received intact?  Yes
- 9. Were labs informed about **short holds & rushes**?  Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes  No

11. Any Subcontracting needed? Yes  No  
ESS Sample IDs: \_\_\_\_\_  
Analysis: \_\_\_\_\_  
TAT: \_\_\_\_\_

12. Were VOAs received? Yes  No  
a. Air bubbles in aqueous VOAs? Yes / No / NA  
b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes  No  
a. If metals preserved upon receipt: Date: \_\_\_\_\_  
b. If dissolved metals are requested, are they: Yes / No Field Filtered  
c. Low Level VOA vials frozen: Date: \_\_\_\_\_

Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
Yes / No To Be Lab Filtered  
Time: \_\_\_\_\_ By: \_\_\_\_\_

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes  No  
a. Was there a need to contact the client? Yes  No  
Who was contacted? \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	566492	Yes	N/A	Yes	8 oz jar	NP	
2	566493	Yes	N/A	Yes	8 oz jar	NP	

**2nd Review**

Were all containers scanned into storage/lab?

Initials BSB  
Yes / No  
Yes / No / NA  
Yes / No / NA  
Yes / No / NA  
Yes / No / NA

- Are barcode labels on correct containers?
- Are all Flashpoint stickers attached/container ID # circled?
- Are all Hex Chrome stickers attached?
- Are all QC stickers attached?
- Are VOA stickers attached if bubbles noted?

Completed By: [Signature]  
Reviewed By: [Signature]

Date & Time: 6/27/24 18:44  
Date & Time: 6/27/24 19:17

Last Modified: 02/12/2025 at 8:17PM EST





*CERTIFICATE OF ANALYSIS*

Frank Rodrigues  
Tighe & Bond  
1 University Ave N. Lobby STE100  
Westwood, MA 02090-1245

**RE: Fall River DPW Improvements (F5033011A.03.08)**  
**ESS Laboratory Work Order Number: 24G0239**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard  
Laboratory Director

**REVIEWED**

**By ESS Laboratory at 5:59 pm, Jul 15, 2024**

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**SAMPLE RECEIPT**

The following samples were received on July 09, 2024 for the analyses specified on the enclosed Chain of Custody Record.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
24G0239-01	PCB-01 Scale House Ext Window Caulk	Solid	8082A
24G0239-02	PCB-02 Attendant Booth Ext Window Caulk	Solid	8082A
24G0239-03	PCB-03 Attendant Booth Ext Door Caulk	Solid	8082A

Last Modified: 02/12/2025 at 8:17PM EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**PROJECT NARRATIVE**

**No unusual observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

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[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)

Last Modified: 02/12/2025 at 8:17PM EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

1010A - Flashpoint  
6010D - ICP  
6020B - ICP MS  
7010 - Graphite Furnace  
7196A - Hexavalent Chromium  
7470A - Aqueous Mercury  
7471B - Solid Mercury  
8011 - EDB/DBCP/TCP  
8015C - GRO/DRO  
8081B - Pesticides  
8082A - PCB  
8100M - TPH  
8151A - Herbicides  
8260D - VOA  
8270E - SVOA  
8270E SIM - SVOA Low Level  
9014 - Cyanide  
9038 - Sulfate  
9040C - Aqueous pH  
9045D - Solid pH (Corrosivity)  
9050A - Specific Conductance  
9056A - Anions (IC)  
9060A - TOC  
9095B - Paint Filter  
MADEP 19-2.1 - EPH  
MADEP 18-2.1 - VPH

**Prep Methods**

3005A - Aqueous ICP Digestion  
3020A - Aqueous Graphite Furnace / ICP MS Digestion  
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion  
3060A - Solid Hexavalent Chromium Digestion  
3510C - Separatory Funnel Extraction  
3520C - Liquid / Liquid Extraction  
3540C - Manual Soxhlet Extraction  
3546 - Microwave Extraction  
3580A - Waste Dilution  
5030B - Aqueous Purge and Trap  
5030C - Aqueous Purge and Trap  
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

Last Modified: 02/12/2025 at 8:17PM EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: PCB-01 Scale House Ext Window Caulk  
 Date Sampled: 07/08/24 11:10  
 Percent Solids: N/A  
 Initial Volume: 2.03g  
 Final Volume: 10ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24G0239  
 ESS Laboratory Sample ID: 24G0239-01  
 Sample Matrix: Solid  
 Units: mg/kg wet  
 Analyst: JLG  
 Prepared: 7/10/24 12:30

**8082A Polychlorinated Biphenyls (PCB)**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1221	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1232	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1242	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1248	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1254	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1260	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1262	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003
Aroclor 1268	ND (0.2)	---	8082A	---	1	07/12/24 0:55	---	DG41003

Last Modified: 02/12/2025 at 8:17PM EST

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	61 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	70 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: PCB-02 Attendant Booth Ext Window Caulk  
 Date Sampled: 07/08/24 11:15  
 Percent Solids: N/A  
 Initial Volume: 2.24g  
 Final Volume: 10ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24G0239  
 ESS Laboratory Sample ID: 24G0239-02  
 Sample Matrix: Solid  
 Units: mg/kg wet  
 Analyst: JLG  
 Prepared: 7/10/24 12:30

**8082A Polychlorinated Biphenyls (PCB)**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1221	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1232	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1242	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1248	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1254	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1260	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1262	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003
Aroclor 1268	ND (0.2)	---	8082A	---	1	07/12/24 1:14	---	DG41003

Last Modified: 02/12/2025 at 8:17PM/EST

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	50 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	52 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements  
 Client Sample ID: PCB-03 Attendant Booth Ext Door Caulk  
 Date Sampled: 07/08/24 11:20  
 Percent Solids: N/A  
 Initial Volume: 2.07g  
 Final Volume: 10ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24G0239  
 ESS Laboratory Sample ID: 24G0239-03  
 Sample Matrix: Solid  
 Units: mg/kg wet  
 Analyst: JLG  
 Prepared: 7/10/24 12:30

**8082A Polychlorinated Biphenyls (PCB)**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1221	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1232	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1242	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1248	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1254	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1260	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1262	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003
Aroclor 1268	ND (0.2)	---	8082A	---	1	07/12/24 1:34	---	DG41003

Last Modified: 02/12/2025 at 8:17PM EST

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	77 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
 Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
---------	--------	-----	-------	-------------	---------------	------	-------------	-----	-----------	-----------

8082A Polychlorinated Biphenyls (PCB)

**Batch DG41003 - 3540C**

**Blank**

Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0193		mg/kg wet	0.02500		77	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0195		mg/kg wet	0.02500		78	30-150			
Surrogate: Tetrachloro-m-xylene	0.0182		mg/kg wet	0.02500		73	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0195		mg/kg wet	0.02500		78	30-150			

**LCS**

Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		77	40-140			
Aroclor 1016 [2C]	0.4	0.02	mg/kg wet	0.5000		78	40-140			
Aroclor 1260	0.4	0.02	mg/kg wet	0.5000		80	40-140			
Aroclor 1260 [2C]	0.4	0.02	mg/kg wet	0.5000		83	40-140			

Surrogate: Decachlorobiphenyl	0.0196		mg/kg wet	0.02500		79	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0199		mg/kg wet	0.02500		80	30-150			
Surrogate: Tetrachloro-m-xylene	0.0193		mg/kg wet	0.02500		77	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0197		mg/kg wet	0.02500		79	30-150			

**LCS Dup**

Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		81	40-140	5	30	
Aroclor 1016 [2C]	0.4	0.02	mg/kg wet	0.5000		82	40-140	5	30	
Aroclor 1260	0.4	0.02	mg/kg wet	0.5000		84	40-140	5	30	
Aroclor 1260 [2C]	0.4	0.02	mg/kg wet	0.5000		87	40-140	6	30	

Surrogate: Decachlorobiphenyl	0.0204		mg/kg wet	0.02500		82	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0208		mg/kg wet	0.02500		83	30-150			
Surrogate: Tetrachloro-m-xylene	0.0200		mg/kg wet	0.02500		80	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0205		mg/kg wet	0.02500		82	30-150			

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*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond

Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**Notes and Definitions**

U	Analyte included in the analysis, but not detected
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

Last Modified: 02/12/2025 at 8:17PM EST

*CERTIFICATE OF ANALYSIS*

Client Name: Tighe & Bond  
Client Project ID: Fall River DPW Improvements

ESS Laboratory Work Order: 24G0239

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutOfStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

[http://datamine2.state.nj.us/DEP\\_Opra/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_Opra/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752

<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

### ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KP/B/TB

ESS Project ID: 24G0239

Shipped/Delivered Via: ESS Courier

Date Received: 7/9/2024

Project Due Date: 7/16/2024

Days for Project: 5 Day

- 1. Air bill manifest present?  No  
Air No.: NA
- 2. Were custody seals present?  No
- 3. Is radiation count <100 CPM?  Yes
- 4. Is a Cooler Present?  Yes  
Temp: 1.4 Iced with: Ice
- 5. Was COC signed and dated by client?  Yes

- 6. Does COC match bottles?  Yes
- 7. Is COC complete and correct?  Yes
- 8. Were samples received intact?  Yes
- 9. Were labs informed about short holds & rushes? Yes / No /  NA
- 10. Were any analyses received outside of hold time? Yes /  No

- 11. Any Subcontracting needed? Yes /  No  
ESS Sample IDs: \_\_\_\_\_  
Analysis: \_\_\_\_\_  
TAT: \_\_\_\_\_

- 12. Were VOAs received? Yes /  No  
a. Air bubbles in aqueous VOAs? Yes /  No  
b. Does methanol cover soil completely? Yes / No /  NA

- 13. Are the samples properly preserved?  Yes / No  
a. If metals preserved upon receipt: Date: \_\_\_\_\_  
b. If dissolved metals are requested, are they: Yes / No Field Filtered  
c. Low Level VOA vials frozen: Date: \_\_\_\_\_

Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
Yes / No To Be Lab Filtered  
Time: \_\_\_\_\_ By: \_\_\_\_\_

Sample Receiving Notes:

- 14. Was there a need to contact Project Manager? Yes /  No  
a. Was there a need to contact the client? Yes /  No  
Who was contacted? \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ By: \_\_\_\_\_

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	569925	Yes	N/A	Yes	4 oz. Jar	NP	
2	569926	Yes	N/A	Yes	4 oz. Jar	NP	
3	569927	Yes	N/A	Yes	4 oz. Jar	NP	

**2nd Review**

- Were all containers scanned into storage/lab?
- Are barcode labels on correct containers?
- Are all Flashpoint stickers attached/container ID # circled?
- Are all Hex Chrome stickers attached?
- Are all QC stickers attached?
- Are VOA stickers attached if bubbles noted?

Initials: BB  
Yes / No  
Yes / No /  NA  
Yes / No /  NA  
Yes / No /  NA  
Yes / No /  NA

Completed By: [Signature]  
Reviewed By: [Signature]

Date & Time: 7/9/24, 14:58  
Date & Time: 7/9/24 1502

Last Modified: 02/12/2025 at 8:17PM EST



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## SECTION 02 41 23

### REMOVAL OF EXISTING HYDRANTS AND VALVES

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Removal of existing hydrants.
2. Removal of existing gate valve boxes

###### B. Related Sections:

1. Section 31 23 00 – Excavation, Backfill, Compaction and Dewatering
2. Section 31 05 13 – Borrow Material
3. Section 33 31 13 – Ductile Iron Pipe and Fittings
4. Section 32 12 16 – Bituminous Concrete Pavement
5. Section 32 92 00 – Lawns and Grasses

##### 1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of this work in the Section.
- B. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION

##### 3.1 GENERAL

- A. Removal of existing hydrants shall be performed only after the old water mains have been deactivated and the new water mains have been tested and disinfected and placed into service.
- B. Remove existing hydrants by approved methods and properly dispose of the ones determined to be non-salvageable.

##### 3.2 HYDRANT REMOVAL

- A. Carefully remove from the ground each hydrant on the water main to be abandoned. Dig up the hydrant and remove from the hydrant branch line by cutting or snapping off the branch line, approximately 2 feet away from the base in a neat and workmanlike manner. Excavation, backfill, and compaction shall be in accordance with Section 31 23 00. Ground surface repairs including loam and seed, and pavement repair work, shall be in accordance with Sections 32 92 00 and 32 12 16, respectively. If subject to line pressure, the end of the old hydrant branch shall be mechanically

capped or plugged in accordance with Section 33 11 13. If not subject to line pressure, the end of the old hydrant branch shall be plugged with concrete.

B. Removal of hydrant gate boxes shall be in accordance with Part 3.3 below.

### 3.3 REMOVAL OF WATER MAIN VALVE BOXES

A. After the existing water mains have been deactivated, remove the top sections of all gate boxes, fill in holes with ordinary borrow or sand per Section 31 05 13 and patch with bituminous concrete in the area of the valve box in accordance with Section 32 12 16.15.

### 3.4 DISPOSAL

A. All hydrants and valve boxes determined to be salvageable by the Owner or the Engineer shall be delivered to a site designated by the Owner. All non-salvageable hydrants and valve boxes shall be disposed of by the Contractor at no additional cost to the Owner.

END OF SECTION

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SECTION 02 81 00

CONTAMINATED SOIL EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Excavation, handling, stockpiling, and temporary storage of Contaminated Soil
2. Movement, placement, and covering of Contaminated Soil into a temporary controlled stockpile area or loading of soils directly into trucks for transportation to an approved disposal facility
3. Decontamination of tools, equipment, and vehicles and the collection, management and disposal of resulting liquids and/or solids
4. Other work involving the handling of contaminated materials which may be required including but not limited to miscellaneous facility component removal, removal of obstructions, excavation support systems, and any incidental work related thereto

B. Related Sections

1. Section 01 35 29 - Health & Safety Plan
2. Section 02 81 01 - Transportation and Disposal of Contaminated Soil
3. Section 31 23 00 - Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

- A. 310 CMR 40.0000, Massachusetts Contingency Plan
- B. MADEP Policy, WSC-94-400, "Interim Remediation Waste Policy for Petroleum Contaminated Soil"
- C. MADEP Policy, WSC-402-96, "Commonwealth of Massachusetts Underground Storage Tank Closure Assessment Manual"
- D. 310 CMR 30.000, Massachusetts Hazardous Waste Regulations
- E. 40 CFR Part 261, Identification and Listing of Hazardous Waste
- F. 40 CFR Part 268, Land Disposal Restrictions
- G. 520 CMR 14.00 Excavation and Trench Safety

1.3 DEFINITIONS

- A. Natural Soil: Soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.

- B. Contaminated Soil: Soils or fills determined by analytical results to contain oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600.
- C. Special Handling: Methods used to excavate, collect, grade, load, move, transport, stockpile, dispose, or otherwise manage a contaminated material or Contaminated Soil are such that (1) the spillage, loss, co-mingling, or uncontrolled deposition of such material is minimized, (2) personal exposure to contaminants present in such a material are minimized, (3) the adverse impacts to the community and the surrounding environment from contaminants present in such material are minimized, (4) all applicable regulatory requirements applicable to such activity are satisfied.

#### 1.4 QUALITY ASSURANCE

- A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), 520 CMR 14.00, and other State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
- B. All contaminated material excavated or otherwise collected, consolidated and managed during the course of the work will require Special Handling in accordance with these specifications, Contractor Health and Safety Plan, and all applicable permits, approvals, authorizations, and Regulations.
- C. Perform the handling of contaminated materials with equipment and techniques in accordance with the performance requirements defined in this specification.

#### 1.5 PERMITS

- A. In accordance with 520 CMR 14.00, no person shall, except in an emergency, make an excavation in any public way, public property, or privately owned land until a permit is obtained from the appropriate designated permitting authority. For this project, the permit should be obtained from the city of Fall River.

### PART 2 PRODUCTS – NOT USED

### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Provide all employees and subcontractor(s) with personal protective equipment and protective clothing consistent with the levels of protection required for this work as indicated in Contractor's Health and Safety Plan.
- B. Perform all contaminated material handling operations in accordance with standard engineering practices applicable to such activity, according to MADEP regulations, and according to the provisions of Contractor Health and Safety Plan. Utilize methods which consider the health and safety of all Contractor and subcontractor personnel, support personnel, Engineer(s) and their representatives, and the surrounding environment.
- C. All site health and safety controls shall be fully established and in operation prior to beginning any contaminated material handling activity. Site controls shall include but not be limited to work zones properly barricaded, decontamination facilities, establishment of stockpile/laydown areas, air monitoring, and all support equipment

and supplies including personal protective equipment. Comply with the requirements of Section 01 35 29, Health and Safety Plan.

- D. Minimize the spread of contaminated materials during handling. Transport vehicles used to move Contaminated Soil at the Project Site shall be free from leaks. Trucks or other conveyances deemed unacceptable for use by Engineer shall not be used for the movement of contaminated materials.
- E. Keep work areas, including but not limited to, areas adjacent to excavations, roadways leading to and from excavation areas, driveways, parking areas, and public roadways free of contaminated materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed of to the satisfaction of Engineer no later than the end of each working day or as requested by Engineer.
- F. Owner is the generator and will sign all manifests and bills of lading. Except for materials required to be transported under manifest, transport all Contaminated Soil material under bills of lading (prepared by Engineer) regardless of the chemical quality of the soils. Natural Soil or soil not considered to be Contaminated Soil may be transported under a Material Shipping Record, with Owner/Engineer approval.

### 3.2 EXCAVATION OF CONTAMINATED MATERIALS

- A. Perform excavation in accordance with the requirements of Sections 02 81 01 Transportation and Disposal of Contaminated Soil, 31 23 00 Excavation, Backfill, Compaction and Dewatering, this section, and the Release Abatement Measure Plan to be prepared by the Owner/Engineer.
- B. Excavate contaminated soil to vertical and horizontal limits identified by the Engineer.
- C. Engineer will evaluate field conditions following excavation activities to determine if additional excavation is required to achieve remedial objectives. This evaluation may require Engineer to work in close proximity to Contractor's excavation equipment, and may require frequent pauses in the work. Contractor shall work in a cooperative manner at all times during these operations to ensure the safety of Engineer, and to allow for thorough field evaluations to be conducted.
  - 1. When contaminated material excavation is undertaken, Engineer will make the final determination as to the limits of excavation required to achieve remediation objectives. Such limits may be greater than or less than the limits identified prior to excavation and shall be based upon actual conditions encountered at the time of excavation.
  - 2. If required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation shall be required based upon field observations.
- D. Minimize the spread and loss of contaminated materials during excavation activities.
  - 1. Following excavation, transport contaminated materials directly to the temporary controlled stockpile area for stockpiling. Excavated contaminated materials shall not be placed directly on the ground, rather shall be placed on an impermeable surface or on 6 mil or greater polyethylene sheeting.
- E. Employ methods necessary to isolate contaminated materials from non-contaminated soils to the degree practicable.

- F. Segregate construction debris from excavated contaminated materials at the point of excavation, prior to the movement of contaminated materials from excavation areas. Engineer may evaluate debris during excavation to determine if such material can be designated uncontaminated general demolition material.
- G. Open excavations represent a substantial hazard. Contractor shall implement measures as appropriate to secure open excavations while awaiting Engineer's confirmation test results from soils (refer to Item 3.5) or any other period when excavations remain open.
- H. Implement measures to divert surface water around excavation sites to prevent water from directly entering into open excavations.

### 3.3 BACKFILL

- A. Backfill excavations in accordance with Section 31 23 00, Excavation, Backfill & Compaction and Dewatering.
- B. Backfill excavations as soon as possible after Engineer has indicated that test results confirm remediation objectives have been achieved and backfilling may proceed.

### 3.4 UNFORESEEN CONTAMINATED MATERIALS

- A. In the event that unforeseen contaminated materials are encountered during the course of the work, contact the Owner and Engineer immediately and permit the Engineer sufficient time to devise an appropriate course of action based upon the conditions present.
  - 1. Until such appropriate course of action is devised, Contractor shall secure the work area in question such that it does not pose a health and safety risk.
  - 2. Engineer will provide Contractor with a scope of work and performance requirements for the collection, consolidation, removal or excavation of unforeseen contaminated material. Contractor shall then undertake contaminated material remediation with equipment and techniques established by Contractor in accordance with said scope of work and performance requirements.
- B. Contaminated material remediation shall be performed in accordance with scope of work outlined in accordance with this specification.

### 3.5 CONFIRMATION TESTING BY ENGINEER

- A. At such time the Engineer is satisfied that the limits of contaminated material have been reached, Engineer will perform appropriate confirmation sampling to confirm remediation objectives have been achieved and no additional contaminated material excavation or removal is required.
- B. Contractor is hereby notified that laboratory turnaround time for the analysis of confirmation samples may be up to 5 working days from date of collection. No claim for delay will be considered based upon Contractor failing to accommodate the laboratory turnaround time as defined herein.
- C. Engineer will inform Contractor if test results confirm remediation objectives have been achieved and backfilling may proceed.

- D. Should the results of Engineer's testing indicate additional contaminated material excavation or removal is required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation or removal shall be required.

### 3.6 STORAGE OF EXCAVATED MATERIALS

- A. Excavated contaminated material shall be temporarily stockpiled on-site. Stockpile contaminated soils in an area designated by the Engineer in such a manner to protect existing site surface, materials and structures from contamination, runoff and erosion. Place the contaminated soil on a minimum of 6 mil polyethylene sheeting and at the end of each day the stockpiled soil shall be covered with 6 mil polyethylene sheeting and secure the covering to prevent the stockpile from becoming uncovered due to winds. Stockpiles shall be separated by anticipated waste stream and/or destination facility in such a manner so no cross-contamination might occur; stockpiles shall also be labeled clearly based on origin, destination facility, and generation date.

### 3.7 DUST CONTROL

- A. Implement fugitive dust suppression to prevent unacceptable levels of dust resulting from handling operations associated with contaminated materials. Dust suppression methods shall be subject to approval from Engineer. Supervise fugitive dust control measures and monitor airborne particulate matter as required.

END OF SECTION

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SECTION 02 81 01

TRANSPORTATION AND DISPOSAL OF CONTAMINATED SOIL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Transportation and disposal of Contaminated Soil or materials collected, consolidated, excavated, and generated during performance of the Work.
2. Coordination, loading, transportation and disposal of contaminated materials.
3. Decontamination of tools, equipment, and vehicles and the collection, management, and disposal of resulting liquids and/or solids.

B. Related Sections

1. Section 01 35 29, Health & Safety Plan
2. Section 02 81 00, Contaminated Soil Excavation
3. Section 02 80 00, Hazardous Waste & Materials Abatement

1.2 REFERENCES

- A. 310 CMR 40.0000, Massachusetts Contingency Plan, latest version
- B. MassDEP Policy, WSC-94-400, "Interim Remediation Waste Policy for Petroleum Contaminated Soil"
- C. 310 CMR 30.000, Massachusetts Hazardous Waste Regulations, latest version
- D. MassDEP, 310 CMR 19.000, Solid Waste Management Facility Regulations, latest version
- E. MassDEP, 310 CMR 10.00, Massachusetts Wetlands Protection Act, latest version
- F. MassDEP, 310 CMR 7.00, Massachusetts Air Pollution Control Regulations, latest version
- G. 310 CMR 16.000, Massachusetts Solid Waste Rules, latest version
- H. 40 CFR Part 261, Identification and Listing of Hazardous Waste
- I. 40 CFR Part 268, Land Disposal Restrictions
- J. MassDEP Policy # Comm-97-001: Massachusetts Landfill Soil Cover Policy
- K. MassDEP Guideline: Construction Activities In Contaminated Areas, 1994
- L. MassDEP Guideline: Similar Soils Provision Guidance (WSC#-13-500)
- M. MassDEP Interim Policy # Comm-15-01: Re-Use of Soil for Large Reclamation Projects Policy
- N. 520 CMR 14.00 Excavation and Trench Safety

- O. Analytical data provided by Tighe & Bond, Inc

### 1.3 DEFINITIONS

- A. Disposal: The discharge, deposit, injection, dumping, spilling, leaking, incineration or placing of any contaminated material or otherwise hazardous substance into or on any land or water so that such hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.
- B. Generator: Any person, by site, whose act or process produces hazardous waste, or whose act first causes an oil or hazardous material to become subject to regulation. This includes the owner of contaminated soil removed from the site.
- C. Regulated Waste: Non-Resource Conservation and Recovery Act (RCRA) hazardous wastes such as oils, petroleum products or residuals, chemical liquids, chemical gases or vapors, non-Toxic Substances Control Act (TSCA) polychlorinated biphenyls (PCBs), waste chemical solids, including soils, and other contaminated material wastes not defined as RCRA Hazardous, TSCA-regulated, or Special Waste. This includes, but is not limited to, soils considered to be Remediation Waste per 310 CMR 40.0000.
- D. Manifest: An approved form used as a shipping document to identify the quantity, composition, and the origin, routing, and destination of regulated or hazardous waste from the site of generation to the point of disposal, treatment, storage, or use.
- E. Shipping Paper: An invoice, bill of lading, or other shipping document serving a similar purpose; other than a hazardous waste manifest used to document the conveyance of materials between different locations, including regulated wastes when applicable.
- F. Treatment: Any method, technique or process, including neutralization, incineration, stabilization or solidification, designed to change the physical, chemical or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste less hazardous, non-hazardous, safer to transport, amenable to storage, or reduced in volume, except such method or technique as may be included as an integral part of a manufacturing process at the point of generation.
- G. Natural Soil: Soil in which all substances naturally occurring therein are present at concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.
- H. Contaminated Soil: Soils or fills determined by analytical results to contain oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600 or above background conditions and attributable to releases that may be exempt from 310 CMR 40.0000.
- I. Special Handling: Methods used to excavate, collect, grade, load, move, transport, stockpile, dispose, or otherwise manage a contaminated material or Contaminated Soil are such that (1) the spillage, loss, commingling, or uncontrolled deposition of such material is minimized, (2) personal exposure to contaminants present in such a material are minimized, (3) the adverse impacts to the community and the surrounding



environment from contaminants present in such material are minimized, and (4) all applicable regulatory requirements applicable to such activity are satisfied.

- J. LSP: Licensed Site Professional: *Tighe & Bond, Inc.*
- K. MassDEP: Massachusetts Department of Environmental Protection
- L. EPA: U.S. Environmental Protection Agency
- M. MCP: Massachusetts Contingency Plan
- N. OSHA: Occupational Safety and Health Administration
- O. PID: Photoionization Detector
- P. OHM: Oil and Hazardous Materials
- Q. QEP: Qualified Environmental Professional
- R. RAM: Release Abatement Measure
- S. RIP: Remedy Implementation Plan

#### 1.4 QUALITY ASSURANCE

- A. The LSP will monitor the Contractor's activities associated with the Work of this Section. This monitoring will include, but not be limited to:
  - 1. Observing and screening excavated soils as necessary to confirm that their quality is consistent with the findings of the Precharacterization Program;
  - 2. Establishing requirements for stockpiling, segregating, and handling if the quality of the excavated soils is not consistent with the findings of the Precharacterization Program;
  - 3. Perform perimeter dust monitoring for compliance with the 0.15 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) action level and notify Contractor to implement dust controls if action levels are exceeded, if necessary.
  - 4. Review requests from Contractor-proposed off-site reuse, recycling, treatment, and disposal facilities for additional chemical testing; and
  - 5. Document that appropriate LSP-prepared paperwork accompanies each load of excavated soil and material that is transported to or from the site.
- B. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), 520 CMR 14.00, and other State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
- C. All contaminated material excavated or otherwise collected, consolidated, and managed during the work will require Special Handling in accordance with these specifications, Contractor Health and Safety Plan, and all applicable permits, approvals, authorizations, and Regulations.
- D. Perform the handling of contaminated materials with equipment and techniques in accordance with the performance requirements defined in this specification.

### 1.5 PERMITS

- A. In accordance with 520 CMR 14.00, no person shall, except in an emergency, make an excavation in any public way, public property, or privately-owned land until a permit is obtained from the appropriate designated permitting authority. For this project, the permit should be obtained from the respective municipality (Fall River) or State Agency where the trenching activities are to be performed.

### PART 2 PRODUCTS – NOT USED

### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Provide all employees and subcontractor(s) with personal protective equipment (PPE) and protective clothing consistent with the levels of protection for this work as indicated in Contractor's Health and Safety Plan.
- B. Management of excavated soils in accordance with standard engineering practices applicable to such activity, according to the *Tighe & Bond, Inc. Soil and Groundwater Management Plan*, MassDEP regulations, and according to the provisions of Contractor Health and Safety Plan. Utilize methods which consider the health and safety of all Contractor and subcontractor personnel, support personnel, LSP firm and its representatives, and the surrounding environment.
- C. All site health and safety controls shall be fully established and in operation prior to beginning any contaminated material handling activity. Site controls shall include but not be limited to work zones properly barricaded, decontamination facilities, air monitoring, and all support equipment and supplies including PPE.
- D. Minimize the spread of contaminated materials during handling. Vehicles used to move Contaminated Soil at the Project Site shall be free from leaks. Trucks or other conveyances deemed unacceptable for use by LSP shall not be used for the movement of contaminated materials.
- E. Keep work areas, including but not limited to, areas adjacent to excavations, roadways leading to and from excavation areas, driveways, parking areas, and public roadways free of contaminated materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed to the satisfaction of LSP no later than the end of each working day or as requested by LSP.
- F. Owner is the generator and will sign all manifests, material shipping records, bills of lading and facility generator profile forms. Except for materials required to be transported under manifest, transport all Contaminated Soil material under bills of lading or material shipping records as prepared by LSP.
- G. No excavated contaminated soils or contaminated materials shall leave the site without prior approval of the Owner. Additionally, no contaminated soils or contaminated materials shall be imported to the site without prior approval of the Owner and their LSP.

#### 3.2 SUBMITTALS

- A. Off-site Reuse, Recycling, Treatment, and Disposal Facilities
1. Allow a minimum of 14 days for preparation of a complete submittal. If greater than 5 submittals are requested at one time allow an additional 14 days for review.
  2. Provide a list of soil reuse/recycling/disposal facilities for LSP approval. The list shall identify primary and secondary facilities for each soil classification identified.
  3. A minimum of 14 days prior to starting the submittals outlined below, provide the name, address, telephone number, and contact person and applicable facility permits for each proposed off-site reuse, recycling, treatment, and disposal facility or location. This submittal is considered a prescreening of the Contractor-proposed receiving facilities or locations.
  4. A minimum of 30 days prior to transport of any soils from the site, submit a letter from each Contractor-proposed receiving facility or location providing all the information outlined below. The submittal will not be considered complete without all this information. The Owner will review and approve up to two facilities for each soil group. Additional reviews will be conducted at the Contractor's expense.
    - a. A statement from the facility or the facility's LSP/QEP (for facilities that are not licensed by the State), indicating that the facility has reviewed the applicable precharacterization data and soil disposal quantity information provided by the Contractor and can legally accept the material. This statement shall also include any contingencies upon which the acceptance is based.
    - b. A statement from the facility or the facility's LSP (for facilities that are not licensed by the State), indicating if additional soil quality testing is required to meet the facility's acceptance criteria. If additional testing is required, the facility shall indicate types, numbers, and locations of tests. The Owner will evaluate the requested additional testing, determine the reasonableness of the request, and arrange for and conduct the additional testing as necessary. The Contractor shall provide the equipment (e.g., excavators and/or drill rigs) to obtain the samples at no additional cost to the Owner. No claim for delay will be considered based upon additional testing required by Contractor's selected facility(ies).
    - c. If the Contractor selects a facility which requires PID monitoring at the time of excavation, it is the responsibility of the Contractor to conduct the PID screening and provide PID screening logs to the facility as outlined by their permit. Copies of the PID screening logs shall also be provided to the Owner and LSP at the end of each week. The contractor shall notify the Owner and LSP if PID screening results do not comply with the facility's acceptance criteria and the soil stockpiled separately.
    - d. A copy of the facility's permit, consent order(s), and other applicable documentation under which the facility is operating, that indicate the facility's testing requirements and acceptance criteria.

- e. A statement from the facility or the facility's LSP/QEP (for facilities that are not licensed by the state), indicating the following:
  - 1) That the facility is operating in accordance with its permit, consent order(s), and other applicable documents.
  - 2) If any previous violations or complaints have been filed against the facility; and, if so, provide a brief statement describing the violation(s), how it was addressed, and its status.
  - 3) Proposed use of soil or material (i.e., reuse, treatment, disposal, or other) at the facility.
  - 4) Any limitations on soils or materials proposed for transport to the facility based on material consistency (e.g., granular soil, organic soil, or cohesive soil, debris content, slurry excavate, etc.).
  - 5) Whether the facility is an EPA Superfund site or part of one.
  - 6) Describing any remedial treatment systems that are in operation at the facility.
  - 7) If any releases have occurred at or adjacent to the site, if they have been reported to the MassDEP, the Release Tracking Number, and the status of the release.
- f. Facility information necessary to complete Section E of MassDEP Bureau of Waste Site Cleanup Form BWSC-012A Bill of Lading (Type C and D soils), and to complete Section E of DEP Bureau of Waste Prevention Material Shipping Record and Log (Type A and B soils).
- g. For facilities or locations that are not licensed by the State, provide the following:
  - 1) A letter of permission from the local Board of Health and other governing authorities (e.g., Conservation Commission) authorizing the facility or location to receive soils of the Group classifications proposed by the Contractor.
  - 2) Background chemical test data on soil and groundwater representing conditions at proposed facility or location.
  - 3) A statement indicating if the facility or location is in an aquifer recharge area.
- h. Once the submittal requirements outlined above are completed to the satisfaction of the LSP, the LSP will prepare a letter of acceptance for signature by the facility, the facility's LSP, or other authorized representative of the facility. This letter, once signed and returned to the LSP, will constitute approval of the facility for this project. The LSP will prepare this letter within 7 days of satisfactory completion of the above submittal requirements. The Owner maintains the right to reject any proposed facility at any time in the review and acceptance process.

5. A minimum of 14 days prior to transport of any soils from the site, provide a letter stating the name and address of the transporter for each material group classification and each off-site facility as applicable. The LSP will prepare a Bill-of-Lading or Material Shipping Record for each facility within 7 days of approval of the facility and following receipt of the transporter information.
6. Within 20 days of last shipment, submit copies of completed Material Shipping Record & Log Forms and Bills of Lading documenting transport of excavated soils and materials from the site to approved off-site disposal, reuse, recycling, or treatment facilities. The submittal shall also include weight slips for each load transported from the site to the disposal facility and facility attestation acknowledging receipt of the soil.
7. Within 45 days after shipment date, submit the designated manifest copy with any corrections noted.
8. Plan outlining the procedures, products, site logistics, and schedule for the on-site treatment of Type E soils, if encountered.
9. Prior to handling any hazardous waste, provide a Decontamination Plan that provides procedures for handling, managing, and disposal of hazardous waste, if encountered. The Decontamination Plan shall include health and safety measures for construction worker safety, mitigation measures for avoiding cross contamination between work zones/soil types, and best management practices (BMPs) for preventing hazardous waste contacting both paved and unpaved surfaces.
10. Provide weekly soil management reporting to the Owner and the LSP that includes a summary of the daily excavated volume by locations, work zone, and estimated soil volume generated by soil type. The report shall include the disposition of the excavated materials including volumes, shipment, dates, number of shipments, and final tonnage of materials that were transported offsite for reuse/recycling/disposal at the facilities approved by the LSP.

### 3.3 CLASSIFICATION OF SOILS

- A. Excavated materials shall be classified into five general groups for purposes of off-site reuse, recycling, treatment, and disposal according to criteria established by applicable federal, state, and local agencies having jurisdiction over the Work. Classification is based on the results of the Precharacterization Program. At the Owner's discretion soils may be reclassified by the LSP and/or Owner during excavation based on field PID screening, visual and olfactory observations, and the results of additional laboratory chemical testing collected following completion of the Precharacterization Program. In no case shall any soil or material group be transported to residential settings, schools, playgrounds, or similar sites.
  1. **Type A Soil - Reuse at Sand and Gravel facility:** Soils which do not contain OHM, or contain OHM below levels consistent with "natural" soil per MassDEP's Similar Soils Provision Guidance (WSC-13-500) are not considered Remediation Waste and may be reused at an active sand and gravel processing facility that holds a Site Assignment Authorization with approval from the LSP-of-Record. Facilities that are reclaiming former sand and gravel pits must have

a MassDEP approved ACO in place in accordance with MassDEP Interim Policy COMM-15-01: *Re-Use of Soil for Large Reclamation Projects Policy*.

2. **Type B-1 and B-2 Soil - Reuse:** Soil containing OHM concentrations below MCP RCS-1 or RCS-2 criteria as appropriate can be used as fill material at off-site industrial/commercial locations provided that pre-existing OHM concentrations at the fill location are equal to or higher than those that exist in the construction generated soil. Facilities must have a MassDEP approved ACO in place in accordance with MassDEP Interim Policy COMM-15-01.
3. **Type C-1 Soil - Massachusetts Unlined Landfills:** Soil that contains OHM concentrations above MCP RCS-1 levels but below the criteria for Massachusetts Unlined landfills per MassDEP Policy COMM-97-001. Soils that contain OHM concentrations greater than or equal to MCP RCS-1 but below criteria for MA Lined/Unlined Landfills per COMM-97-001.
4. **Type C-2 Soil - Massachusetts Lined Landfills:** Soil that contains OHM concentrations above MCP RCS-1 levels and Massachusetts Unlined landfills but below the criteria for Massachusetts Lined landfills per MassDEP Policy COMM-97-001.
5. **Type D-1 Soil - Asphalt Batch Facility:** Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted asphalt batch facility can be recycled at such facilities: Soil that contains OHM at concentrations greater than or equal to RCS-1 and Massachusetts Landfill criteria.
6. **Type D-2 Soil - Thermal Desorption Facility:** Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted thermal desorption facility can be recycled at such facilities.
7. **Type D-3 Soil - Non-Hazardous Waste Out of State Subtitle D Landfill Facility:** Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted non-hazardous waste out of state Subtitle D landfill facility for use as daily cover.
8. **Type D-4 Soil - Non-Hazardous Waste Out of State Subtitle D Landfill Facility:** Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted non-hazardous waste out of state Subtitle D landfill facility can be disposed at such facilities.
9. **Type E-1 Soil - U.S. EPA Hazardous Waste Subtitle C RCRA Landfill Facility:** Soil containing OHM concentrations that exceed reuse levels for Massachusetts landfills, asphalt batch and/or thermal desorption facilities and exceed federal TCLP limits or otherwise meets the definition of hazardous

waste. Meets acceptance criteria for a permitted hazardous waste out of state Subtitle C Resource Conservation and Recovery Act (RCRA) landfill facility.

10. **Type E-2 Soil - U.S. EPA Hazardous Waste PCB TSCA Landfill:** Soils that either contain PCB concentrations greater than 50 ppm or are TSCA regulated and being managed under a Performance Based Cleanup can be disposed at approved TSCA facilities in accordance with 40 CFR 761.
11. **Type E-3 Soil - Soil Stabilization to treat TCLP metals:** Soil stabilization treatment of soil containing OHM concentrations that exceed federal TCLP limits for metals, to render soils non-hazardous.

### 3.4 ACCEPTANCE OF SOIL AT RECEIVING FACILITIES

- A. The Owner and the LSP will review information submitted by the Contractor as detailed in the submittal section. The Owner may reject a facility if the submittal process is incomplete, or if the Owner deems the proposed facility unacceptable. Facilities may be deemed unacceptable for any of the following: if the facility is not operated in accordance with state/federal guidelines or a state/federal granted permit applicable to or issued to the facility; if the facility is or is part of an EPA Superfund Site or is part of a Massachusetts listed spill or disposal site; if the facility is located in a resource area as defined in the MCP; if there are unreported or outstanding releases at the site; if previous releases have not been dealt with to the satisfaction of the Owner; if the facility's controls for accepting and monitoring waste are not adequate; if background data at Type A facilities is not adequate to characterize the site; if existing material at the site does not meet the permit or site guidelines; or any reason that may put the Owner at risk.

### 3.5 UNFORESEEN CONTAMINATED MATERIALS

- A. If unforeseen contaminated materials are encountered during the work, permit the LSP sufficient time to devise an appropriate course of action based upon the conditions present.
  1. Until such appropriate course of action is devised, Contractor shall secure the work area in question such that it does not pose a health and safety risk.
  2. LSP will provide Contractor with a scope of work and performance requirements for the collection, consolidation, removal or excavation of unforeseen contaminated material. Contractor shall then undertake contaminated material remediation with equipment and techniques established by Contractor in accordance with said scope of work and performance requirements.
- B. Contaminated material remediation shall be performed in accordance with Section 02 81 00 Contaminated Soil Excavation and this specification.

### 3.6 STORAGE OF EXCAVATED MATERIALS

- A. Excavated contaminated material may be temporarily stockpiled on-site (at no additional cost to the Owner) or directly loaded into trucks. Stockpile contaminated soils in an area approved by the Owner and LSP in such a manner to protect existing site surface, materials, and structures from contamination, runoff, and erosion. Place the contaminated soil on a minimum of 6 mil polyethylene sheeting. At the end of

each day the stockpiled soil shall be covered with 6 mil polyethylene sheeting and secure the covering to prevent the stockpile from becoming uncovered due to winds.

- B. Soils that require additional chemical testing or are approved for reuse on site shall be temporarily stored in clearly labeled stockpiles segregated by soil types and located in on-site areas proposed by the Contractor and approved by the Owner. The Owner shall be responsible for the collection of additional soil disposal characterization samples.
- C. The stockpiles should be free of construction debris to comply with the applicable facility permitting. Material rejected by a facility due to excess construction debris will be at the cost of the Contractor.
- D. Construction debris encountered during excavation shall be segregated and stockpiled separately in an area approved by the Owner. The Contractor shall dispose the debris at a site shall be permitted to accept the waste stream by the applicable State Agency. Perform the loading of demolition and excess construction debris in a manner that prevents materials and activities from generating excessive dust and ensures minimum interference with roads, sidewalks and streets both onsite and offsite.
- E. Provide proof that the demolition materials have been received at a legal disposal, recycle, reuse or salvage location. Such proof may include truck weight slips from an approved disposal facility or documentation of transfer of title. Transport of all materials off site shall be in accordance with applicable Department of Transportation Regulations. All materials leaving the site shall become the property of the Contractor.
- F. The Contractor shall place Jersey barriers around stockpiles to provide confinement. Haybales and other siltation control measures are required to prevent erosion and washing of stockpiled soils from their temporary storage locations.
- G. Per MassDEP regulations, excavated Type C, D, and E soils shall not be stockpiled for longer than 120 days. Soils shipped to an off-site laydown yard shall be shipped off-site to the final receiving facility within 14 days. If the laydown yard is not owned by the Owner, then MassDEP may require approval of the laydown yard for storage of contaminated soils.

### 3.7 TREATMENT OF TYPE E-3 SOILS

- A. The Contractor shall compare the soil precharacterization data against the UTS and/or Alternative Soil Treatment Standards (ATS) included 40 CFR 268: Land Disposal Restrictions. The means and method for the soil stabilization treatment should be implemented to either prevent the generation of a hazardous waste or, in the event a hazardous waste, the treated soils that do not comply with the ATS or segregated and managed as a hazardous waste an approved facility.
- B. If feasible, Type E-3 soils shall be treated in place prior to excavation. If not feasible to treat in place, the LSP may allow the Contractor to treat soils following excavation provided the proposed means for treatment does not result in the soil being classified as generated hazardous waste. In no case shall treatment be conducted outside the limits of the area of contamination as defined by RCRA or the State where the soil is ultimately being disposed. Unless otherwise approved by the Owner, the Contractor shall provide a submittal of proposed treatment methods for Owner's and their LSP's approval.



- C. In the event that the means and methods selected by the contractor results in the generation of hazardous waste, the Contractor is responsible for stabilizing the soils to below the Universal Treatment Standards (UTS) for metals at no additional cost to the Owner.
- D. The Contractor shall provide a site-specific treatment plan at least 14 days prior to treatment for approval by the LSP.
- E. The Contractor shall collect post treatment confirmatory soil samples at a frequency of 1 sample per 100 tons or per the facility's disposal requirement, whichever is more stringent. The samples will be submitted to a NELAC accredited environmental laboratory for Toxicity Characteristic Leaching Procedures (TCLP) analysis and any additional facility post treatment analytical requirements.
- F. The Contractor shall treat and potentially retreat at no added cost to Owner the Type E-3 soils until chemical testing confirms that the soil has been rendered non-hazardous. No claim for delay will be considered based on additional requests from MassDEP regarding Type E-3 soil treatment.
- G. Following successful Type E-3 soil treatment, the soil will be transported and disposed at a Type C or Type D facility.

### 3.8 DUST CONTROL

- A. Implement as necessary dust controls to mitigate fugitive dust emissions. The action level for soil particles at the site perimeter shall be the National Ambient Air Quality Standard (NAAQS) of 0.15 mg/m<sup>3</sup> averaged over a 24-hour period. The average reading over each one hour period will be used to calculate the perimeter site level.
- B. Immediately upon exceeding the action level established above, the Contractor shall implement dust suppression measures as necessary. The contractor shall notify the LSP within two hours when hourly monitoring indicates an exceedance of the action level (0.15 mg/m<sup>3</sup>) averaged over a one-hour period. The Contractor shall then implement dust control measures during site activities.

### 3.9 TRANSPORTATION OF EXCESS MATERIAL

- A. The Contractor will be responsible for handling, re-handling, loading, transporting, and legal off-site removal of all excavated soils and materials to approved facilities.
- B. No soils shall be removed from the site without prior approval from the Owner and their LSP.
- C. Excavated soils and materials removed from the site shall be loaded within the site limits. All trucks shall be covered and cleaned of debris that might fall from the trucks during transport before leaving the site.
- D. The Contractor shall take measures to prevent debris from being spilled from trucks or tracked from the site onto local streets. The Contractor shall sweep streets adjacent to the site as necessary or as directed by the Owner.

### 3.10 CONTINGENCIES

- A. If potentially hazardous conditions develop during the work, the work in that specific area shall be terminated until the hazardous condition has been addressed to the

Owner's and their LSP's satisfaction. Potentially hazardous conditions include, but are not limited to, buried containers, tanks, or drums.

- B. The removal of buried tanks, containers, or drums shall be performed in accordance with the requirements of 520 CMR 9.00, Tanks and Containers and the MCP.
- C. If buried containers, drums or tanks are encountered or if a release of oil or potentially hazardous materials has occurred, the Contractor shall notify the Owner and LSP immediately. The Contractor shall secure the area to prevent health risks to workers or the public and releases into the environment. The sources of the event causing the material to be considered suspect will be evaluated by the Owner. The Owner will notify MassDEP Incident Response within the required reporting time period (MassDEP Emergency Notification at 888-304-1133 and the City of Fall River Fire Department at 508-324-2743 or 911 as required. The Owner will also notify the local Fire Department and State Fire Marshal's office upon discovery of an underground storage tank or buried container. The Contractor shall obtain permission for removal of buried storage tanks.
- D. The impact on the Work should be evaluated and, if necessary, the Contractor's Health and Safety Plan should be revised in response to the unforeseen conditions.

END OF SECTION

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SECTION 02 87 13

HAZARDOUS MATERIALS / UNIVERSAL WASTE MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes, but is not limited to, labor, materials, and equipment required to complete the removal and lawful disposal of hazardous, regulated or universal wastes in preparation for demolition of structures located at the Fall River DPW facility at 10 Lewiston Street, Fall River, Massachusetts. The removal and disposal of hazardous, regulated or universal waste materials include the Attendant Booth, Truck Scale and Scalehouse, and Salt Shed. Refer to contract drawings for specific location of buildings.
- B. Work includes the following.
  - 1. Removal, characterization (any testing that may be required by disposal facility) and lawful disposal or recycling of items listed in the Hazardous Materials / Universal Waste Materials Abatement Schedule appended to this specification, located throughout the project work areas.
  - 2. File all necessary notices, obtain all permits and licenses, and pay all governmental taxes, fees, and other costs in connection with the work. Obtain all necessary approvals of all governmental departments having jurisdiction.
  - 3. Comply with project specific Health and Safety Plan.
- C. The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to hazardous waste and universal waste material management, disposal and worker safety.
  - 1. The Contractor shall hold the Owner and Owner's Representative (OR) harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the Contractor, the Contractor's employees, or Subcontractors.

1.2 RELATED INFORMATION

- A. Related Sections
  - 1. Section 02 41 00, Demolition

1.3 LOCATION OF WORK

- A. Location of Work areas, descriptions, estimated types and quantities of hazardous materials, hazardous wastes and universal wastes are described in the Hazardous Materials / Universal Waste Materials Abatement Schedule appended hereto.
  - 1. If additional hazardous materials, hazardous wastes or universal wastes are encountered, notify Engineer immediately and be prepared to remediate the material.

2. The quantities are provided for general guidance and may not correspond exactly to the quantity to be removed.
3. The Contractor is responsible to investigate for the presence of all hazardous materials, hazardous wastes and universal wastes.

#### 1.4 REFERENCES

A. The Contractor is advised to thoroughly review the documents referenced in this Section. Strict adherence to the hazardous materials, noise, air and water pollution regulations and requirements is required.

1. Code of Federal Regulations
  - a. 29 CFR 1910, "Occupational Safety and Health Standards" (General Industry Standards)
  - b. 29 CFR 1910.1200, "Hazard Communication"
  - c. 29 CFR 1910.134, "Respiratory Protection"
  - d. 29 CFR 1926, "Safety and Health Regulations for Construction" (Construction Industry Standards)
  - e. 40 CFR 117, "Determination of Reportable Quantities for Hazardous Substances"
  - f. 40 CFR 172, "Hazardous Waste Transportation"
  - g. 40 CFR 261, "Identification and Listing of Hazardous Waste"
  - h. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste"
2. Commonwealth of Massachusetts Department of Environmental Protection
  - a. 310 CMR 40 Massachusetts Contingency Plan
  - b. 310 CMR 30 Hazardous Waste Regulations
  - c. 310 CMR 16, 19 Solid Waste Regulations

B. Local Town, City or County bylaws, rules, and regulations

#### 1.5 SUBMITTALS

A. Prior to removal of hazardous materials, hazardous wastes, and universal wastes, submit a Hazardous Waste Handling Plan, which includes means and methods for handling, packaging, labeling and transportation of hazardous, materials, hazardous wastes and universal wastes. Include health and safety equipment to be used to protect workers (i.e., personnel protection equipment). Include identification of the proposed waste hauler and disposal facility with copies of all applicable licenses, registrations and approvals.

B. Submit copies of all worker certifications associated with OSHA Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120.

- C. After completion of hazardous materials, hazardous wastes and universal wastes removal, submit a final report documenting removal, transportation and disposal activities. This shall include copies of manifests, shipping slips, permits and licenses for this project.

## 1.6 DEFINITIONS

- A. The following definitions relative to hazardous materials, hazardous wastes and universal wastes as used in this Section are offered:
1. BALLAST: a passive component used in an electric circuit to moderate changes in current. A light ballast regulates the current to the lamps and provides sufficient voltage to start the lamps. Ballasts manufactured prior to 1979 may contain PCBs. Ballasts manufactured between 1979 and 1991 may contain Di(2-ethylhexyl) phthalate (DEHP).
  2. CAPACITOR: a device used to store an electric charge, consisting of one or more pairs of conductors separated by an insulator. May contain PCBs. Capacitors are commonly used in electronic equipment including HVAC Units, pumps, etc.
  3. DEHP: Di(2-ethylhexyl) phthalate; manufactured chemical typically added to plastics to make them flexible. May be found in lighting ballasts manufactured between 1979 and 1991. Probable human carcinogen per U.S. EPA. Reasonably anticipated to be a human carcinogen per CDC.
  4. HANDLER: The Contractor removing the universal waste product.
  5. HAZARDOUS MATERIAL: Any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.
  6. HAZARDOUS WASTE: Waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment.
  7. LARGE QUANTITY GENERATOR: a handler can accumulate 5,000 kilograms or more of universal waste at any time.
  8. MERCURY: A silvery-white poisonous metallic element, liquid at room temperature and used in thermometers, barometers, vapor lamps, and batteries and in the preparation of chemical pesticides. Mercury is known to have many diverse types of health effects particularly with the nervous, digestive and urinary systems.
  9. NON-HAZARDOUS WASTE: Waste materials not specifically deemed hazardous under federal law are considered non-hazardous wastes.
  10. POLYCHLORINATED BIPHENYLS (PCBs) - Any of several compounds that are produced by replacing hydrogen atoms in biphenyl with chlorine, have various industrial applications, and are toxic environmental pollutants which

tend to accumulate in animal tissues. Probable human carcinogen per U.S. EPA. Reasonably anticipated to be a human carcinogen per CDC.

11. SMALL QUANTITY GENERATOR: a handler can accumulate not more than 5,000 kilograms or more of universal waste at any time.
12. UNIVERSAL WASTE: batteries, mercury-containing thermostats, certain pesticides, lamps (including but not limited to fluorescent, neon and mercury vapor lamps), and used electronics.

## PART 2 PRODUCTS

### 2.1 PROTECTIVE EQUIPMENT

- A. Provide health and safety equipment required to protect workers and to comply with the requirements of the project Health and Safety Plan.

### 2.2 TRANSPORTATION AND STORAGE CONTAINERS AND LABELING

- A. Provide DOT approved drums or containers for the disposal of the specified materials.
- B. All drums or containers for hazardous waste and universal waste must be closed, structurally sound, compatible with the contents of the specific waste, and must be capable of preventing leakage, spillage or damage that could cause leakage.
- C. All hazardous or universal waste products must be stored in a container and the container shall be properly labeled in accordance with applicable regulations. Appropriate labeling is as follows.
  1. Hazardous waste materials shall be labeled as "Hazardous Waste" in accordance with EPA RCRA.
  2. Universal Waste Lamps (each lamp) or containers or packages in which such lamps are contained must be labeled or marked clearly with any of the following: "Universal Waste - Lamp(s)" or "Waste Lamp(s), or "Used Lamp(s)".
  3. Universal Waste Mercury-Containing Devices or containers must be labeled or clearly marked with any of the following: "Universal Waste - Mercury Device(s)" or "Waste Mercury Device(s)" or "Used Mercury Device(s)."

## PART 3 EXECUTION

### 3.1 HAZARDOUS MATERIALS / WASTE - GENERAL

- A. Use proper PPE and health and safety equipment required to protect workers and to comply with the Health and Safety Plan.
- B. Use DOT approved drums or containers for the disposal of specified materials.
- C. All hazardous materials and universal waste shall be characterized and disposed of in accordance with applicable regulations. Submit disposal manifests for all waste disposals.

- D. Workers who manage hazardous materials shall be properly trained in hazardous materials handling procedures. At a minimum, this shall include OSHA 40 Hour Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120 for personnel handling hazardous waste.
- E. Remove as soon as possible any hazardous materials containers that are in poor condition.
- F. Managing Hazardous Waste
  - 1. Place waste in DOT approved containers and label the containers for transport to a licensed disposal site.
  - 2. Use an authorized hazardous waste transporter to haul waste to a hazardous waste facility.
  - 3. Follow all record keeping, chain-of-custody and reporting requirements including a copy of the hazardous waste manifest.
  - 4. Accurately measure and weigh the volume of each container or load of waste removed from the site. Submit records of waste volumes to Owner and Engineer.
  - 5. Give special attention to the time of storage, amount of material stored at any one time, use of proper containers and personnel training.
  - 6. Provide appropriate notifications to regulatory agencies if there is a release to the environment exceeding the CERCLA reporting requirements (e.g., lead -- 1 pound).
  - 7. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.
  - 8. Provide legal transportation of the waste to the disposal landfill, and complete or obtain all required licenses, manifests, landfill slips, or other forms. Submit copies of all forms or licenses, and the signed original of the Waste Manifest for each waste load.

### 3.2 LIGHT BALLASTS

- A. Remove, characterize and lawfully dispose to an appropriate off-site PCB disposal facility all PCB and non-PCB light ballasts throughout the facility. In preparing its bid, Contractor should assume that all light ballasts contain PCBs.
- B. Light fixtures shall be disassembled and inspected by the Engineer. All resulting lamps shall be immediately packaged for reclamation in accordance with Section 3.3 of this specification.
- C. If ballasts are found to be leaking, contaminated light fixtures, lenses and electrical motors shall be disposed of as PCB-contaminated materials.

- D. If a leaking ballast or visibly contaminated light fixture component is detected during removal, workers shall immediately don chemically resistant protective suits, (i.e., Tyvek), to reduce skin contact with PCBs and Mercury.
- E. Contractor shall have on hand spill containment and absorbent materials in the event a spillage of PCB-containing fluids occurs. Provide appropriate polyethylene sheeting to protect concrete floor and other surfaces from any spillage.
- F. All protective equipment (gloves, suits) and materials contaminated during any cleanup shall be disposed of as PCB- Remediation Waste along with the ballasts and fixtures.
- G. All ballasts shall be placed in DOT-approved barrels for subsequent transport immediately upon removal. Barrels will be labeled with the following yellow PCB caution labels:

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**CAUTION  
CONTAINS  
PCBs**

**(Polychlorinated Biphenyls)  
A toxic environmental contaminant  
Requiring special handling and  
Disposal in accordance with U.S.  
Environmental Protection Agency  
Regulations 40 CFR 761 - For  
Disposal Information contact the  
Nearest U.S. EPA Office.**

-----  
**In case of accident or spill, call toll  
Free the U.S. Coast Guard National  
Response Center:  
800-424-8802**

- H. Separate ballasts, capacitors and fixture components into separate drums. Leaking ballasts and capacitors shall be separate from all other items.
- I. Use DOT approved containers that have been approved for transporting hazardous materials. Used or reconditioned drums may be used only if they have been properly cleaned, evaluated, and labeled.
- J. Document all disposal activities to ensure compliance with regulations.

**3.3 UNIVERSAL WASTES**

- A. Mercury-Containing Equipment and Devices: Under current federal regulations, certain items containing mercury may be classified as universal waste. these include, but are not limited to fluorescent lamps, high-intensity discharge lamps, mercury thermostats and thermometers, mercury switches and the devices that contain them, mercury barometers and mercury manometers. The following shall be followed for recycling/disposal of these mercury items:
  - 1. Collection, characterization and proper recycling/disposal of all mercury-containing equipment found throughout the Site.
  - 2. Collect the mercury containing device or part of the device that contains mercury and place directly into approved containers.
  - 3. Care must be taken to not break these items, as that may cause mercury exposure to individuals managing them and may require additional clean-up and decontamination.
  - 4. Properly label all containers in accordance with Section 2.2 of this specification.
  - 5. Provide all waste shipment records or recycling records and incorporate them in the final report.

### 3.4 REFRIGERATION CFC SOURCES

- A. Refrigerant from typical window type air conditioners were identified. Refer to the Hazardous Materials / Universal Waste Materials Abatement Schedule appended to this Section for quantities and locations. Collect and capture remnant refrigerant from typical window type air conditioners.
- B. Capture and evacuate all refrigerant-containing systems using a vacuum pump.
  - 1. Furnish and install all necessary valves and fittings required to capture and collect the refrigerant in DOT-approved recovery cylinders or drums.
  - 2. Properly label all recovery cylinders and drums.
- C. All activities associated with the removal and reclamation of refrigerant gases shall be in accordance with Section 608 of the Federal Clean Air Act Amendments and any applicable state regulations.
- D. After removal of refrigerants, Contractor shall coordinate with the General Contractor regarding the disposal of the specific housing unit (i.e. window A/C unit) in accordance with applicable regulations.

### 3.5 UNKNOWN CHEMICALS/MATERIALS

- A. Although not observed, unknown chemicals/materials may exist in and around the buildings. The following shall be followed for the disposal of all unknown chemicals/materials:
  - 1. All unknown chemicals/materials must be characterized in accordance with State and Federal regulations.
  - 2. Once characterized, the unknown chemicals/materials must be packaged, labeled, transported, and disposed of in accordance with all State and Federal regulations.
  - 3. Provide all waste shipment records or recycling records and incorporate them into the final report.

### 3.6 FINAL CLEANING

- A. Unless otherwise specified under Sections of this Specification, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.
- B. Maintain the project site free from accumulations of waste, debris and rubbish caused by operations. At the completion of the work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave the project clean.
- C. Cleaning shall include all surfaces, interior and exterior, to which the Contractor has had access.
- D. Use only those materials that will not create hazards to health or property.

### 3.7 CLOSEOUT DOCUMENTS

- A. Submit to the OR, final completed copies of the waste manifests or bills of lading signed by all transporters and the designated disposal site owner/operator.
- B. Submit to the OR copies of all Contractor's logs and all worker certifications.
- C. Submit to the OR copies of all OSHA personal air monitoring results.
- D. Final payment will be withheld until receipt of all the above documentations to Owner's/OR's satisfactory.

END OF SECTION

### APPENDIX A - HAZARDOUS MATERIAL/UNIVERSAL WASTE ABATEMENT SCHEDULE

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## APPENDIX A

**SECTION 02 87 13  
HAZARDOUS MATERIALS/UNIVERSAL WASTE MATERIALS  
ABATEMENT SCHEDULE  
FALL RIVER DPW  
10 LEWISTON STREET  
FALL RIVER, MASSACHUSETTS**



Material	Waste Type	Container Type & Size	Approximate Quantity	Location	Comments
<b>ATTENDANT BOOTH, SCALE HOUSE</b>					
Thermostat	Mercury	1 oz vial	1 CT	Attendant Booth	Circular type wall mounted thermostat with built in mercury vial
Refrigerant	Chlorofluorocarbons (CFC)	Window AC Units	1 CT	Scale House	Properly reclaim refrigerant prior to recycling or disposal.
Light Ballasts	PCB/DEHP	Metal	10 CT	Attendant Booth and Scale House	Light fixtures are intact and require removal of ballast from light carcass.
Fluorescent Light Tubes	Mercury	4' glass tubes	10 CT	Attendant Booth and Scale House	Remove light tubes from light carcasses and properly package and recycle.
<b>NOTE: No hazardous building materials or universal waste materials were identified in the Salt Shed.</b>					
<b>Legend:</b> CFC = Chlorofluorocarbons CT = Count PCB = Polychlorinated biphenyl DEHP = Diethylhexyl Phthalate					

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SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Welded Wire Fabric
2. Reinforcing Accessories

B. Related Sections

1. Section 03 10 00 - Concrete Forms and Accessories
2. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

A. The Massachusetts State Building Code, latest edition.

B. American Concrete Institute (ACI)

1. ACI 117 - Standard Tolerance for Concrete Construction and Materials
2. ACI 301 - Specifications for Structural Concrete for Buildings
3. ACI 315 - Details and Detailing of Concrete Reinforcement
4. ACI 318 - Building Code Requirements for Reinforced Concrete, American Concrete Institute
5. ACI 350R - Environmental Engineering Concrete Structures
6. ACI SP-66 - Detailing Manual

C. American Society for Testing and Materials (ASTM)

1. A185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
2. A675 - Specifications for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties

D. American Welding Society (AWS)

1. D1.4 Structural Welding Code - Reinforcing Steel

1.3 SUBMITTALS

- A. Provide shop drawings in accordance with the recommendations of ACI 315, "Details and Detailing of Concrete Reinforcement" and show the following: elevations, dimensions of concrete work with specified reinforcement clearances; ledges, brackets, openings, sleeves or other items furnished by other Sections, where interference with reinforcement may occur; bending diagrams; assembly diagrams; splices and laps of reinforcement; temperature and shrinkage reinforcement;

construction joint reinforcement and shape; dimensions, grade designations, and details of reinforcement and accessories. Show dowels with concrete work to be placed first. Shop drawings shall be drawn to scale.

- B. Prior to delivery of reinforcing steel or concrete to job site, submit certified mill test reports of reinforcing steel and cement (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this project.

#### 1.4 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.
- B. Reinforcing steel shall be covered and stored off the ground, protected from moisture, and kept free from dirt, oil, or other foreign matter.

### PART 2 PRODUCTS

#### 2.1 WELDED WIRE FABRIC

- A. Welded wire fabric shall conform to ASTM A185

#### 2.2 REINFORCEMENT ACCESSORIES

- A. Reinforcement accessories shall conform to Product Standard PS7-766, National Bureau of Standards, Department of commerce, Class C, as produced by Dayton Superior Corporation; R.K.L. Building Specialties Co., Inc. or equal approved by the Engineer.
- B. Reinforcement accessories shall include spacers, chair ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement.
- C. Tie wire shall be of sufficient strength for all intended purpose, but not less than No. 18 gauge. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete.
- D. Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs.
- E. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.
- F. Expansion Joint Dowels
  - 1. Dowels shall conform to ASTM A675.
  - 2. Expansion dowel caps shall be No. 87 dowel caps as manufactured by Heck Building Products, Inc., Type F-46 dowel caps as manufactured by the Dayton Sure-Grip and Shore Company, or equal.

### PART 3 EXECUTION

#### 3.1 EXAMINATION



- A. Review all work prepared by others to receive work of this Section. Commencement of work will be construed as complete acceptance of preparatory work by others.

### 3.2 PREPARATION

- A. Notify the Engineer prior to the start of any phase of the reinforcing work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of reinforcement placements and at least 36 hours in advance of other inspections (forms, etc.).

### 3.3 INSTALLATION

- A. Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by the Engineer. For slabs, grade beams, etc. where concrete is poured on grade, use additional setup bars and concrete brick to provide required cover over reinforcement.
- B. Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by the Engineer.
- C. Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.
- D. Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved. Splices of reinforcement at points of maximum stress shall generally be avoided.
- E. Welded wire fabric shall lap 6 inches or one space plus 2 inches whichever is larger, and shall be wired together. Provide No. 4 set up bars spaced 30 inches on center for slabs-on-grade or elevated slabs with composite decks.
- F. Proceed with installation of embedded items, and reinforcement, but do not place concrete into or around such items until the Engineer has approved work.

### 3.4 FIELD QUALITY CONTROL

- A. The Engineer shall have the right to postpone or stop concrete operations when in his judgment, reinforcement and embedded item installation has not been properly completed or the quality of construction will impair strength and durability or desired finished product. Costs arising from delays due to noncompliance will not be considered.
- B. Any material or workmanship that is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- C. Before concrete is placed, reinforcement shall be free of excessive rust, dirt, oil, scale or other foreign matter that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.
- D. Before concrete is placed, check all installed reinforcement to ensure that it conforms to Contract Documents and approved Shop Drawings. Such checking shall be done only by qualified experienced personnel. In addition, the Engineer shall be notified at

least 36 hours prior to concrete placement and given opportunity to inspect completed reinforcement. Prior approval of Shop Drawings shall in no way limit the Engineer's right to require modifications or additions to reinforcement or accessories.

- E. Expansion joint dowels must be straight and clean, free of loose flaky rust and loose scale. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04 inches on the diameter of the dowel and extends no more than 0.04 inches from the end. Bars shall be coated with a bond breaker on the expansion end of the dowel. Expansion caps shall be provided on the expansion end.

### 3.5 ADJUSTING

- A. Carry out corrections without delay as directed by the Engineer when construction operations indicate that requirements of Contract Documents or prudent construction practices are being or are about to be violated.

END OF SECTION

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Concrete Materials
2. Admixtures
3. Concrete Mix
4. Miscellaneous Concrete Materials

B. RELATED SECTIONS

1. Section 03 10 00 - Concrete Forms and Accessories
2. Section 03 20 00 - Concrete Reinforcement

1.2 REFERENCES

A. The Massachusetts State Building Code, latest edition

B. American Concrete Institute (ACI)

1. ACI 301-95 - Specifications for Structural Concrete for Buildings, (included as part of this specification)
2. ACI 305 - Hot Weather Concreting
3. ACI 306.1-90 - Standard Specifications for Cold Weather Concreting

C. American Society for Testing and Materials (ASTM)

1. C33 - Standard Specification for Concrete Aggregates
2. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
4. C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
5. C87 - Standard Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
6. C94 - Standard Specification for Ready-Mixed Concrete
7. C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
8. C150 - Standard Specification for Portland Cement

9. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
10. C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
11. C494 - Standard Specification for Chemical Admixtures for Concrete
12. C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
13. C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
14. C685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
15. C881 – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete
16. C989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
17. C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete

### 1.3 SUBMITTALS

- A. Submit concrete mix proposed for use, indicating design strength, supplier, batch quantities, and constituents. Provide test report copies indicating prior satisfactory performance in accordance with ACI 301.
- B. Submit data and descriptive literature for concrete constituents including admixtures, aggregate tests, bond breaker, bonding agent, and repair grout.
- C. Submit detailed methods proposed for curing and protection of concrete. This submittal shall be made not less than 10 days prior to the placement of any concrete.
- D. Submit a truck load ticket for every concrete delivery. Ticket information shall include batch time and date, weights of all constituents, quantity of admixtures, water added at the batch plant and moisture content of coarse and fine aggregates.
- E. Maintain an accurate daily record of the locations and quantity of concrete placed.

### 1.4 QUALITY ASSURANCE

- A. Provide inspection of cast-in-place concrete work, and testing, including slump tests, air content, and standard compression testing. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer. Such inspection and testing shall not relieve Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of this Section.
- B. Provide notification prior to the start of any phase of concrete placement work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of concrete placements and at least 36 hours in advance of other inspections (forms, rebar, etc.).

- C. Facilitate observation by the Engineer as well as inspection and testing by the concrete testing agency, and furnish the following:
1. Safe access to the work at all times to allow proper inspection of the work
  2. Full and ample means and assistance for sampling and testing materials and proper facilities for inspection of work in plant and at project site
  3. Covered box large enough to contain twenty-four standard concrete cylinders. At temperatures below 60°F, box shall be electrically heated and thermostatically controlled to maintain inside temperature of 60° to 80°F. Cylinders shall be placed in box immediately after molding and shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.
  4. Access by the Engineer or his representative to the batch plant supplying the concrete at any time.
- D. Compression tests shall consist of one set of 4 cylinders for each test made, cured, and tested by testing laboratories during progress of job. 6 cylinders shall be required for each test made with concrete mix containing fly ash or ground granulated blast furnace slag. One set of cylinders shall be taken for every 100 cubic yards of concrete or fraction thereof placed in any one day.
1. 1 cylinder of each set shall be tested for 7-day compressive strength; 2 cylinders shall be tested for 28-day compressive strength. The remaining cylinder shall be tested for 56-day compressive strength if either one of the 28-day tests are below the specified strength, otherwise the 56-day test will be eliminated.
  2. For modified mix with fly ash or ground granulated blast furnace slag, 1 cylinder of each set shall be tested for 7-day compressive strength, 2 cylinders shall be tested for 28-day compressive strength and 2 cylinders shall be tested for 56-days compressive strength. The remaining cylinder shall be tested for 84-day compressive strength if either one of the 56-day tests are below the specified strength, otherwise the 84-day test will be eliminated.
  3. Compression strength test of cylinders shall conform to ASTM C39, latest revision. The testing laboratory will submit certified copies of the test results directly to the Engineer and the Owner within 24 hours after tests are made.
  4. Sampling, molding, curing and testing of cylinders shall conform to ASTM requirements. Specimens shall be cured under laboratory conditions. The Engineer may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength.
  5. Report of tests shall include: name of project, date and location of concrete placement, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, type of fracture, and type of curing.
- E. Slump test, to check consistency, shall be made from the sample used to mold cylinders. Additional slump tests may be taken of every batch delivered to job site.
- F. Tests for determination of air content shall be made as required to verify conformance with the specifications.

- G. The strength level of the concrete mix shall be considered satisfactory if both of the following criteria are satisfied:
  - 1. Every arithmetic average of any three consecutive strength tests equals or exceeds the specified design strength.
  - 2. No individual strength test (average of two cylinders from the same test group) falls below the specified design strength by more than 500 psi when the specified design strength is 5000 psi or less or by more than 10 percent of the specified design strength when the design strength is more than 5000 psi.
- H. When tests of control specimens fall below these requirements, the Engineer will require 56 day or 84 day cylinder tests or core specimens taken from concrete in question and tested in accordance with ASTM C42. If these specimens do not meet strength requirements, the Engineer has the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance, and durability of structure. Additional testing, load tests, strengthening or removal and replacement of parts or structure and any costs associated with delay of project shall be at no additional cost to the Owner.
- I. Any material or workmanship which is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- J. If arrangements for corrections and/or replacements are not made within seven days after notice of rejection, the Owner has the right to have corrections and/or replacement made and charge cost thereof and any costs associated with delay of project against balance of monies withheld.
- K. Acceptance of work and admixtures at the batch plant shall not prevent final rejection at job site upon arrival or after it has been installed, if work is found to be defective.
- L. Portions of a structure which do not meet the requirements of the Contract Documents based on appearance or for any other aesthetic reason, shall be corrected or removed and replaced at no additional cost to the Owner.
- M. Work on new concrete structures shall conform to the requirements of ACI 306.1, Standard Specifications for Cold Weather Concreting, except as modified herein.

## PART 2 PRODUCTS

### 2.1 CONCRETE MATERIALS

- A. Cement: shall be American-made Portland Cement, free from water soluble salts or alkalis which will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C150. Air entraining cements are prohibited.
- B. Pozzolans and Blast Furnace Slag
  - 1. Fly Ash: Class F conforming to the requirements of ASTM C618.
  - 2. Ground Granulated Iron Blast-Furnace Slag: Conforming to ASTM C989.
- C. Normal weight Fine Aggregate

1. Washed, inert, natural sand conforming to ASTM C33 and the following additional requirements.
  - a. Fineness Modulus 2.75 (plus/minus 0.25)
  - b. Clay lumps and friable particles – 3.0 percent maximum
  - c. Coal and lignite – 0.5 percent maximum
  - d. Organic Impurities (ASTM C40) – Organic Plate No. 2
  - e. Strength of Mortar (ASTM C87) – not less than 95 percent at 7 days
  - f. Soundness (AASHTO T-104) - 10 percent maximum loss (magnesium sulfate solution, five cycles)

D. Normal weight Coarse Aggregate

1. Well graded crushed stone or washed gravel conforming to ASTM C33 and the following additional requirements:
  - a. Material finer than No. 200 sieve – 1.0 percent maximum
  - b. Clay lumps and friable particles – 2.0 percent maximum
  - c. Chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight.
  - d. Sum of clay lumps, friable particles, and chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight. This limitation only applies to aggregates in which chert appears as an impurity.
  - e. Coal and lignite – 0.5 percent maximum
  - f. Soundness - 18 percent maximum loss (magnesium sulfate solution, five cycles)
  - g. Soundness - 10 percent maximum loss (sodium sulfate solution, five cycles)
2. Coarse aggregates shall not exceed 35% by weight "percentage of wear" as determined by the Los Angeles Abrasion and Impact Tests in ASTM C131 and C535.

- E. Water shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

## 2.2 ADMIXTURES

- A. Water-reducing agent:
1. Water-reducing agent shall be by same manufacturer as air-entraining agent.
  2. Daracem - 55 W.R. Grace & Co.
  3. Pozzolith 220N – BASF Admixtures, Inc.
  4. Eucon MR - Euclid Chemical Co.

- 5. Or equal conforming to ASTM C494 Type A.
- B. Air-entraining agent:
  - 1. DAREX AEA - W.R. Grace & Co.
  - 2. MB-VR or MB-AE90 - BASF Admixtures, Inc.
  - 3. Air-Mix - Euclid Chemical Co.
  - 4. Or equal conforming to ASTM C260.
- C. Admixtures which retard setting of cement in concrete shall not be used without written approval of the Engineer. Admixtures causing accelerated setting of cement in concrete shall not be used.

**2.3 CONCRETE MIX**

- A. Select proportions of ingredients to meet the design strength and materials limits specified and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportioning shall also conform to the requirements in ACI 301 and ACI 318.
- B. The concrete mix design shall be a 4000 psi compressive strength concrete using ¾ inch aggregate. The design mix shall be selected based on previous test records for a mix with essentially the same proportions, and shall meet the following limiting values in Table A:

**TABLE A**  
 Maximum Allowable Water/Cement Ratios

Minimum Allowable 28 day Compressive Strength (psi)	Maximum Allowable Water/Cement Ratio	Total Cementitious Material (Pounds)	
		Min	Max
4000	0.45	611	635

- C. If sufficient test records are not available, (at least 30 consecutive strength tests or two groups of tests totaling at least 30 within the past 12 months), the design mix shall be developed using laboratory trial mixtures in accordance with ACI 301.
- D. All concrete is normal weight with air-dry weight not to exceed 150 lbs. per cubic foot.
- E. Fly ash may be substituted for up to 20 percent by weight of the total cementitious material. Ground granulated iron blast-furnace slag may be substituted for up to 40 percent by weight of the total cementitious material.
- F. For concrete flatwork with a steel trowel finish, fly ash may be substituted for up to 10 percent by weight and ground granulated iron blast-furnace slag may be substituted for up to 25 percent by weight of the total cementitious material.
- G. All concrete shall contain the approved air-entraining admixture as per manufacturer's written instructions to provide entrained air by volume in the cured concrete between 4.5 and 7.5%.



H. The design mix shall meet the following slump limiting values in Table B:

**TABLE B**  
 Concrete Slump<sup>1</sup>

Portion of Structure	Recommended (inches)	Maximum Range (inches)
Mats	2	2-3
Walls, Column, Beams	4	3-5
Slabs	3	2-4

<sup>1</sup>After addition of high range water reducer

I. The approved water-reducing admixture shall be used in all concrete, in accordance with manufacturer's written instructions.

**2.4 MISCELLANEOUS MATERIALS**

A. Grout shall be a ready-to-use, non-metallic, non-shrink aggregate product requiring only the addition of water at the job site. Grout shall be as manufactured by Five Star Products, Inc.; Euclid Chemical Company; Master Builders; or equal. Grout shall be easily workable and shall have no drying shrinkage at any age. Compressive strength of grout (2 inch by 2 inch cubes) shall not be less than 5000 psi at 7 days, and 7500 psi at 28 days.

B. Floor Hardener, Sealer, and Waterproofing Treatment:

1. Concrete floor surfaces not covered with resilient flooring or carpet shall receive a surface treatment after steel trowel finishing.
2. Product and Manufacturer:
  - a. Ashford Formula hardener and sealer as manufactured by Concrete Chemical Company, Inc., Springville, Utah
  - b. Seal Hard concrete sealer as manufactured by L&M Construction Chemicals, Inc., Omaha, Nebraska
  - c. Approved equal

C. Concrete Construction Joint Roughener:

1. Provide a water soluble non-flammable, surface-retardant roughener.
2. Product and Manufacturer:
  - a. Rugasol-S by Sika Corporation for horizontal joints only
  - b. MasterFinish QD 200 by BASF Corporation for vertical joints
  - c. Approval equal

D. Bond Breaker:

1. Provide an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint.
  2. Bond breaker for concrete other than where tape is specifically called for shall be either bond breaker tape or an ASTM C309 non-staining type bond prevention coating such as Masterkure 100WB by Degussa Construction Chemicals, Dayton Superior Sure Lift J6WB, StarSeal Clean Lift by Vexcon Chemicals or equal.
- E. Bonding Agent:
1. Provide a two-component, 100% solids, moisture -tolerant structural epoxy adhesive conforming to ASTM C881, Type II. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, NJ, Concessive Liquid (LPL) by Degussa Admixtures, Inc. of Cleveland, OH or equal.
  2. Latex bonding agent shall be a non-remulsifiable acrylic-polymer latex conforming to ASTM C1059 Type II.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify cover requirements over all reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- C. Verify site conditions to ensure that full access is available for placement of concrete.

#### 3.2 JOINTS

- A. Construction and expansion joints indicated on Drawings are mandatory and shall not be omitted. Construction joints shall conform to the requirements of Section 03 10 00 and the following:
  1. Before placing new concrete against concrete already in place and hardened, the surface shall again be cleaned with a jet where practical. The exposed aggregate shall then be mopped with a mortar composed of the same proportions of sand and placed and mopped in place immediately prior to the placing of concrete and shall not have set up or hardened prior to the placing of concrete.
  2. Where joints other than those shown are required, they shall be made at such locations as the Engineer may allow, and shall in no case impair the structural strength of the structure.
- B. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.
- C. Saw-cut joints shall be installed in the locations shown on the Drawings. Saw-cut joints shall not be substituted for formed construction joints unless approved by the Engineer. Saw-cut joints shall conform to the following requirements:

1. The depth of the saw cut shall be at least  $\frac{1}{4}$  of the slab thickness or a minimum depth of one inch unless otherwise shown on the Drawings.
2. Do not saw cut through slab reinforcing steel unless directed to do so in writing by the Engineer.
3. Joints produced using conventional wet-cut process shall be completed within 4 to 12 hours after the slab has been finished - 4 hours in hot weather conditions and 12 hours in cold weather conditions.
4. Joints produced using the early-entry dry cut process shall be formed using diamond-impregnated blades and shall be completed within 1 to 4 hours after the slab has been finished - 1 hour in hot weather conditions and 4 hours in cold weather conditions. The maximum depth of joints produced by the dry cut process shall not exceed 1-1/4 inches. Care should be taken to make sure that the saw does not ride up over large or hard coarse aggregates.
5. Regardless of the saw cutting process chosen, the saw cutting must be performed before the concrete starts to cool, as soon as the concrete surface is firm enough not to be torn or damaged by the cutting blade, and before random-drying-shrinkage cracks can form in the concrete slab.

### 3.3 MIXING, CONSISTENCY, AND DELIVERY OF CONCRETE

- A. Concrete shall be ready-mixed, produced by a central batch plant. Hand or site mixing shall not be allowed. Constituents, including admixtures, shall be batched at the central batch plant. Admixtures shall be premixed in solution form and dispensed as recommended by the manufacturer.
- B. Central plant and rolling stock equipment and methods shall conform to Truck Mixer and Agitator Standard of Truck Mixer Manufacturer's National Ready-Mixed Concrete Association, ASTM C94, ASTM C685, and Contract Documents. Consistency of concrete at time of placement shall be at a 3 inch slump, +/- 1 inch.
- C. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site shall be within one and one-half hours after cement is first introduced into the aggregates. Concrete with a temperature greater than 90°F. shall be rejected and removed from the site.
- D. During any of the following conditions: high ambient temperature, high concrete temperature, low relative humidity, increased wind velocity, high solar radiation, when the temperature of the concrete is 85°F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed one hour. In addition, when the rate of evaporation on the surface of the concrete is expected to approach 0.2 lb/ft<sup>2</sup>/hr. (see chart in ACI 305R) special precautions shall be taken against the formation of plastic shrinkage cracking on the surface of the concrete after placement.
- E. During any period when for more than three successive days the average daily outdoor temperature drops below 40°F, the concrete temperature at the time of placement shall be as specified in Table C below.

**TABLE C**  
Concrete Temperature During Cold Weather

Least dimension of section, inches.	Minimum temperature of concrete as placed and maintained during the protection period, °F	Maximum gradual decrease in surface temperature during any 24 hours after end of protection, °F
Less than 12	55	50
12 to less than 36	50	40
36 to 72	45	30
Greater than 72	40	20

- F. Central mixed concrete shall be plant mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged.
- G. Retempering of concrete which has partially hardened by mixing with or without additional cement, aggregates, or water shall not be permitted.

**3.4 PLACING CONCRETE**

- A. Remove excess water and foreign matter from forms and excavations. Do not place concrete on frozen soil. Provide adequate protection against frost action during freezing weather.
- B. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of ingredients and displacement of reinforcements, and which avoid re-handling. Do not deposit partially hardened concrete. When concrete is conveyed by chutes, equipment shall be of such size and shape to ensure continuous flow in chute. Flat (coal) chutes shall not be used. Chutes shall be of metal or metal lined and uniformly sloped. Slope shall not be less than 25° nor more than 45° from horizontal. Concrete shall be lowered and maintained as near to the surface of deposit as practicable. The chute shall be thoroughly cleaned before and after each use and debris and any water shall be discharged outside of the forms. Concrete shall not be allowed to flow horizontally over distances exceeding 10 feet or dropped vertically over 6 feet.
- C. Place concrete in such a manner as to prevent segregation and accumulations of hardened concrete on forms or reinforcement above the grade of concrete being placed. Suitable hoppers and spouts with restricted outlets and tremies shall be used as required.
- D. Thoroughly consolidate each layer of concrete by rodding and vibrating using internal type mechanical vibrator. Vibration shall be done by experienced operators under close supervision and shall be carried on only enough to produce homogeneity and optimum consolidation without permitting segregation of constituents or "pumping" of air. Vibrators used for normal weight concrete shall operate at speeds of not less than 7,000 vpm and be of suitable capacity. Do not use vibrators to move concrete. Vibration shall be supplemented by spading to remove bubbles and honeycombs adjacent to visible surfaces. At least one vibrator shall be on hand for every 10 cubic

yards of concrete placed per hour, plus one spare. Vibrators shall be operable and on site prior to starting concrete placement.

- E. Deposit concrete continuously, and in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within the section. If a section cannot be placed continuously between planned construction joints, as specified, field joints and additional reinforcement shall be introduced at the Contractor's expense to preserve structural continuity.
- F. Cold joints, particularly in exposed concrete, including "honeycombs", are unacceptable. If they occur in concrete surfaces exposed to view, the Engineer will require that entire section in which blemish occurs be removed and replaced with new materials at the Contractor's expense.

### 3.5 CURING AND PROTECTION

- A. When concrete is placed at or below an ambient air temperature of 40°F. or whenever this temperature or lower values are likely to occur within 48 hours after placement of concrete, cold weather concreting procedures, according to ACI 306.1 and as specified herein, shall be followed. The entire area affected shall be protected by adequate housing or covering, and heating. No salt, chemicals or other foreign materials shall be used in the mix to lower the freezing point of concrete. No oil or kerosene heaters shall be utilized. Vent flue gases from combustion heating units to the outside of the enclosure.
- B. No frozen materials shall be used in batching concrete and any ice shall be removed from coming into contact with the concrete.
- C. Protect concrete work against injury from heat, cold, and defacement of any nature during construction operations.
- D. Concrete shall be treated and protected immediately after concreting or cement finishing is completed, to provide continuous moist curing above 50°F. for at least 7 days, regardless of ambient air temperatures.
- E. All concrete shall be cured immediately after finishing in accordance with the following requirements:
  - 1. Curing shall be accomplished by a continuous soaking process such as the use of soaker hose or sprinklers, or by use of plastic roll materials to cover the concrete, which shall be thoroughly wetted at least once a day or more often as required in very hot weather. Such plastic shall be placed as soon as possible after finishing of concrete so that scarring of the surface will not occur. Plastic shall be held in place on the surface of the concrete in such a manner and means as will not allow it to be blown off or otherwise dislodged from the concrete surface. Curing procedures shall be maintained continuously for a period of at least 7 days.
  - 2. All methods of curing shall be subject to approval of the Engineer, and each method employed shall be practical and adequate for the curing required. Curing compounds in lieu of wet curing will not be allowed.

- F. Keep permanent temperature records showing date and outside temperature during concreting operations. Thermometer readings shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded in such manner as to show any effect temperatures may have had on construction.

**3.6 REMOVAL OF FORMWORK**

- A. Forms shall not be removed until concrete has attained sufficient strength to support its own weight, construction loads to be placed thereon and lateral loads, without damage to structure or excessive deflection.
- B. With the exception of construction joint bulkheads and keyways, forms and supports shall remain in place for not less than the minimum time periods noted below.
  - 1. Unless specifically authorized by the Engineer, forms for vertical surfaces shall not be removed before the concrete has attained a strength of not less than 30 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.
  - 2. Unless specifically authorized by the Engineer, forms for horizontal surfaces shall not be removed before the concrete has attained a strength of not less than 60 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.

**TABLE D**  
 Minimum Degree Day Requirement for Form Removal

Form Use	Degree-Days
Walls and Vertical Surfaces	200
Elevated Slabs	400
Beams and Girders	600

- 3. Definition of degree-days - Total number of days times mean daily air temperature at the surface of the concrete. For example, 5 days at temperature of 60°F. equals 300 degree-days. Days or fractions of days in which temperature is below 50°F. shall not be included in calculation of degree-days except where modified by Table C above.
- C. Forms for construction joint bulkheads and keyways may be removed the following day, after the concrete pour. Extreme caution must be used to avoid damage to the concrete surface and keyway.
- D. Any test cylinders required to verify the specified minimum strengths for form removal shall be field cured under the same conditions as the concrete they represent. Such cylinders and testing shall be at the Contractor's expense.

**3.7 FINISHING OF CAST-IN-PLACE CONCRETE**

- A. Slab Surfaces

- a. "Broom Finish" - On exterior work such as sidewalks and where else called for, a broom finish shall be used. The finishing shall be accomplished in the following manner. Screeding shall be done and the surface worked up with a wood float. At a proper time thereafter, the surface shall be steel troweled at least once and more if so directed. Upon completion of troweling, a sufficiently stiff bristled broom shall be drawn lightly across the surface to produce a slightly striated finish. The brooming shall in general be perpendicular to the main traffic route. Coordinate required finish with the Engineer before application.
2. For all of the finishing procedures described, the time element is important and something that must be determined during the progress of the work as conditions warrant. Normally, free water on the surface of concrete should not occur. Allow the concrete surface to dry before starting finishing operations. Do not, under any circumstance, add dry cement to wet areas in order to accelerate drying. Finishing and rubbing required for all parts of the work shall be done only by competent "Cement Finishers" trained for the work.

### 3.8 CLEANING

- A. Concrete surfaces shall be cleaned of objectionable stains as determined by the Engineer. Materials containing acid in any form or methods which will damage the "skin" of concrete surfaces shall not be employed, except where otherwise specified.

END OF SECTION

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SECTION 03 31 00

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Wood Form Material
  - 2. Prefabricated Forms
  - 3. Formwork Accessories
- B. Related Sections
  - 1. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

- A. American Concrete Institute (ACI)
  - 1. ACI 318 - Building Code Requirements for Reinforced Concrete
  - 2. ACI 347 - Guide to Formwork for Concrete
- B. American Society for Testing and Materials (ASTM)
  - 1. D4 - Standard Test Method for Bitumen Content
  - 2. D6 - Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds
  - 3. D71 - Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)
  - 4. D217 - Standard Test Method for Cone Penetration of Lubricating Grease
  - 5. D1056 - Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
  - 6. D1751 - Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
  - 7. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
  - 8. D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
- C. American Association of State Highway and Transportation Officials (AASHTO)
  - 1. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing
- D. National Institute of Standards and Technology (NIST)

1. Voluntary Product Standard PS 1-95 - Construction and Industrial Plywood

1.3 SUBMITTALS

- A. Drawings showing schedule of placement, location of all construction joints and all control joints with methods of forming. Show the location and elevation of all sleeves, wall pipes and embedded items.
- B. Drawings showing sizes and materials for forms, form bracing, and form ties.
- C. Product Data on form release agent, permanent formwork and inserts.
- D. Samples for the following materials:
  - 1. Form ties (including cones) and spreaders
  - 2. Waterstops
  - 3. Compressible filler
  - 4. Premolded fillers
  - 5. Other materials requested by the Engineer

1.4 DESIGN REQUIREMENTS

- A. Design formwork and shoring at the Contractor's expense by a Professional Engineer registered in the State where the work will be performed to conform to all design and code requirements in ACI 301, ACI 318 and ACI 347 and other applicable regulations and codes. The design shall consider any special requirements that may result due to the use of super plasticized and/or retarded set concrete.

**PART 2 PRODUCTS**

2.1 WOOD FORM MATERIALS

- A. Plywood: Class I High Density Overlay plyform, exterior grade, not less than 5 ply nor less than 5/8 inches thick conforming to Voluntary Product Standard PS 1-95
- B. Lumber: Douglas Fir species, No. 1 grade S4S with grade stamp clearly visible

2.2 PREFABRICATED FORMS

- A. Manufacturers:
  - 1. Symons Corporation, DesPlains, Illinois
  - 2. HICO Corporation, Bronx, NY
  - 3. Or equal
- B. Preformed Steel Forms: Minimum 16 gage (1.5 mm), tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces; with clean, warp free, undented, ungouged, undamaged surfaces
- C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces

## 2.3 FORMWORK ACCESSORIES

### A. Form Ties:

1. Flat bar snap ties for panel forms shall have plastic or rubber inserts with 1½ inch minimum depth to allow patching of tie hole after removal.
2. Setback cones shall be wood or plastic tapered cones 1 inch diameter and 1½ inches deep to allow filling and patching of the concrete surface after removal.
3. Common wire ties shall not be used.

### B. Form Release Agent:

1. Non-staining and non-emulsifiable type which will not stain concrete or absorb moisture nor interfere with adherence of any material to be applied to concrete surfaces.

### C. Corners:

1. Chamfered No. 1 Poplar wood strips; ¾ inch by ¾ inch; maximum possible lengths

### D. Dovetail Anchor Slot:

1. Galvanized steel 22 gage thick; non-filled, release tape sealed slots for securing to concrete formwork

### E. Flashing Reglets:

1. Galvanized steel 26 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots for securing to concrete formwork

### F. PVC Waterstops:

1. Virgin polyvinyl chloride, minimum  $2000 \pm 50$  psi tensile strength, minus 50°F to plus 170°F working temperature range, 9 inches (see designer note above) wide, 3/8 inches thick, factory made corner sections, heat welded jointing; manufactured by Paul Murphy Plastics, Greenstreak, Vinylex or equal
2. Exceed the requirements set forth in the U.S. Army Corps of Engineers waterstop specification (CRD-C572-84)
3. Must exhibit zero water leakage when tested in accordance with the American Concrete Institute (ACI) standard test method for waterstop
4. Heat fused field splices shall be tested for a complete seal by use of a corona discharge unit.
5. Multi-rib design with center bulb shall be used for all expansion joints as noted on Drawings and proposed for the work.
6. Ribbed flat heavy duty design shall be used for all construction joints as noted on Drawings and proposed for the work.

### G. Compressible Filler:

1. Closed cell expanded neoprene, ASTM D1056, Grade No. 2C1, ozone and weather resistant
- H. Premolded Joint Filler:
  1. Buildings and Structures: Self-expanding cork, ASTM D1752, Type III; and Federal Specification HH-F-341-F, Type II, Class C; capable of one directional swelling up to 140% of its original thickness
  2. Sidewalks: Asphalt impregnated, ASTM D1751, 3/4 inch thick unless otherwise shown on the Drawings
- I. Elastomeric Bearing Pads:
  1. 60 Durometer neoprene rubber conforming to AASHTO M251

### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.
- B. Review all work prepared by others to receive work of this Section and correct any defects affecting installation. Commencement of work by the Contractor will be construed as complete acceptance of preparatory work by others.
- C. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing frozen material. Remove improper and rejected materials immediately from point of use. Cover materials and accessories during construction period.

#### 3.2 EARTH FORMS

- A. Earth forms are not permitted.

#### 3.3 FORM PREPARATION

- A. Coat contact surfaces of forms with a form release agent prior to form installation.
- B. Thoroughly clean steel forms between uses using high pressure water or jet or sand blasting to remove all mill scale, concrete laitance or other ferrous deposits from the contact surfaces of the forms.
- C. Before re-use of wood forms, thoroughly clean form contact surfaces, repair damaged areas and remove projecting nails. A partial or complete steel lining on wood sheathing or plywood will not be allowed.

#### 3.4 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements of ACI 301 and the following additional requirements:
  1. Variation from plumb in the lines and surfaces of columns, piers, and in walls
    - a. In any 10 feet of length 1/4 inch
    - b. Maximum for entire length 1/2 inch

2. Variation of the linear building lines from established position in plan and related positions of columns, walls and partitions:
  - a. In any bay  $\frac{1}{4}$  inch
  - b. In any 20 foot of length  $\frac{1}{4}$  inch
  - c. Maximum for the entire length  $\frac{1}{2}$  inch
3. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:
  - a. Minus  $\frac{1}{8}$  inch
  - b. Plus  $\frac{1}{4}$  inch

### 3.5 JOINTS

- A. Construction and expansion joints indicated on the Drawings are mandatory and shall not be omitted.
- B. Use premolded joint filler at expansion joints unless otherwise noted.
- C. Form construction and expansion joints with a keyway and waterstop unless otherwise shown on the Drawings. The depth of the keyway shall be approximately 3 inches, and the minimum width of keyway shall be one-third the width of the wall or floor section unless otherwise shown on the Drawings. The maximum width of any key at a joint with waterstop shall be 3 inches. Construction and expansion joints are to be formed in place prior to notifying the Engineer for inspection of formwork.
- D. Where joints other than those shown are required, obtain approval prior to installation.
- E. For slab-on-grade construction (welded wire fabric reinforcement only) with large floor areas where construction joints are not shown, the maximum area per section is approximately 600 square feet, but will not limit the number of sections which may be placed at one time. For structural slabs reinforced with deformed bars where construction joints are not shown on the Drawings, the maximum area will be approximately 900 square feet. Slab dimensions between construction joints for floor areas shall be as "square" as possible, but the length shall not exceed 1.5 times the width under any circumstances.
- F. For slab-on-grade construction, a preformed metal keyway with removable top strip may be substituted for intermediate construction joints unless otherwise shown on the Drawings.
- G. Joints shall be straight and true. Brace all slab bulkheads adequately to keep joints straight. Construction joints in slabs exceeding 5 inches in thickness shall be keyed using a keyway nominally 3-5/8 inches by 1/3 of the slab thickness but not greater than 3 inches wide.
- H. Wall construction joints shall be placed as shown on the Drawings, or the maximum spacing of vertical construction joints in walls shall not exceed 40 feet where construction joints are not shown.
- I. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.

### 3.6 INSERTS, EMBEDDED ITEMS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work in conformance with requirements of ACI 318, paragraph 6.3, "Conduits and pipes embedded in concrete."
- B. Locate and set in place items that will be cast directly into concrete.
- C. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed or damaged during placement of concrete.
- D. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at the bottom of forms to allow flushing water to drain.
- E. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so that joints will not be apparent in exposed concrete surfaces after concrete placement.

### 3.7 WATERSTOPS

- A. Install PVC waterstops in all construction and expansion joints in walls and slabs unless otherwise noted on the Drawings. Position waterstop in the center of the joint and extend the entire length of the joint. Securely fasten waterstop to reinforcing steel or formwork on both sides at 12 inch maximum spacing. Provide 2 inch minimum clearance between waterstop and reinforcing steel.
- B. Heat and splice PVC waterstop with a thermal splicing unit designed for that specific purpose. Only properly mitered, straight butt splices shall be made in the field. All field splices shall be tested for a complete seal by use of a corona discharge unit.
- C. No holes will be permitted in the PVC waterstop. Nail holes or other penetrations in the waterstop shall be repaired prior to placement of concrete.

### 3.8 ACCESSORIES

- A. Install form liners into formwork prior to placement of reinforcing steel or concrete in compliance with the manufacturer's requirements.
- B. Neoprene waterstop washers are to be placed along the form ties or inside ties so they are in the middle third of the thickness of the structural element.

### 3.9 FORM REMOVAL

- A. The Contractor shall be responsible for damage resulting from form removal. Forms and shoring for structural slabs or beams shall remain in place in accordance with requirements in ACI 301. Form removal shall also conform to the requirements specified in Section 03 30 00.

### 3.10 INSPECTION

- A. The Engineer shall be notified when the forms are complete and ready for inspection at least thirty-six hours prior to the proposed concrete placement.
- B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of these Specifications, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or

replaced at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of these Specifications and approval of the Engineer.

END OF SECTION

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SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Surface preparation and application of coatings.

B. Related Sections

1. Section 33 51 13 – Natural Gas Service and Distribution

1.2 REFERENCES

A. The Society for Protective Coatings (SSPC):

1. Surface Preparation Specifications
  - a. SP-1 - Solvent Cleaning
  - b. SP-2 - Hand Tool Cleaning
  - c. SP-3 - Power Tool Cleaning
  - d. SP-5 - White Metal Blast Cleaning
  - e. SP-6 - Commercial Blast Cleaning
  - f. SP-7 - Brush-Off Blast Cleaning
  - g. SP-10 - Near-White Blast Cleaning
2. SP-16 – Brush Off Blast of Galvanized and Non-Ferrous Metals
3. National Association of Pipe Fabricators (NAPF):
  - a. NAPF 500-03-01 - Solvent Cleaning
  - b. NAPF 500-03-02 – Hand Tool Cleaning
  - c. NAPF 500-03-03 – Power Tool Cleaning
  - d. NAPF 500-03-04 – Abrasive Blast Cleaning for Ductile Iron Pipe
  - e. NAPF 500-03-05 – Abrasive Blast Cleaning for Cast Ductile Iron Pipe
4. SSPC-PA 1 – Shop, Field and Maintenance Painting
5. SSPC-PA 2 - Measurement of Dry Coating Thickness with Magnetic Gages
6. SSPC Visual Standards SSPC VIS 1-89

B. Occupational Safety and Health Administration (OSHA) Standards

C. National Association of Pipe Fabricators (NAPF)

1. NAPF 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings In Exposed Locations Receiving Special External Coatings and/or Special Internal Linings

### 1.3 SCOPE OF WORK

- A. Items of work include but are not limited to the surface preparation and coating of the following:
  1. Exposed exterior natural gas piping
  2. Exposed Exterior of Bollards

### 1.4 SUBMITTALS

- A. Applicator qualifications for general coatings.
- B. List of coating products and systems proposed, giving brand, type and manufacturer.
- C. Product for product listing of the manufacturer's coating system showing a comparison with the specified coating systems in Schedules 09 91 00-A and 09 91 00-B.
- D. Manufacturer's current printed recommendations and product data sheets for each system, and ASTM performance criteria.
- E. Paint manufacturer's compatibility guide, to be a complete listing of all compatible paint systems/combinations produced by the paint manufacturer.
- F. Copies of manufacturer's complete color charts for each coating system.
- G. When requested by the Engineer, provide product container labels and labeled mixing instructions for products utilized in the Work.

### 1.5 QUALITY ASSURANCE

- A. Use adequate number of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.
- B. Applicator Qualifications – Minimum 5 years' experience in application of specified products.
- C. Regulatory Requirements – Meet federal, state and local requirements limiting the emission of volatile organic compounds.
- D. A qualified and experienced representative of the paint manufacturer shall meet with Contractor and Engineer to coordinate items requiring painting and to schedule the Work. Monthly field visits shall occur to ensure proper application of the painting system. The Contractor shall coordinate with the paint manufacturer to schedule site visits.
- E. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.

### 1.6 DELIVERY, HANDLING, STORAGE AND PROTECTION

- A. Deliver materials to painter's area in original, unbroken, containers with name and analysis of product, manufacturer's name, and shelf life date. Do not use or retain contaminated, outdated, prematurely opened, or diluted materials.
- B. Storage of materials shall be in accordance with the paint manufacturer's recommendations.
- C. Store coated items carefully. Store paints and painter's materials only in areas designated solely for this purpose. Avoid damaging or dirtying coatings by contact with soil, pavement or other harmful materials that might necessitate special cleaning. Use suitable blocking during storage.
- D. Confine mixing, thinning, clean-up and associated operations, and storage of painting debris before authorized disposal, to these areas.
- E. Do not expose primed surfaces to weather for more than six months before top coating. Allow less time if recommended by coating manufacturer.
- F. Do not use plumbing fixtures, piping or mechanical equipment for mixing or disposal of paint materials.
- G. Store waste temporarily in closed, nonflammable containers until final disposal. Keep no rubbish in painter's area longer than 24 hours. Finally, dispose of waste in an approved disposal system.
- H. During surface preparation, cleaning and painting operations, protect all surfaces not to be painted.
- I. Protect coated items, whether prime or finish, from damage due to shipping and handling. Use padding, blocking, fabric slings and extra care as required.
- J. Upon completion of field painting, ensure coatings are undamaged and in good condition. Repair damaged or deteriorated coating, resulting from failure to observe foregoing requirements.

#### 1.7 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
  - 2. Do not apply coatings when dust is being generated.
- B. Cover or otherwise protect work by other trades and surfaces not being painted during all painting operations.
- C. All shop primed ferrous metals shall be primed using the same coatings specified in the paint schedule.

#### 1.8 EXTRA MATERIALS

- A. Provide one spare 1 gallon paint container for each type and color applied.

- B. Multi-component products shall have sufficient unopened quantities of each component to produce the required amount of mixed paint for future maintenance.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Coating systems are designated by reference to Tnemec Company, Inc. and Sherman Williams products to establish the type and quality required. Equal products as manufactured by International Protective Coatings, PPG Industries, Carboline Company or equal will be considered if provided with a "Product for Product" listing with the submittal. The Engineer reserves the right to request and receive detailed technical literature of each proposed coating system before approval.
- B. No coating systems will be considered that decrease the film thickness, decrease the number of coats, decrease the effectiveness of the surface preparation or change the type of coating specified in the schedule of this section.

### 2.2 MATERIALS, GENERAL

- A. Paint Coatings - Suitable for intended use, recommended by their manufacturer for intended service. All coatings, unless otherwise specified, shall be suitable for severe service.
- B. Products Used - Minimum of five years satisfactory use under similar service conditions.
- C. Use products of one manufacturer in any one paint coating system; all coating materials compatible. Coatings for touch-up - same as original.
- D. Equipment prime or finish painted by the equipment manufacturer shall be painted in strict accordance with this Section and the equipment's individual specification section.
- E. Bear entire responsibility in providing complete compatibility of all shop and field painting systems.
- F. It is recognized that the specific application of the coating products varies for each specific manufacturer (number of coats, mil thickness per coat, etc.). Therefore, these Specifications represent the minimum to be provided under this contract and shall be increased in accordance with each manufacturer's recommendations.

### 2.3 COLORS AND FINISHES

- A. All finish colors will be selected from manufacturer's color chips. The Owner will select the colors. Match final colors to selected color chips, as scheduled.
- B. To provide contrast between successive coats, lightly tint each coat to distinguish it from preceding coats.
- C. Unless otherwise indicated, use gloss or semi-gloss for finish paint.

### 2.4 COATING TYPES

- A. Coating types and minimum acceptable percent (by volume) of component solids are described in Schedule 09 91 00-A Coating Types. Description of coating systems

including surface preparation and dry film thicknesses are included in Schedule 09 91 00-B Coating Systems.

### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work.
- B. Do not proceed with surface preparation or coating application until conditions are suitable.
- C. The following shop and field instruments shall be used to inspect surface preparation and dry film thickness.
  - 1. SSPC visual standards SSPC-VIS 1-89
  - 2. Testex Press-O-Film replica type x-coarse
  - 3. Surface temperature thermometer
  - 4. Sling psychrometer and psychrometric tables
  - 5. Type I or Type II dry film thickness gauges
  - 6. SSPC-PA2 methods

#### 3.2 PREPARATION

- A. Basic Steps
  - 1. Arrange to do all preparation and paint work in heated enclosure unless ambient weather conditions ensure still, dry air and a minimum of 50 degree F temperature. Do not apply paints to surfaces in direct sunlight.
  - 2. Coordinate cleaning and painting operations to eliminate contamination of one by the other.
  - 3. Maintain all coating materials at manufacturer's recommended mixing and application temperatures for not less than 24 hours before use. Have clean, proper containers, spray equipment, applicators and accessory items ready for use before decanting or mixing paint materials.
  - 4. Ensure proper coordination of materials to be applied hereunder with previous coatings on affected surfaces. Have all manufacturer's written directions on hand, and follow them strictly, except where otherwise specified.
  - 5. Carefully coordinate preparation and material compatibility requirements of paint systems used by manufacturers to shop prime equipment.
- B. Before any paint application, carefully clean all surfaces to be coated of dust, dirt, grease, rust, mill scale, paint unsuitable for top coatings, efflorescence, oil, moisture, foreign matter or conditions detrimental to coating bond and durability.

1. Following cleaning, apply preparatory treatment in strict accordance with manufacturer's written instructions.
  2. Fill imperfections and holes in surfaces to be painted.
- C. Metals
1. Prepare all field and shop primed ferrous metals, including galvanized ferrous metals, in accordance with Schedule 09 91 00-B Coating System Schedule included under this Section.
  2. A needle gun may be used for field welds and shop welds which occur in narrow, unprimed areas in an otherwise shop primed surface.
  3. Bituminous coated metals for paint finish - clean of all dirt, grease, oil and foreign matter, and prime with a barrier coat to seal the bitumen and prevent bleeding and discoloration of finish.
  4. Prepare non-ferrous and galvanized metal surfaces for finishing in accordance with SSPC-SP16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steels, Stainless Steels and Non-Ferrous Metals. Provide minimum uniform anchor profile of 1 mil. Apply coatings as outlined on the Paint Schedule.
- D. Provide higher degree of cleaning for acceptable equivalent paint products when paint manufacturer recommends in his printed surface preparation recommendations.
- E. Concrete for Paint Finishes
1. Clean thoroughly of all form oil, release agents, dirt, dust, grease, paint, loose material and foreign matter. Remove laitance; roughen smooth surfaces by brush sand blasting in accordance with SSPC-SP13 Surface Preparation of Concrete (Reference ICRI CSP 3-5 visual standards).
  2. After concrete has dried, prime where required in strict accordance with manufacturer's printed instructions.
  3. Concrete Floors - Prepare all surfaces in accordance with SSPC-SP13 Surface Preparation of Concrete utilizing Shot-Blasting or Mechanical surface preparation. Reference (ICRI CSP- 3-5 visual standards). Acid washing is not permitted.
  4. Concrete for submerged service: Prepare all surfaces via abrasive blast cleaning in accordance with SSPC-SP13 Surface Preparation of Concrete. Reference (ICRI CSP- 3-5 visual standards). Acid washing is not permitted.
- F. Concrete masonry units for paint finishes:
1. Clean thoroughly by brushing, scraping and sanding or grinding slick areas.
  2. Solvent wash oil, grease, and paint spots before applying block filler.
- G. Before applying field coat, touch-up abraded areas of shop coats with paint of the same type. Apply an entire coat if necessary. Touch-up coats are in addition to, and not a

substitute for first field coat. Clean deteriorated surfaces to bare metal before applying touch-up coat.

- H. After installation and before applying field coats, touch-up all scratches and blemishes on equipment, motors, pumps, instrumentation panels, electrical switchgear, and similar items with shop coats, paint filler, enamel or other treatment customary with manufacturer.
- I. After installation, touch up all scratches and blemishes on all steel.

### 3.3 APPLICATION

#### A. Conditions

1. Do not apply paints or other finish to wet or damp surfaces, except in accordance with instructions of manufacturer. Do not apply exterior paint during cold, rainy, or frosty weather, or when temperature is likely to drop to freezing within the paint coatings curing time as specified by the paint manufacturer. Avoid painting of surfaces while they are exposed to direct sunlight.
2. Paint surfaces which have been cleaned, pretreated, or otherwise prepared for painting with first finish coat as soon as practicable after such preparation has been completed, but in any event prior to deterioration of prepared surface.
3. Coat blast cleaned metal surfaces immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Do not coat blast cleaned surfaces later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.
4. Work shall conform to SSPC-PA 1.

#### B. Methods

1. Prepare surfaces, mix and apply paint materials in strict accordance with manufacturer's printed instructions and recommendations, except where specifically directed otherwise. Control temperature of materials upon mixing and application, surface temperature and condition, thinning and modifying.
2. Protect surfaces to be coated, before, during and after application unless ambient weather conditions are favorable.

#### C. Workmanship

1. Apply coating materials to meet manufacturer's spreading rate and dry film thickness recommendations. Dry film thicknesses specified are constant for brush, spray, roller or other form of application.
  - a. Control thinning for spray use and to manufacturer's printed instructions, and produce specified dry film thickness on level surfaces, interior and exterior angles.
  - b. Record quantities of materials of each type, for each coat used.

2. Apply paints and coatings using skilled painters, brushed or rolled or sprayed out carefully to a smooth, even coating without runs or sags. Allow each coat of paint to dry thoroughly, on the surface and throughout the film thickness, before the next coat is applied. High polymer coatings may be exempted from the drying requirement if recoat time is specified by manufacturer.
3. Finish surfaces - Uniform in finish and color, and free from flash spots and brush marks.
4. Accessory items, finish hardware, lighting fixtures, escutcheons, plates, trim and similar finish items not to be painted: Remove or carefully mask before painting adjacent surfaces; carefully replace and reposition upon completion of adjacent painting and cleaning work.

#### 3.4 PROTECTION, CLEAN-UP

- A. Protect all materials and surfaces painted or coated under this Section, from the time of surface preparation until the final coat has fully dried. Also protect all adjacent work and materials from touch-up painting by the use of sufficient drop cloths during the progress of this work. Upon completion of the work, clean up all paint spots, oil, and stains from floors, glass, hardware, and similar finished items.

#### 3.5 PAINT SCHEDULE

- A. Coordinate, schedule and confirm the various cleaning, touch-up and finishing operations. Ensure the transmission of materials data, color selections and coating system methods between the coating applicators. Take responsibility for not exceeding exposure and recoat time limits.
- B. Color code all piping in accordance with Schedule 09 91 00-C, Color Schedule.

#### 3.6 FACTORY ASSEMBLED EQUIPMENT AND SKID PACKAGES

- A. Painting fabricated ferrous assemblies, frames, supports, skids, vessels, tanks, and OSHA guards shall strictly conform to the requirements of this Section including SSPC-SP6 surface preparation, epoxy primer, and intermediate coats, and a polyurethane topcoat.
- B. Painting of piping shall be in accordance with this section.
- C. The Engineer shall be given a minimum 7 day notice to witness blasting and painting operations.
- D. Painting of electrical components, motors and enclosures shall be manufacturer's standard coating system with a minimum of an industrial grade painting system.
- E. Submit detailed schedule of painting system(s) to be used for all equipment to the Engineer. All schedules shall be provided prior to commencement of all painting operations.
- F. Stainless steel and aluminum are not required to be painted unless it is the manufacturer's standard practice.



### 3.7 FIELD QUALITY CONTROL

- A. Leave staging and lighting in place until the Engineer has inspected surface or coating. Replace staging removed prior to approval by the Engineer. Provide additional staging and lighting as requested by the Engineer.
- B. Unsatisfactory Application
  - 1. If surface has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
  - 2. Evidence of runs, bridges, shiners, laps or other imperfections is cause for rejection.
  - 3. Repair defects in accordance with written recommendations of coating manufacturer.
- C. Damaged coatings, Pinholes and Holidays
  - 1. Feather edges and repair in accordance with recommendations of paint manufacturer.
  - 2. Hand or power sand visible areas of chipped, peeled or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on the extent of repair and appearance, a finish sanding and topcoat may be required.
  - 3. Apply finish coats, including touchup and damage repair coats in a manner that will present a uniform texture and color-matched appearance.

### 3.8 FINAL TOUCH-UP

- A. Prior to final completion and acceptance, examine painted and finished surfaces and retouch or refinish as necessary to leave surfaces in perfect condition.
- B. After doors have been fitted and hung, refinish edges, tops and bottoms.

<b>Schedule 09 91 00-A - Coating Types</b>		
<b>Tnemec Company Inc.</b>	<b>Sherwin-Williams</b>	<b>Type of Coating System (Solids Content by Volume)</b>
Series V104 Pota-Pox	Macropoxy 646 PW Potable Water Epoxy or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)
Series V140F Pota-Pox (Fast Cure)	Macropoxy 646 PW Potable Water Epoxy or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)
Series V69 Hi-Build Epoxoline	Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (78.0 ± 2.0%)
Series 1095 Endura Shield	Acrolon 218 HS Acrylic Polyurethane-Semi-Gloss	Aliphatic Acrylic Polyurethane (58.0 ± 2.0%)
Series 94-H2O Hydro-Zinc	Corothane I Galvapac 2K 100 Zinc Primer (NSF) Or Corothane I Galvapac 1K 100 Zinc Primer (NSF)	Aromatic Urethane, Zinc Rich (63.0 ± 2.0%)
Series 218 MortarClad	Dura-Plate 2300 WB Epoxy Cementitious Resurfacer	Epoxy Modified Concrete (100%)
Series 217 MortarCrete	AW Cook Cement Cemtec MSM Mortar or Rapid Cure Vertical Grade.	Acrylic Modified Cement (100%)
Series 434 PermaShield	DuraPlate 5900 HB Epoxy (formerly Cor-Cote SC Plus) with Type SC aggregate.	Modified Aliphatic Amine Epoxy Mortar (100%)
Series G435 Perma-Glaze	Dura-Plate 5900 HB Epoxy (formely Cor Cote SC Plus).	Modified Polyamine Epoxy (100%)
Series 1 Omnithane	Corothane I Galvapac Two Pack Zinc Primer (NSF).	MIO/Zinc-Filled Urethane (61.0 ± 2.0%)
Series 215 Surfacing Epoxy	Steel Seam FT910 Epoxy Patching and Surfacing Compound.	Modified Polyamine Epoxy (100%)
Series 1528 Endura-Heat DTM	Heat Flex 1200 / Heat Flex 3500	Inert Multipolymeric Matrix (65%)

<b>Schedule 09 91 00-B - Coating Systems</b>				
<b>Surface</b>	<b>System Surface Preparation (Shop/Field)</b>	<b>System Finishes</b>		
		<b>Primer</b>	<b>2nd</b>	<b>Final</b>
		<b>DFT = Dry Film Thickness, Mils</b>		
Ferrous Metals, Interior Non-Submerged	SSPC-SP-6	Series 1 (2.5-3.5 DFT)	Series V69 (4.0-6.0 DFT)	Series 1095 (2.5-5.0 DFT)
		<i>Corothane I Galvapac 2K</i>	<i>Macropoxy 646 FC Epoxy</i>	<i>Acrolon 218 HS Polyurethane</i>
Ferrous Metals, Exterior Non-Submerged	SSPC-SP-6	Series 1 (2.5-3.5 DFT)	Series V69 (3.0-5.0 DFT)	Series 1095 (2.5-5.0 DFT)
		<i>Corothane I Galvapac 2K</i>	<i>Macropoxy 646 FC Epoxy</i>	<i>Acrolon 218 HS Polyurethane .</i>
Ferrous Metals, Submerged or Intermittently Submerged - Potable	SSPC-SP-10	Series 94-H2O (2.5-3.5 DFT)	Series V140 or V140F (6.0-8.0 DFT)	Series V140 or V140F (6.0-8.0 DFT)
		<i>Corothane I Galvapac 2K</i>	<i>Macropoxy 5500 or 646 PW</i>	<i>Macropoxy 5500 or 646 PW</i>
Ductile and Cast Iron Pipe, Interior and Exterior, Non-submerged	NAPF 500-03-04 / SSPC-SP-6	Series V69 (3.0-5.0 DFT)	Series V69 (3.0-5.0 DFT)	Series 1095 (2.5-5.0 DFT)
		<i>Macropoxy 646 FC Epoxy</i>	<i>Macropoxy 646 FC Epoxy</i>	<i>Acrolon 218 HS Polyurethane</i>
Ductile and Cast Iron Pipe, Interior and Exterior, Submerged. Potable	NAPF 500-03-04 / SSPC-SP-10	Series 94-H2O (2.5-3.5 DFT)	Series V140 or V140F (4.0-6.0 DFT)	Series V140 or V140F (4.0-6.0 DFT)
		<i>Corothane I Galvapac</i>	<i>Macropoxy 5500 or 646 PW</i>	<i>Macropoxy 5500 or 646 PW</i>
Ferrous & Non-Ferrous Metals, Encased in concrete or requiring backpainting due to inaccessibility once installed	SSPC-SP-2			Series 1 (2.5-3.5 DFT)
		<i>Macropoxy 646 FC Epoxy</i>		<i>Macropoxy 646 FC Epoxy</i>
	SSPC-SP-16 Surface	Series V69 (2.0-3.0 DFT)		Series 1095 (2.5-3.0 DFT)

Schedule 09 91 00-B - Coating Systems				
Surface	System Surface Preparation (Shop/Field)	System Finishes		
		Primer	2nd	Final
		DFT = Dry Film Thickness, Mils		
Non-Ferrous Metal (Other Than Galvanized), Interior and Exterior Non-Submerged	Preparation of Galvanized Steel (Minimum 1 mil anchor profile)	<i>Macropoxy 646 FC Epoxy</i>		<i>Acrolon 218 HS Polyurethane</i>
Non-Ferrous Metal (Other Than Galvanized), Submerged or Intermittently Submerged	SSPC-SP-16 Surface Preparation of Galvanized Steel (Minimum 2 mil anchor profile)	Series V69 (3.0-5.0 DFT)		Series V69 (4.0-6.0 DFT)
		<i>Macropoxy 646 PW</i>		<i>Macropoxy 646 PW</i>
Galvanized Steel, Interior and Exterior	SSPC-SP-16 Surface Preparation of Galvanized Steel 1.0-1.5 mil profile	Series 1 for field touch-up (2.5-3.5 DFT)	Series V69 (2.0-3.0 DFT)	Series 1095 (2.5-3.0 DFT)
		<i>Corothane I Galvapac 1K for field touch up</i>	<i>Macropoxy 646 FC Epoxy</i>	<i>Acrolon 218 HS Polyurethane</i>
Submerged or Intermittently Submerged Concrete - Potable	SSPC-SP-13 (Reference ICRI CSP 5)	Series 218 (~ 125 mils DFT)		Series 22 or FC22 (25.0-30.0 DFT)
		<i>Dura-Plate 2300</i>		<i>Dura-Plate UHS</i>
Submerged or Intermittently Submerged Concrete - Non-Potable, pH 5-10	SSPC-SP-13 (Reference ICRI CSP 5)	Series 218 (~ 125 mils DFT)		Series G435 (30.0-40.0 DFT)
		<i>Dura-Plate 2300</i>		<i>Dura-Plate 5900 + Type SC aggregate</i>
Plastic Pipe & Insulation, Including Fiberglass	SSPC-SP-1 and Lightly Sanded	Series V69 (2.0-3.0 DFT)		Series V69 (2.0-3.0 DFT)
		<i>Macropoxy 646 FC Epoxy</i>		<i>Macropoxy 646 FC Epoxy</i>

Schedule 09 91 00-B - Coating Systems				
Surface	System Surface Preparation (Shop/Field)	System Finishes		
		Primer	2nd	Final
		DFT = Dry Film Thickness, Mils		
<i>Notes</i>				
(1) Tnemec Products are listed in the first row for each surface and Sherwin-Williams products are listed in italics on the second row for each surface without a dry film thickness. Refer to Paragraph 2.1 for "or equal" products.				

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**Table 09 91 00-C - Color Schedule**

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<b>Item</b>	<b>Color</b>
Raw Water	Olive Green
Treated or Potable Water	Dark Blue
Backwash Supply	Light Blue
Backwash Drain/Waste	Light Brown
Sanitary, Drain and Vents	Dark Gray
Potassium Hydroxide	Yellow with Green Bands
Sodium Hypochlorite	Yellow
Phosphate	Light Green with Red Bands
Domestic Water	Label
Sample Plumbing Lines	Label
Chemical Vents	Light Grey with bands of identification color
Gas	Red
Hollow Metal Doors	Medium Bronze (85BR)
Bollards	Safety Yellow

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END OF SECTION

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SECTION 10 14 00

TRAFFIC SIGNAGE AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Signage
  - 2. Sign supports and hardware

1.2 REFERENCES

- A. Manual of Uniform Traffic Control Devices, U.S. Department of Transportation
- B. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 2020 Edition as amended
- C. Commonwealth of Massachusetts Department of Public Works "Standard Drawings for Signs and Supports," 1990 Edition as amended
- D. Commonwealth of Massachusetts Department of Public Works "The Massachusetts Amendments to the 2009 Manual on Uniform Traffic Control Devices and the Standard Municipal Traffic Code," January 2012 Edition as amended.

1.3 SUBMITTALS

- A. Submit complete Shop Drawings of all signs, supports, and hardware specified in this Section

1.4 PRODUCTS

- A. Signs
  - 1. Signs shall be fabricated in accordance with the 2009 Manual on Uniform Traffic Control Devices (MUTCD) included the Massachusetts Amendments, and the Contract Drawings.
- B. Supports
  - 1. Supports for ground mounted signs shall be Breakaway P-5 Post Assemblies and shall meet the requirements set forth by relevant provisions of Section 800 of the Massachusetts Highway Department's Standard Specifications for Highways and Bridges and the Standard Drawings for Signs and Supports.
- C. Hardware
  - 1. Hardware for mounting signs shall meet the requirements set forth by relevant provisions of Section 800 of the Massachusetts Highway Department's Standard Specifications for Highways and Bridges and the Standard Drawings for Signs and Supports.

PART 2 EXECUTION

2.1 INSTALLATION

- A. Install signs, posts, and hardware in accordance the Drawings and the relevant provisions of Section 800 of the Massachusetts Highway Department's Standard Specifications for Highways and Bridges, the 2009 Manual on Uniform Traffic Control Devices (MUTCD), and the Standard Drawings for Signs and Supports.

END OF SECTION

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SECTION 26 05 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Basic Electrical Requirements specifically applicable to Division 26 Sections
2. As-Built Documentation

B. Related Sections

1. Section 01 14 00- Work Restrictions
2. Section 01 77 00- Closeout Procedures
3. Section 26 08 00 - Electrical Testing

1.2 REFERENCES

- A. ASCE 7-10 – Minimum Design Loads for Buildings and Other Structures
- B. International Building Code – IBC 2015
- C. Massachusetts Electrical Code
- D. Massachusetts State Building Code, 9<sup>th</sup> Edition, 780 CMR
- E. NFPA 70 - National Electrical Code
- F. NFPA 79 – Electrical Standard for Industrial Machinery
- G. ANSI/ISA-S5.4 – Instrument Loop Diagrams

1.3 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Submit as-built documentation in accordance with Section 01 77 00. I&C documentation shall conform to the latest versions of NFPA 79 and ANSI/ISA-S5.4.
- C. Submit a written warranty.
- D. Seismic restraint details including stamped certification from a professional engineer.
- E. Provide a schedule of all Electrical system related Owner training, within one month of the Notice to Proceed. Prior to training, resubmit schedule if training is rescheduled and resubmit upon completion of all training. At a minimum, for each piece of equipment or system to be demonstrated, the schedule should include the following:
  1. Equipment or system to be demonstrated
  2. Related specification section

3. Anticipated date of training
  4. Anticipated duration of training session
  5. Name and company of instructor providing the training
  6. Date completed
  7. Actual duration of training session
- F. Submit a Sequence of Construction for the demolition and installation of equipment with restrictions listed in this document and 01 14 00. Sequence of Construction shall be updated during construction (if changes are required) and resubmitted for comment.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable Massachusetts Building Code.
- B. Electrical - Conform to the state-adopted version of the National Electrical Code with Massachusetts amendments. All references to the National Electrical Code or NEC in the project manual or on the drawings shall be construed as references to the Massachusetts Electrical Code.
- C. Conform to applicable Local Building Codes.
- D. Obtain and pay for all applicable permits.
- E. Schedule and pay for all inspections necessary for the electrical installation including but not necessarily limited to the general electrical inspection and fire department inspections.

#### 1.5 PROJECT CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from the Engineer before proceeding.
- C. Location of electrical equipment, devices, and similar items, as indicated, are approximate only. Exact locations are to be determined by the Contractor during construction. If any location is different from those indicated (greater than 5 feet away from location shown on Drawings), the Engineer must give approval to the change.
- D. Verify in field, existing conditions and final locations of equipment installed under other Sections that require electrical work.
- E. Where it is necessary to core a hole through an existing concrete slab or wall, the Contractor shall conduct a survey with a pachometer or by similar means to identify the location of steel reinforcing bars. The new hole shall be located so as to avoid cutting reinforcing bars. Where reinforcing steel is close enough together that it is not possible to core the required hole without cutting reinforcing bars, contact the Engineer for further direction before cutting a hole. Where reinforcing bars are cut

without the consent of the Engineer, the slab or wall will be repaired at the expense of the Contractor.

F. Equipment wiring

1. Equipment power and control wiring is based on specific manufacturers and models. Actual wiring required may be different.
2. Before pulling any power or control wire or installing conduit, obtain equipment electrical and control installation instructions and wiring diagrams. Any discrepancies from what is shown on the electrical drawings shall be brought to the attention of the Engineer. The Engineer will provide instructions for any changes that may be necessary.
3. Installation of conduit or wire prior to obtaining the above specified information shall be at the Contractor's risk. The Owner will not be responsible for any extra costs related to removal or replacement of conduit or wire resulting from the failure to coordinate equipment conduit and wire requirements. In the event that additional conductors or larger conductors than shown on the Drawings are required, the Owner will not be responsible for any labor costs related to the installation of these materials unless it can be demonstrated by the Contractor to the satisfaction of the Engineer that these conductors could not have been installed at the same time as the conductors shown on the Drawings.
4. Provide wiring shown on the Drawings unless specifically excluded.

G. Drawings and Specifications

1. Drawings and Specifications are typical of work done and of arrangement desired. Provide accessories and appurtenances necessary for complete installation (e.g., home runs, conduit and wire for instrumentation and control wiring) that are required to provide a complete electrical system.

H. As-Built Drawings: Maintain a master set of as-built drawings showing the changes and deviations from the Drawings or the approved shop drawings. Make markups as the changes are made.

I. Where underground electric facilities are installed, measure, record, and submit as built dimensions.

1.6 SEQUENCING AND SCHEDULING

- A. Shutdown quantity and durations shall be minimized and limited to restrictions specified in 01 14 00 Work Restrictions and as described below.
- B. To the greatest extent feasible, transfer existing electrical loads from central garage (Southwest corner) panelboard to new P2-1 panelboard before the demolition of single-phase electrical service.
- C. Coordinate shutdown schedule and durations with the Owner.
- D. Install all conduit/wire to the extent feasible prior to shutdowns to minimize outage durations.

1.7 WARRANTY

- A. Submit a written warranty, executed by the Contractor and manufacturer agreeing to the replacement and installation of all material, parts and adjustments required due to failure in materials or workmanship within one year from final acceptance of the Work.
- B. This warranty shall be in addition to, and not a limitation of, other rights and remedies the Owner may have against any party under the Contract Documents. This warranty is in addition to all other warranties existing under either the Contract Documents or required by Law.

## 1.8 SEISMIC REQUIREMENTS

- A. Components, systems and their supports shall be designed by the contractor in accordance ASCE 7-10, Section 13.6 Mechanical and Electrical Components, the International Building Code (IBC 2015), and the Massachusetts Amendments to IBC 2015.
- A. Submit details showing the seismic restraints where applicable.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Products shall be listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) recognized by OSHA if a listing for that product is available. NRTL shall be Underwriter's Laboratory (UL), Electrical Testing Laboratory (ETL), Factory Mutual (FM) or equal.
- B. Equipment Ampere Interrupting Capacity (AIC) and/or Short Circuit Current Rating (SCCR): Electrical equipment shall be labeled in accordance with NFPA 70 and have an Ampere Interrupting Capacity rating or Short Circuit Current Rating of equal to or greater than the following:
  - 1. 480-volt equipment: 35,000 amps unless otherwise stated in the drawings.
  - 2. 240-volt and 208-volt equipment: 22,000 amps unless otherwise stated in the drawings.

### 2.2 FINAL SYSTEM DOCUMENTATION

- A. Prior to final acceptance of the system, provide operating and maintenance manuals (O&M's) covering instruction and maintenance on each type of equipment in accordance with Section 01 77 00.
- B. The requirements for final documentation shall be as specified in Section 01 77 00.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Perform all work in accordance with OSHA (Occupational Safety and Health Administration) requirements.
- B. Perform all work in accordance with NFPA 70E, Handbook for Electrical Safety in the Workplace.

- C. Install all equipment in accordance with manufacturer's instructions and recommendations.
- D. Test all electrical components in accordance with Section 26 08 00 and as indicated in individual electrical equipment specification sections.
- E. Perform all electrical equipment installation, checkout, and test in a safe manner. Provide the following special safety precautions, as appropriate:
  - 1. Locking and tagging procedures
  - 2. Barricades
  - 3. De-energization and/or isolation of equipment prior to testing
  - 4. Review of procedures with the Engineer and the Owner
  - 5. Erection of warning signs
  - 6. Stationing of guards and watchmen
  - 7. Maintenance of voice communications
  - 8. Personnel orientation
- F. Do not install electrical equipment in its permanent location until structures are weather-tight or equipment is properly protected from the weather.
- G. Before energizing any machine, visually inspect for serviceability. Verify that equipment and machines have been properly lubricated and aligned. Verify nameplate for electrical power requirements.
- H. Contractor shall provide a label on each of the following types of equipment that indicates the maximum available short circuit current at that equipment. Obtain available short circuit current values from engineer during construction. Unless values shown on drawings, Contractor shall request values from Engineer at least 4 weeks prior to starting up equipment.
  - 1. Panelboards
  - 2. Equipment that is required to be marked with a short circuit current rating, such as motor controllers and industrial control panels of multi-motor and combination load equipment.

END OF SECTION

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## SECTION 26 05 05

### MINOR ELECTRICAL DEMOLITION

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Electrical demolition

#### PART 2 PRODUCTS

##### 2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: as specified in individual Sections.

#### PART 3 EXECUTION

##### 3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on field observation and existing record documents. Report discrepancies to the Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

##### 3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Provide temporary power source(s), wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- C. Existing Electrical System: Disable system only to make switchovers and connections. Obtain permission from Owner at least 24 hours before partially or completely disabling any system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Verify permission to disable with the Owner immediately before the work. See 26 05 00 and 01 14 00 for additional requirements.

##### 3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, boxes, supports and fasteners, including above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

- E. Voids created by the removal of conduit in floors or walls above or below ceilings shall be patched and sealed with materials matching the existing construction.
- F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Repair adjacent construction and finishes damaged during demolition and extension work with materials matching the existing construction.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

#### 3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangements.

#### 3.5 INSTALLATION

- A. Install relocated materials and equipment as indicated.

END OF SECTION

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SECTION 26 05 19

CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Building wire and cable
2. Shielded signal cable
3. Ethernet cable
4. Wire connectors

B. Related Sections

1. Section 26 05 53 - Electrical Identification

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

1.3 SUBMITTALS

- A. Submit shop drawings, product data and reports.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Determine required separation between cable and other work.
- C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Stranded conductor insulated wire, multi-conductor control cable and tray cable.
- B. Conductor: copper
- C. Insulation Voltage Rating: 600 volts
- D. Insulation Temperature Rating: 90°C

E. Insulation: ANSI/NFPA 70; all power and control wiring shall be XHHW-2 unless otherwise indicated in this specification.

F. Manufacturer

1. Okonite Co.
2. Rome Cable Corp.
3. American Insulated Wire Corp.
4. Southwire
5. or equal

## 2.2 SHIELDED SIGNAL CABLE

A. Description: twisted pair shielded instrumentation wire, NEC type TC listed, wet location, approved for Class 1 circuits as permitted in NEC Article 725.

B. Conductor: tinned copper 18 AWG

C. Insulation Material: PVC with a nylon overcoat

D. Insulation Temperature Rating: 75°C wet, 90°C dry

E. Shield: 100% coverage, with drain wire

F. Jacket: 90°C PVC

G. Insulation voltage rating: 600 volts

H. Manufacturer

1. Belden No. 8760
2. Approved equal by Alpha
3. Approved equal by Clifford
4. or equal

## 2.3 ETHERNET CABLE

A. Description: NEC CMR cable, Category 6 unbonded-pair cable

B. Construction: 23 AWG solid bare copper, 4 twisted pairs, overall shield, drain wire, RJ-45 compatible, non-plenum, polyolefin (PO) or PO+FEP insulation, PVC jacket.

C. Manufacturer

1. Belden 2412F
2. Approved equal by Alpha
3. Approved equal by Quabbin

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

### 3.3 INSTALLATION

- A. Minimum size for power wiring shall be AWG #12.
- B. Minimum size for control wiring shall be AWG #14.
- C. All wiring shall be run in conduit, unless otherwise noted.
- D. Install products in accordance with manufacturers instructions.
- E. Use stranded conductors for all wire sizes.
- F. In raceways, mechanically complete the installation in all details. Pull all conductors into raceway at same time.
- G. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- H. Protect exposed cable from damage.
- I. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.
- J. Use suitable cable fittings and connectors.
- K. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- L. Clean conductor surfaces before installing lugs and connectors.
- M. Instrumentation, control and signal wiring shall be continuous with no splices from source to destination, unless otherwise shown on drawings.
- N. Splices
  1. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
  2. Properly connect and insulate shields at all splice points.
  3. Underground Splices or Splices called out to be Submersible
    - a. Provide Polaris Submersible Splice Connectors or equal one-piece system by Burndy, Blackburn or equal.
    - b. Underground splices shall be made in a handhole or manhole provided by the contractor and sized per the NEC.
  4. Above grade splices
    - a. 8 AWG and Larger: Use split bolt connectors for copper conductor splices and taps. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

- b. 10 AWG and smaller: Use insulated spring wire connectors with plastic caps for copper conductor splices and taps.
- 5. Above ground splices wire reducer
  - a. When wire size has been increased to account for derating and/or voltage drop, provide an In-Line Standard Barrel Reducer Splice Kit to reduce the wire down to the size necessary to terminate at the circuit breaker, disconnect, equipment, etc.
  - b. The reduced wire shall be sized by the contractor per NEC Table 310.15(B)(16) using the 60°C Column. The wire shall be sized according to the upstream over current protective device size.
  - c. The splice kit shall contain clear heat shrink tube to protect the butt splice.
  - d. Tape splice with electrical tape to 150 percent of insulation rating of conductor.
  - e. The Reducer splice kit shall be:
    - 1) Butt splice compression type with inspection window.
    - 2) Tin plated Copper
    - 3) Provide Burndy Hyreducer or equal by Blackburn, Polaris or equal.
- O. Ground signal cable shields on receiving end only.
- P. Provide Kellems grips for all cord connected devices.
- Q. Provide separation of power wiring from control and signal wire in accordance with NEC Article 725.
- R. Install Ethernet cables in accordance with manufacturer's instructions and industry standards for category 6 wiring.

### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 26 05 53.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

### 3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION

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## SECTION 26 05 26

### GROUNDING AND BONDING

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Power system grounding
2. Electrical equipment and raceway grounding and bonding
3. Grounding of piping, tanks, handrails and other conductive equipment
4. Communication system grounding
5. Grounding electrode system three-point test

###### B. Related Sections

1. Section 26 08 00 – Electrical Testing

##### 1.2 REFERENCES

- A. NFPA 70 – National Electrical Code
- B. NFPA 780 – Standard for the Installation of Lightning Protection Systems
- C. UL 96 – UL Standard for Safety for Lightning Protection Systems
- D. UL 467 - Grounding and Bonding Equipment
- E. UL 486A – Wire Connectors and Soldering Lugs for Use with Copper Conductors
- F. UL 1059 – Terminal Blocks
- G. IEEE/ANSI 142 – Latest Edition Recommended Practice for Grounding of Industrial and Commercial Power Systems.
- H. IEEE 837 – Standards for Qualifying Permanent Connections Used in Substation Grounding
- I. ASTM B3 - Solid Conductors
- J. ASTM B8 – Assembly of Stranded Conductors
- K. ASTM B33 – Tinned Conductors
- L. NEMA GR1 – Ground Rods and Ground Rod Couplings

##### 1.3 SYSTEM DESCRIPTION

- A. Ground the electrical service system neutral and ground bus at the utility service entrance equipment to grounding electrodes. For new electrical services, grounding electrode system shall include a minimum of three driven ground rods (unless one electrode has a resistance to earth less than 25 ohms), the underground water service pipe, sprinkler service pipe and the metal frame of the building (if effectively

grounded). For new construction, the grounding electrode system shall include the rebar in accordance with NEC 250.52(A)(3). Run exposed grounding electrode conductors in conduit.

- B. Ground each separately derived system neutral to the nearest effectively grounded building structural steel member or, if such is not available, to the nearest grounding electrode other than a water pipe.
- C. Provide communications systems grounding conductor at point of service entrance and connect to nearest effectively grounded building structural steel member or, if such is not available, to the nearest grounding electrode other than a water pipe.
- D. Bond together exposed non-current carrying metal parts of electrical equipment, handrails, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, metallic tanks and all metallic piping.
- E. Install grounding in accordance with NEC Article 250.

#### 1.4 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Indicate layout of ground rods, location of system grounding electrode connections, and routing of grounding electrode conductor.
- C. Submit ground resistance testing reports in accordance with Section 26 08 00.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Grounding Electrode Conductors
  - 1. Type: Medium-hard drawn bare copper
  - 2. Manufacturer
    - a. Okonite Co.
    - b. Rome Cable Corp.
    - c. American Insulated Wire Corp.
    - d. Southwire
    - e. or equal
- B. Grounding Conductors - insulated copper, minimum size #12 AWG and in accordance with NEC Tables 250.66, 250.102(C)(1) and 250.122, or larger if so indicated on the Drawings
- C. Ground Rods: Copper-clad steel,  $\frac{3}{4}$  inch diameter, minimum length 10 feet
- D. Connectors - Mechanical
  - 1. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used and specific types, sizes and combination of conductors and items connected.

2. The mechanical connector bodies shall be manufactured from high strength, high conductivity cast copper alloy material. Bolts, nuts, washers and lock washers shall be made of silicon bronze and supplied as part of the connector body and shall be two bolted pressure types.
3. The connectors shall meet or exceed UL467 and be clearly marked with the catalog number, conductor size and manufacturer.
  - a. Manufacturer
    - 1) ABB Blackburn Installation Products
    - 2) Burndy
    - 3) Ilsco
    - 4) Or equal

E. Connectors - Compression

1. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used and specific types, sizes and combination of conductors and items connected.
2. Irreversible compression connectors that meet or exceed the performance requirements of IEEE837, UL467 latest revisions. Compression connectors shall be listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and specific types, sizes and combinations of conductors and other items connected.
3. The irreversible compression connectors shall be manufactured of from pure wrought copper.
  - a. The installation of the connectors shall be made with a hydraulic compression tool and die system clearly showing embossed die stamp on each crimp as recommended by the manufacturer of the connectors
  - b. The connectors shall be clearly marked with the manufacturer, catalog number, conductor size
  - c. Each connector shall be factory filled with an oxide - inhibiting compound where applicable.
4. Manufacturer
  - a. ABB Blackburn Installation Products
  - b. Burndy
  - c. Ilsco
  - d. Or equal

F. Connectors - Welded

1. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used and specific types, sizes and combination of conductors and items connected.

2. Exothermic welded connections for copper to copper and copper to steel connections to ground rods, ground buses, ground wires, steel beams etc.
3. Conductors spliced with exothermic welded connections shall be considered as a continuous conductor, as stated in the noted accompanying NEC Article 250.50, 250.64 and IEEE Standard 80 latest edition.
  - a. Procedures outlined in the manufacturer's installation instructions shall be followed. Molds shall not be modified during installation in field applications
  - b. Weld metals shall be a mixture of copper oxide and aluminum. Only one weld metal mixture shall be required for each grounding connection.
  - c. Grounding connections shall be tested and certified in accordance with IEEE837, UL487A and UL 467.
  - d. Manufacturer
    - 1) ABB Furseweld Installation Products
    - 2) Burndy Thermoweld
    - 3) Erico Cadweld
    - 4) Or equal

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Provide a separate, insulated equipment grounding conductor with each feeder and branch circuit. Terminate each end on a grounding lug, bus, or bushing.
- B. Run all exposed grounding electrode conductors and equipment grounding conductors in conduit.
- C. Use a minimum of #8 AWG copper wire to ground all piping, new handrails and other conductive equipment or structures including ductwork and floor gratings.
- D. Use the following types of ground connections for the grounding electrode system:
  1. Cable to cable & cable to ground rod: Use compression type
  2. Cable to building structural and reinforcing steel: Use exothermic weld
  3. Cable to piping: Use mechanical type
- E. Supplementary Grounding Electrode: Use effectively grounded metal frame and rebar of the building and ground rods spaced a minimum of 10 feet apart in sufficient quantity to have a measured resistance to ground of not more than 5 ohms.
- F. Isolated Grounding Systems: Use insulated equipment grounding conductor and connect only to service grounding electrode.
- G. Drive ground rods one foot below finished grade.

- H. Ground the water pipe as required by NEC Article 250. Provide a grounding jumper over the water meter as required. Provide a grounding jumper over all meters installed on incoming metallic piping for utility equipment.

### 3.2 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation and compliance with NEC Article 250.

### 3.3 TESTING

- A. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
- B. Test the grounding electrode system using a fall of potential three-point test and measure ground resistance. Submit tabulation of results to the Engineer. Include identification of electrodes, date of reading and ground resistance value in the test reports. If the resistance is not 5 ohms or less, contact the Engineer. The Engineer will initiate design changes, if necessary, to obtain acceptable values of ground resistance.
- C. Ground resistance of conduits, equipment cases, and supporting frames, shall not vary from that of system as a whole and shall not exceed 0.5 ohms to ground. Measure resistance to ground of representative items, as directed by the Engineer. Submit all readings to the Engineer.

END OF SECTION

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SECTION 26 05 29

ELECTRICAL HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Support channel
  - 2. Fastening hardware
  - 3. Anchor bolts

1.2 REFERENCES

- A. ASTM A-780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dipped Galvanized Coatings

1.3 SUBMITTALS

- A. Submit shop drawings, product data, and reports.

1.4 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 PRODUCTS

2.1 SUPPORT CHANNEL

- A. Support channel shall be hot dipped galvanized steel unless noted otherwise.
- B. Support channel assembly hardware shall be galvanized steel.
- C. In wet locations, support channel components in contact with the floor shall be stainless steel.
- D. Manufacturer:
  - 1. Unistrut
  - 2. B-Line
  - 3. ABB Super Strut Installation Products
  - 4. Or equal

2.2 FASTENING HARDWARE

- A. All fastening hardware shall be galvanized steel unless noted otherwise.

2.3 ANCHOR BOLTS

- A. Anchor bolts shall be suitable for cracked or uncracked concrete and CMU construction.

- B. Anchor bolts, nuts, washers, bolt sleeves, and assembly hardware shall be Type 316 stainless steel.
- C. Use expansion anchors in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces.
- D. Manufacturer:
  - 1. Hilti, Kwik-Bolt TZ SS 316
  - 2. Powers Fasteners, Power-Stud+ SD6
  - 3. Simpson Strong-Tie, Strong-Bolt 2
  - 4. Or Equal

#### 2.4 PIPE CLAMPS AND STANDOFFS

- A. Pipe clamps and standoffs shall be rigid one hole, galvanized malleable iron type, or PVC where PVC conduit is used. They shall be of the same manufacturer and shall be designed to be used together.
- B. Strut pipe clamps shall be PVC where non-metallic conduit is used, and 2-piece type galvanized steel elsewhere.
- C. The finish shall be suitable for the piping system being supported.

#### 2.5 THREADED RODS

- A. Threaded hanging rods shall be galvanized steel and shall be one piece. The size shall be suitable for the loads being supported.

#### 2.6 SCREWS

- A. Use Wood Screws in wood construction.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, preset inserts or beam clamps. Do not use spring steel clips and clamps.
- B. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- C. Do not use powder-actuated anchors.
- D. Hanger rods shall be subjected to tension only. Lateral and axial movements shall be accommodated by proper linkage in the rod assembly.
- E. Fabricate supports from support channel rigidly welded or bolted to present a neat appearance. Galvanized structural steel may be used where galvanized support channel is allowed. Use galvanized steel hexagon head bolts with spring lock washers under all nuts. Coat ends of galvanized steel channel that has been cut with zinc-rich paint in accordance with ASTM A-780. WR:31032714 WR:31032715 Pole number removal



- F. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide channel supports to stand cabinet 1 inch off wall.
- G. Bridge studs top and bottom with galvanized steel channels to support flush-mounted cabinets and panelboards in stud walls.
- H. Use standoffs for all surface mounted conduit to maintain ¼ inch space between conduits and walls.

END OF SECTION

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SECTION 26 05 33.13

CONDUIT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Galvanized rigid steel conduit
  - 2. Non-metallic (PVC) conduit
  - 3. Liquidtight flexible conduit
  - 4. Fittings and conduit bodies
  - 5. Conduit wall seals, existing walls
  - 6. Fire stop fittings
  - 7. Underground warning tape
  - 8. Conduit expansion joint
  - 9. Conduit sealing bushing
  - 10. Cold galvanizing compound
- B. Related Sections
  - 1. Section 26 05 26, Grounding and Bonding
  - 2. Section 26 05 29, Electrical Hangers and Supports

1.2 REFERENCES

- A. ACI 318 – Building Code Requirements for Structural Concrete
- B. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- C. ANSI/NFPA 70 - National Electric Code
- D. ANSI C80.1 - Galvanized Rigid Steel Conduit, Zinc Coated
- E. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- F. UL-6 – Standard for Rigid Metal Conduit

1.3 SUBMITTALS

- A. Shop drawings, product data and reports
- B. Riser Diagrams for the electrical installation

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

### 1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.
- D. Provide complete conduit systems between electrical equipment and devices as required.
- E. Where it is necessary to core a hole through an existing concrete slab or wall, the Contractor shall conduct a survey with a pachometer or by similar means to identify the location of steel reinforcing bars. The new hole shall be located so as to avoid cutting reinforcing bars or existing embedded conduits. Where reinforcing steel is close enough together that it is not possible to core the required hole without cutting reinforcing bars, contact the Engineer for further direction before cutting a hole. Where reinforcing bars are cut without the consent of the Engineer, the slab or wall will be repaired at the expense of the Contractor.

## PART 2 PRODUCTS

### 2.1 GENERAL CONDUIT REQUIREMENTS

- A. Minimum Size:
  - 1. Buried: 2 inch minimum unless otherwise specified.
  - 2. All other locations: 3/4 inch minimum unless otherwise specified
- B. Outdoor locations:
  - 1. Exposed: Use galvanized rigid steel conduit
  - 2. Buried: Use schedule 40 PVC conduit, concrete encased where under driving surfaces unless otherwise specified.
  - 3. Buried-to-exposed conduit transitions shall be made below grade.
  - 4. Stub out of concrete or pavement with PVC coated rigid steel conduit. PVC coated conduit shall extend at least 6" above and 6" below the concrete/pavement surface.
- C. Salt Shed Interior:
  - 1. Exposed: Use schedule 40 PVC conduit
- D. Conduit for Fire Alarm Systems:

1. In all locations, Rigid Metal Conduit shall be used.
- E. All Other Locations:
  1. Concealed: Use galvanized rigid steel conduit
  2. Exposed: Use galvanized rigid steel conduit
- F. Connections to portable equipment from junction boxes and connections to all motors: use liquid tight flexible conduit, metallic where metallic conduit is used and nonmetallic where nonmetallic conduit is used.
  1. Minimum Length: 12 inches
  2. Maximum Length: 36 inches

## 2.2 GALVANIZED RIGID STEEL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings
- C. Hot dipped galvanized inside and outside with additional passivation coating for extra protection.

## 2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Description: Interlocked steel construction with PVC jacket
- B. Liquidtight flexible metal conduit and fittings shall be appropriate outer jacket and metallic core for application requirements.
- C. For use where metallic conduit is used.
- D. Fittings: ANSI/NEMA FB 1.
  1. Fittings shall be gasketed.
  2. Dry Locations: zinc-coated or cast zinc
  3. Wet or Damp Locations: cast zinc
  4. Corrosive Locations: Stainless steel
- E. Manufacturer
  1. ABB Installation Products
  2. Carlon
  3. Anamet
  4. Electriflex
  5. Or equal

## 2.4 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT AND FITTINGS

- A. Description: Flexible PVC conduit with smooth inner surface and integral reinforcement within the conduit wall, designated as a Type LFNC-B.

- B. For use where nonmetallic conduit is used.
- C. Fittings: UL 514B. Fittings shall be gasketed. Material shall be nylon or PVC.
- D. Manufacturer
  - 1. ABB Installation Products
  - 2. Carlon
  - 3. Anamet
  - 4. Electriflex
  - 5. Or equal

#### 2.5 NONMETALLIC (PVC) CONDUIT

- A. Description: NEMA TC 2; Schedule 40 PVC
- B. Fittings: NEMA TC3

#### 2.6 CONDUIT WALL SEALS, NEW WALLS

- A. Type - sleeve and compression ring on both ends
- B. Provide compression rings with hex head screws on sealing assembly.
- C. Manufacturers
  - 1. O-Z Gedney, Type WSK
  - 2. Equal by Crouse-Hinds
  - 3. Or equal

#### 2.7 CONDUIT WALL SEALS, EXISTING WALLS

- A. Type - Suitable for core drilled holes
- B. Manufacturer
  - 1. O-Z Gedney, Type CSM
  - 2. Equal by Crouse-Hinds
  - 3. Or equal

#### 2.8 FIRE STOP FITTINGS

- A. Type - Fittings with elastomeric rings to seal smoke and fumes
- B. Fire rating of seal to be equal to or greater than rating of wall
- C. Manufacturers
  - 1. O-Z Gedney, Type CFS
  - 2. Or equal

#### 2.9 UNDERGROUND WARNING TAPE, DETECTABLE

- A. Warning tape for all buried electrical conduit shall be solid aluminum foil core tape and printed with the words "CAUTION - BURIED ELECTRICAL LINE BELOW."
- B. Tape shall be red and 6 inches wide.
- C. Manufacturers
  - 1. Ideal Industries
  - 2. Cable Accessories
  - 3. E. L. S. Products Corp
  - 4. Or equal

## 2.10 FITTINGS AND CONDUIT BODIES

- A. Fittings
  - 1. Description - Threaded, malleable Iron. Material and coating to correspond with type of conduit system being used, galvanized where galvanized steel conduit is used, and PVC where PVC conduit is used.
- B. Conduit Bodies
  - 1. Description - Threaded, malleable iron or iron alloy . Material and coating to correspond with type of conduit system being used, galvanized where galvanized steel conduit is used, and PVC where PVC conduit is used.
  - 2. Manufacturer
    - a. Appleton-Type Mogul - malleable iron or iron alloy
    - b. Equal by ABB Installation Products
    - c. Equal by O-Z Gedney
    - d. Equal by Crouse-Hinds
    - e. or equal
- C. Conduit Hubs
  - 1. Metallic hubs shall be threaded and sealing type with neoprene gasket.
  - 2. Material:
    - a. Zinc plated steel or cast zinc in dry locations
    - b. Cast zinc or galvanized steel in damp or wet locations
    - c. Stainless steel in corrosive locations
  - 3. Manufacturer
    - a. Crouse Hinds – Myers hub Type HUB
    - b. Equal by O-Z Gedney
    - c. Equal by RACO

- d. Equal by Appleton
- e. or equal

#### 2.11 CONDUIT EXPANSION JOINT, RIGID METAL CONDUIT

- A. Weather tight, internal ground, expansion joint for galvanized rigid steel conduit, 4 inch maximum conduit movement
- B. Manufacturer
  - 1. ABB Type XJG Installation Products
  - 2. Crouse-Hinds Type XJG
  - 3. Appleton Type XJ
  - 4. O-Z Gedney Type AX
  - 5. or equal

#### 2.12 CONDUIT EXPANSION AND DEFLECTION FITTING, PVC

- A. Expansion fitting for PVC conduit shall compensate for length changes due to temperature variations in exposed conduit runs, 4-inch maximum conduit movement.
- B. Manufacturer
  - 1. ABB NM-XD Type Installation Products
  - 2. Equal by Carlon
  - 3. Or equal

#### 2.13 CONDUIT SEALING BUSHING

- A. Description: Bushing that provides a waterproof seal around wire and cables in a conduit
- B. Construction: Slotted PVC coated steel discs, neoprene sealing ring and stainless steel head cap screws and washers
- C. Manufacturer
  - 1. O-Z Gedney Type CSBI

#### 2.14 COLD GALVANIZING COMPOUND

- A. Cold galvanizing compound shall be applied to all field threads and shall be as manufactured by ZRC Products Company, a division of Norfolk Corp. or equal.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Junction boxes shown on the Drawings shall be provided in locations indicated. Additional boxes shall be provided as needed to comply with NFPA 70 requirements.
- B. Install conduit in accordance with NECA "Standards of Installation."



- C. Install nonmetallic conduit in accordance with manufacturer's instructions.
- D. Arrange supports to prevent misalignment during wiring installation.
- E. Support rigid steel conduit using galvanized steel or galvanized malleable iron straps, pipe hangers, U-bolt clamps and beam clamps.
- F. Group related conduits; support using conduit rack. Construct rack using support channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls.
- L. Route conduit in and under slab from point-to-point unless drawings indicate otherwise.
- M. Cross conduits in slab only with the Engineer's approval.
- N. Maintain adequate clearance between conduit and piping.
- O. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104°F.
- P. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- Q. Before installation of wires and cables, clean and dry inside of each conduit run.
- R. Provide conduit bushings on the end of each conduit to prevent insulation damage. Bushing shall be grounding type where applicable.
- S. For galvanized conduit, apply cold galvanizing compound to all field threads.
- T. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fittings. Allow joint to cure for 20 minutes, minimum.
- U. Connections to boxes/enclosures:
  - 1. Use conduit hubs with sealing gaskets on all boxes and enclosures, except those with NEMA 1 rating.
  - 2. Use conduit hubs with sealing gaskets to fasten conduit to boxes and enclosures in damp locations, wet locations, and locations below fluid piping. For wet and corrosive locations, use stainless steel conduit hubs.
  - 3. Use two locknuts, one inside and one outside of each box and enclosure when enclosure rating is NEMA 1.

- V. Install no more than equivalent of three 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.
- W. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- X. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints per Manufacturer's best practice and recommendations.
- Y. Provide 100-lb. test nylon pull string in each conduit 2 inch or larger except sleeves and nipples.
- Z. Use suitable caps (cast metal or thermoplastic) to protect installed conduit against entrance of dirt and moisture.
- AA. Do not penetrate waterproofing membranes in the structural floor slab or foundation walls without approval by, and in a manner acceptable to the Engineer.
- BB. Install rigid metal conduit using only threaded fittings.
- CC. Install a chromium plated, spun or split type escutcheon on all exposed conduits passing through walls or ceilings.
- DD. Extend pipe sleeves 3/4 inch above finished floors.
- EE. Install a water and fire resistant caulking around all conduits passing through floors.
- FF. Provide a separate conduit run for each 480V power circuit, unless otherwise shown on drawings.
- GG. Provide separate conduit runs for 480 and 120/208/240 volts systems. Install motor feed and control wiring in the same conduit only when shown on the Drawings or as approved by the Engineer.
- HH. Install all empty conduits in floor so finished installation is flush with finished floor. Use suitable coupling and pipe plug.
- II. Arrange for all duct bank systems to drain away from buildings. Install duct bank systems to drain toward manholes or handholes.
- JJ. Provide thru wall seals on all conduits passing through foundation walls.
- KK. Provide PVC coated rigid steel conduit, at least 6 inches in the concrete and 6 inches in the soil, at all galvanized rigid steel penetrations through floors or walls into soil.
- LL. Use stainless steel hangers and straps to support PVC conduit.
- MM. Use PVC conduit fittings and bodies with PVC conduit.
- NN. Install underground warning tape 12 inches above all underground conduits.
- OO. Install underground conduit with minimum cover, in accordance with National Electric Code or utility requirements, but no less than 36 inches.

- PP. For non-concrete encased underground conduit installations, backfill the trench with sand borrow for the full width of the trench (at least 3-inches around sides and bottom of conduit) and extend the sand borrow 12-inches over the conduit.
- QQ. For penetrations in existing walls, patch with mortar and touch up paint. Match existing paint color.
- RR. For penetrations in fire rated walls, use materials that maintain the fire rating of the wall.
- SS. For penetrations in new concrete walls, provide conduit nipple cast into the concrete.
- TT. Provide conduit expansion joints for underground conduits that enter a building through an exterior wall or connect to an exterior mounted disconnect switch, meter, or other equipment.

END OF SECTION

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SECTION 26 05 33.16

BOXES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Wall and ceiling outlet/device boxes
  - 2. Pull and junction boxes
  - 3. Covers

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes and Conduit Bodies for Conduit and Cable Assemblies
- B. ANSI/NFPA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 volts maximum)
- D. UL514 A - Metallic Outlet Boxes
- E. UL514 C - Nonmetallic Outlet Boxes, Flush-Device Covers and Covers

1.3 SUBMITTALS

- A. Shop drawings, product data, and reports

1.4 PROJECT CONDITIONS

- A. Verify that the field measurements are as shown on the Drawings.
- B. Verify locations of outlets in work areas prior to rough-in.
- C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose. Include installation within 5 feet of location shown.

1.5 DESIGN REQUIREMENTS

- A. Unless otherwise specified or indicated on Drawings, NEMA rating for boxes shall correspond as follows to location classifications indicated on Drawings Outdoor locations are to be considered wet locations unless otherwise indicated.
  - 1. All locations - NEMA 4 mettalic.

PART 2 PRODUCTS

2.1 WALL AND CEILING OUTLET/DEVICE BOXES

- A. Cast Metal Outlet/Device Boxes

1. NEMA FB 1, Type FD, cast iron or copper-free aluminum with internal green grounding screw terminal.
2. Shall be suitable for use in wet locations when used with gasketed covers.
3. Cover shall be by box manufacturer, and shall have stainless steel cover screws and a neoprene gasket.
4. Boxes shall have external mounting feet cast into the box assembly, screw-in feet will not be acceptable.
5. Material and coating shall match that of the conduit system being used.
6. Provide threaded sealing conduit hubs on all conduit entries.
7. Acceptable Manufacturers
  - a. ABB Installation Products
  - b. Crouse-Hinds
  - c. Appleton
  - d. Hubbell
  - e. or equal

## 2.2 PULL AND JUNCTION BOXES

### A. Cast Metal Pull and Junction boxes

1. NEMA FB 1, type 4 cast iron or copper-free aluminum
2. Shall be suitable for use in wet locations when used with gasketed covers.
3. Cover shall be by box manufacturer, and shall have stainless steel cover screws and a neoprene gasket.
4. Material and coating shall match that of the conduit system being used.
5. Boxes shall have external mounting feet cast into the box assembly, screw-in feet will not be acceptable.
6. Provide threaded sealing conduit hubs on all conduit entries.
7. Provide green grounding screw.
8. Acceptable Manufacturers
  - a. Crouse-Hinds
  - b. Appleton
  - c. Hubbell, Inc.
  - d. or equal

## 2.3 COVERS

- A. Provide covers for all boxes. Cover material and coating shall match the box, unless otherwise specified. Covers shall be screw fastened or hinged and comply with NEMA Standards OS 1, OS 2 or FB 1.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. All junction boxes and pull boxes associated with the fire alarm system shall be field painted red with a red cover.
- B. Install electrical boxes as shown on Drawings. Provide additional boxes as required to comply with NFPA 70 requirements, for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Provide separate boxes for 480 and 120/208/240 volts systems. Install motor feed and control wiring in the same box only when shown as combined in a single raceway on the Drawings or as approved by the Engineer.
- D. Install electrical boxes to maintain headroom and to present neat mechanical appearance.
- E. Boxes shall not be mounted to the floor in damp, wet or corrosive locations.
- F. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- G. Secure flush mounting box to interior wall without damaging wall insulation or reducing its effectiveness. Accurately position to allow for surface finish thickness.
- H. Do not fasten boxes to ceiling support wires.
- I. Fasten boxes to walls, ceilings or strut supports; do not support boxes from equipment, panels, etc.
- J. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- K. Use gang box where more than one device is mounted together. Do not use sectional box.
- L. Provide permanent barriers in common boxes to limit voltage between adjacent switches to 300 volts or less.
- M. Common boxes used for gang installation with switches, receptacles, and low voltage devices shall include barriers between the devices and the switches or receptacles.
- N. Through-the-wall outlet boxes shall not be permitted. Outlet boxes shall not be installed back-to-back but shall be staggered on opposite sides of partitions a minimum of 12" on center.
- O. The Contractor shall furnish and install outlet boxes for all wiring devices as shown on the drawings.
- P. Use sealing conduit hubs on all conduit entries in damp and wet locations.

#### 3.2 ADJUSTING

- A. Install knockout closure in unused box opening.

END OF SECTION

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SECTION 26 05 43

DUCT BANKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Handholes
  - 2. Installation of duct banks
  - 3. Installation of handholes
- B. Related Sections
  - 1. Section 31 23 00 - Excavation, Backfilling and Compaction
  - 2. Section 03 10 00 - Concrete Forms and Accessories
  - 3. Section 03 20 00 - Concrete Reinforcement
  - 4. Section 03 30 00 - Cast-In-Place Concrete

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
- B. ANSI/NEMA FB1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- C. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- D. ANSI/SCTE 77-2007 - Specification for Underground Enclosure Integrity

1.3 SUBMITTALS

- A. Manufacturer's shop drawings
- B. Project data

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 5 years documented experience.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of duct bank prior to excavation for rough-in.
- C. Duct bank routing is shown on Drawings in approximate locations unless dimensions are indicated. Route as required to complete duct system.

## PART 2 PRODUCTS

### 2.1 PRECAST CONCRETE HANDHOLES

- A. Manufacturers
  - 1. Chase Precast Products
  - 2. Nashua Precast
  - 3. Arrow Concrete Products or equal
- B. Description
  - 1. Concrete Strength: Portland Cement Type I or II, air-entrained, 4500 psi compressive strength at 28 days; density 150 pcf
  - 2. Construction – bottomless, in modular sections with tongue and groove joints
  - 3. Inside dimensions – as required by NEC Article 314.28
  - 4. Knockouts for duct entry
- C. Handhole Frames and Covers:
  - 1. Material: Machined cast iron.
  - 2. Cover Type: Indented, solid top design, with two drop handles each.
  - 3. Cover Loading: AASHTO H-20.
  - 4. Cover Designation: Cast, on upper side, in integral letters, minimum 2 inches in height, appropriate titles:
    - a. Above 600 Volts: ELECTRIC HV.
    - b. 600 Volts and Below: ELECTRIC LV.
    - c. COMMUNICATIONS
    - d. TELEPHONE

### 2.2 POLYMER CONCRETE HANDHOLES

- A. Description
  - 1. Material shall be a polyester resin in combination with selectively graded aggregates.
  - 2. Material shall be resistant to ultraviolet light and unaffected by moisture and freezing.

3. Loading – Designed to meet ANSI/SCTE 77-2007 requirements for Tier 22 (33,750 lbs) applications.
4. Dimensions – as required, or as indicated on the Drawings.
5. Lid shall be provided by same manufacturer.
6. Any and all hardware required shall be stainless steel.

B. Manufacturers

1. Quazite - Composolite
2. Newbasis
3. or equal

2.3 ACCESSORIES

A. Duct Bank Spacers

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturers
  - a. Underground Device, Inc.
  - b. Carlon.

B. Identification Devices

1. Raceway Tags
  - a. Material: Permanent, nylon or polyethylene.
  - b. Shape: Round.
  - c. Raceway Designation: Pressure stamped, embossed, or engraved.
  - d. Tapes relying on adhesives or taped-on markers not permitted.

PART 3 EXECUTION

3.1 DUCT BANK INSTALLATION

- A. Install duct in accordance with manufacturer's instructions.
- B. Install duct to locate top of duct bank at depths as indicated on drawings (or at 36 inches below grade depths not indicated on drawings).
- C. Install duct with minimum slope of 1.5 inches per 100 feet. Slope duct away from building entrances.
- D. Cut duct square using saw or pipe cutter; de-burr cut ends.
- E. Insert duct to shoulder of fittings; fasten securely.
- F. Join nonmetallic duct using adhesive as recommended by manufacturer.

- G. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- H. Install no more than equivalent of three 90 degree bends between pull points.
- I. Provide suitable fittings to accommodate expansion and deflection where required.
- J. Terminate duct at manhole/handhole entries using end bell.
- K. Stagger duct joints vertically in concrete encasement 6 inches minimum.
- L. Use suitable separators and chairs installed not greater than 4 feet on centers.
- M. Separate conduits by at least 7.5 inches center-to-center in duct banks.
- N. Band ducts together before placing concrete.
- O. Securely anchor duct to prevent movement during concrete placement.
- P. For concrete encased ductbanks, provide the following:
  - 1. Poured in place concrete in accordance with the provisions of Sections 03 10 00, 03 20 00, and 03 30 00.
  - 2. Minimum 3-inch concrete cover at bottom, top, and sides of duct bank.
  - 3. Two No. 4 steel reinforcing bars in top of bank under paved areas.
  - 4. Connect to existing concrete encasement using dowels.
- Q. Excavation, backfill and compaction of trenches shall be performed under provisions of Section 31 23 00.
- R. Provide suitable pull string in each empty duct except sleeves and nipples.
- S. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
- T. Handhole sizes shall be as required by code.
- U. Provide handholes where shown on the Drawings and provide additional handholes and manholes where required to meet code, meet Utility requirements, and as required to pull wiring without damaging insulation. Coordinate locations of additional handholes with the Engineer.

### 3.2 PREPARATION FOR INSTALLATION OF HANDHOLES

- A. Contractor shall provide excavation, installation of base material, and compaction of base material in accordance with the provisions of Section 31 23 00.

### 3.3 INSTALLATION – PRECAST CONCRETE HANDHOLES

- A. Install and seal precast sections in accordance with manufacturer's instructions.
- B. Install handholes plumb.
- C. Set the top of each handhole to finished grade.

### 3.4 INSTALLATION – POLYMER CONCRETE HANDHOLES

- A. Install and seal sections in accordance with manufacturer's instructions.
- B. Install handholes plumb.

- C. Set the top of each handhole to finished grade.

### 3.5 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of exact routing of duct bank.
- B. Accurately record actual locations of each handhole.

END OF SECTION

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SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Nameplates
  - 2. Wire and cable markers

1.2 REFERENCES

- A. NEMA WC5 - Thermoplastics - Insulated Wire and Cable for Transmission and Distribution of Electrical Energy
- B. ANSI C57

1.3 SUBMITTALS

- A. Provide schedule for nameplates.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Engraved two-layer plastic, white letters on a black background
- B. Nameplate Wording:
  - 1. Wording of the nameplates shall be in conformance with Drawings and acceptable to the Owner.
  - 2. Wording of the nameplates for each piece of equipment shall be based on the common name and tag number (when applicable) of the equipment.

2.2 WIRE AND CABLE MARKERS

- A. Wires up to AWG10: Split sleeve or tubing type waterproof markers (Thomas & Betts, Panduit, Burndy or equal).
- B. Wires AWG8 and larger: Plastic impregnated cloth markers, resistant to abrasion, moisture, dirt and oil (Ideal, Panduit, Brady or equal).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using ASA Type U drive screws, and water-resistant adhesive. Secure nameplate to face of panelboard doors one third of the way down from the top of the door. Embossed tape will not be permitted for any application.

### 3.2 WIRE IDENTIFICATION

- A. Provide wire markers on each end of each conductor in panelboard gutters, pull boxes, outlet and junction boxes, switchgear, switchboards, motor control centers, control panels, at each load connection and at each terminal board connection. Identify wiring as following:
  - 1. Power and lighting circuit wires: Wire markers shall identify (a) power source/panelboard name and circuit ID number (e.g. "LP-1,2,3"), and (b) load/equipment name (e.g. "VFD 1").
  - 2. Control & signal wiring: The identification on wire markers shall match the ID tag number of the wire/terminal shown on the associated equipment shop drawings.
- B. Circuits passing through junction boxes shall be individually grouped and bound with Ty-raps.
- C. Include the following color coding of all conductors used for power or lighting circuits.
  - 1. 120/240 volt, single phase 3 wire
    - a. Black - Phase A
    - b. Red - Phase B
    - c. White - Neutral
    - d. Green - Equipment ground
  - 2. 120/208 volt, three phase 4 wire
    - a. Black - Phase A
    - b. Red - Phase B
    - c. Blue - Phase C
    - d. White - Neutral
    - e. Green - Equipment ground
  - 3. 277/480 volt 3 phase 4 wire
    - a. Brown - Phase A
    - b. Orange - Phase B
    - c. Yellow - Phase C
    - d. Gray - Neutral
    - e. Green - Equipment ground
- D. Color coding of multiconductor control cables shall be in accordance with NEMA Standard WC5.



### 3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
- B. Panelboards - ¼ inch to identify equipment designation, 1/8 inch to identify voltage rating and source.
- C. Switches in Panelboards - ¼ inch to identify circuit and load served, including location.
- D. Motor Starters - ¼ inch to identify circuit and load served, including location.
- E. Individual Circuit Breakers, Enclosed Switches, Remote Operator Stations, Time Clocks, Control Devices, and Motor Starters - 1/8 inch to identify load served.
- F. Transformers - ¼ inch to identify equipment designation, 1/8 inch to identify primary and secondary voltages, primary source, and secondary load and location. Power transformer nameplates shall be in accordance with ANSI C57.
- G. Pumps, fans, and other electrical equipment - ¼ inch to identify circuit and equipment designation.
- H. Equipment with More Than One Power Source, Including Motors with Heaters - ¼ inch to identify power sources. Mount nameplate on motor disconnect switch, equipment enclosure, or other prominent location.
- I. Provide a red nameplate/marker stating “Fire Alarm” tag at the circuit breaker feeding fire alarm system equipment, ELOCK-FA circuit lockout kit by Space Age Electronics or equal.

END OF SECTION

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SECTION 26 08 00

ELECTRICAL TESTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Testing of Electrical Systems - General
2. Electrical Test Equipment
3. Electrical Test Procedures
4. Specific Electrical Tests
5. System Function Tests

B. Related Sections

1. Section 26 05 26 – Grounding and Bonding
2. Section 26 05 53 – Electrical Identification

1.2 REFERENCES

- A. Massachusetts Electrical Code
- B. NFPA 79 – Electrical Standard for Industrial Machinery
- C. ANSI/ISA-S5.4 – Instrument Loop Diagrams
- D. ANSI C37

1.3 SUBMITTALS

- A. General: Testing shall be performed, with satisfactory results, prior to connecting and energizing equipment. Problems discovered as a result of testing shall be corrected and retesting performed prior to connecting and energizing equipment.
- B. The following test reports shall be submitted
  1. Megger test results
  2. Wire and cable continuity test results
  3. Grounding system test results
  4. System functional test reports

PART 2 PRODUCTS – NOT USED

## PART 3 EXECUTION

### 3.1 TESTING OF ELECTRICAL SYSTEMS - GENERAL

- A. Provide supervision, labor, materials, tools, test instruments and other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the various electrical and control systems and circuitry throughout the contract.
- B. Pay for all tests specified in Division 26, including expenses incident to re-tests occasioned by defects and failures of equipment to meet specifications. Unless otherwise specified, the Owner will supply the electric current necessary for tests.
- C. After completion of testing replace wiring and equipment found defective (defined as failing to meet specified requirements).
- D. Do not void equipment warranties or guarantees by testing and checkout work. Checks and tests shall be supplemental to and compatible with the manufacturer's installation instructions. Where deviations are apparent, obtain the manufacturer's approved review of procedure prior to testing. Where any repairs, modifications, adjustments, tests or checks are to be made, contact the Engineer to determine if the work should be performed by or with the manufacturer's representative. All checks and tests specified for proper operating and safety of equipment and personnel are to be performed concurrent with progression of the work, prior to final acceptance by the Owner.
- E. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action requires Engineer's approval prior to re-testing, and inspection.
- F. Prior to testing and start-up, equipment and wiring shall be properly and permanently identified with nameplates, and other identification as specified in Section 26 05 53. Check and tighten terminals and connection points, remove shipping blocks and thoroughly clean equipment, repair damaged or scratched finishes, inspect for broken and missing parts and review and collect manufacturer's drawings and instructions for delivery to the Engineer. Make routine checks and tests as the job progresses to ensure that wiring and equipment is properly installed.
- G. Testing and checkout work is to be performed with fully qualified personnel skilled in the particular tests being conducted. Personnel are to have at least 5 years of experience with tests of same type and size as specified.
- H. Conduct tests in presence of the Engineer. Notification is required 7 calendar days or more in advance when any test is to be performed, and do not start tests without approval.
- I. Make openings in circuits for test instruments and place and connect instruments, equipment, and devices, required for the tests. Upon completion of tests, remove instruments and instrument connections and restore circuits to permanent conditions.
- J. Identify test being performed, conductor or equipment the test is being performed on, date the test was performed, value of test results, person performing the test, the witness to the test, and the serial and model number and description of test instrument. Arrange information in tabular form and submit to the Engineer for approval.

- K. When the electrical tests and inspections specified or required within Division 26 are complete and results reported, reviewed, and approved, that portion of the electrical equipment system or installation may be considered electrically complete. Affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "notification of Substantial Electrical Completion" for approval by the Engineer following the Engineer's acceptance of electrical completion. If later in-service operation or further testing identifies problems attributable to the Contractor, these will be corrected.

### 3.2 ELECTRICAL TEST EQUIPMENT

- A. Test equipment used is to be inspected and calibrated.
- B. Perform calibration and setting checks with calibrated test instruments of at least twice that of the accuracy of the equipment, device, relay or meter under test. Dated calibration labels shall be visible on test equipment. Calibrations over 6 months old are not acceptable on field test instruments. Inspect test instruments for proper operation prior to proceeding with the tests.
- C. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.

### 3.3 TEST PROCEDURES

- A. Prepare procedures and schedules for the work specified herein. This work is to be coordinated and compatible with both the work and schedule of the other crafts. Sequence the tests and checks so that the equipment can be energized immediately after the completion of the application tests.
- B. The test procedures shall provide specific instructions for the checking and testing of each electrical component of each system. Schedule tests and inspections as the job progresses.
- C. Testing and checkout work shall be conducted in a safe manner. Provide the following special safety precautions, as appropriate:
  - 1. Locking and tagging procedures
  - 2. Barricades
  - 3. Deenergization and/or isolation of equipment prior to testing
  - 4. Review of procedures with the Engineer and Resident Project Representative
  - 5. Erection of warning signs
  - 6. Stationing of guards and watchmen
  - 7. Maintenance of voice communications
  - 8. Personnel orientation

- D. Before energizing any machine, visually inspect for serviceability. Check manufacturer's instruction manual for correct lubrication and ventilation. Align motor with driven equipment. Check nameplate for electrical power requirements.
- E. Insulation resistance measurements for motor feeders shall be performed with motors disconnected, measure insulation resistance from load side of contactors or circuit breakers.
- F. Perform insulation tests at the following times and conditions:
  - 1. Prior to energization and/or placing into service.
  - 2. When damage to the insulation is suspected or known to exist.
  - 3. After repairs or modifications to the equipment affecting the insulation.
  - 4. Where lightning or other surge conditions are known to have existed on the circuit.
- G. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values.

### 3.4 SPECIFIC ELECTRICAL TESTS

- A. Motors
  - 1. Perform insulation tests on motor windings and record results.
- B. Wire and Cable
  - 1. For all 480 volt circuits, megger test the insulation of every external circuit wire to each other and to ground. Tests shall be conducted at voltages of 1,000 V DC and record results.
  - 2. Continuity test each control and/or low voltage (below 480 volts) wire and cable to verify the field applied tag per conductor and record results.
- C. Perform insulation tests on electrical equipment, apparatus, transformers, power circuit breakers and switches, and similar electrical equipment.
- D. Operator and Instrument Control Panels, and Other Miscellaneous Equipment
  - 1. Upon completion of equipment installation, visually and functionally test equipment and their control devices for tightness of connections and for proper operation. Follow manufacturer's recommended test and installation manuals upon review and approval by the Engineer. In the case of operator panels and cabinets or devices used solely for control, functionally test each circuit for proper operation and compliance with the Drawings and Specifications. Where functional testing is deemed undesirable by the Engineer from a safety or plant operational standpoint, then continuity and terminal connection verification checks will be acceptable.
- E. Grounding Systems
  - 1. Test in accordance with Section 26 05 26.

- F. Verify systems are left in normal operating mode or position, transfer and restoration schemes are enabled, and monitoring and protection devices are operational.

END OF SECTION

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## SECTION 26 12 00

### DRY TYPE TRANSFORMERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
- B. Dry type two winding transformers

##### 1.2 REFERENCES

- A. ANSI/NEMA ST 20 - Dry Type Transformers for General Applications

##### 1.3 SUBMITTALS

- A. Include outline and support point dimensions of enclosures and accessories, unit weight, voltage, KVA, impedance ratings and characteristics, loss data, efficiency at 25, 50, 75 and 100 percent rated load, sound level, tap configurations, insulation system type, and rated temperature rise.
- B. Nameplate data per NEMA ST20-3.26

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to site and store in a warm, dry location with uniform temperature. Cover ventilating openings to keep out dust.
- B. Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow if handled in inclement weather.

#### PART 2 PRODUCTS

##### MANUFACTURERS

- A. Eaton
- B. Square D
- C. Siemens
- D. Or equal

##### 2.2 DRY TYPE TWO WINDING TRANSFORMERS

- A. Dry Type Transformers: ANSI/NEMA ST 20; factory-assembled, air cooled dry type shielded transformers; ratings as shown on the Drawings

##### 2.3 INSULATION SYSTEM

- A. Transformers shall be insulated as follows:
  - 1. 15 kVA and above: Class C insulation for 220°C total temperature, based on 150°C rise.

- B. Required performance shall be obtained without exceeding the above indicated temperature rise in a 40°C maximum ambient, with a 30°C average ambient over 24 hours.
- C. All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

#### 2.4 CORE AND COIL ASSEMBLIES

- A. Transformer core shall be constructed with high grade, non-aging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The transformer core volume shall allow efficient transformer operation at 10 percent above the highest tap voltage. The core laminations shall be tightly clamped and compressed.
- B. Coils shall be wound of electrical grade aluminum with continuous wound construction. The complete coil and core shall be isolated from the enclosure by means of rubber, vibration absorbing mounts.
- C. On units rated below 15 kVA, the core and coil assembly shall be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moisture-proof, shock resistant seal.
- D. On units rated 15 kVA and above, the core and coil assembly shall be impregnated with a non-hydroscopic, thermo-setting varnish and cured to reduce hot spots and seal out moisture. The assembly shall be installed on vibration-absorbing pads and securely bolted to the base to minimize sound transmission.
- E. Windings shall be totally enclosed and the transformers shall be capable of continuous operation at rated load, voltage and frequency in accordance with ANSI C57.96. The coils shall be thoroughly insulated from the bushings and from each other. Bushings shall be built into coils. The complete coil and core assembly shall be impregnated with waterproofing material having high-insulating and good heat-conducting properties, in accord with NEMA ST-20.

#### 2.5 ENCLOSURES

- A. The enclosure shall be made of heavy gauge steel and shall be degreased, cleaned, primed, and finished with ANSI 61 color weather-resistant enamel. All transformers shall be equipped with a wiring compartment suitable for conduit entry from top, bottom and/or sides, and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90°C. The core of the transformer shall be visibly grounded to the enclosure.
- B. The enclosure construction shall be ventilated, NEMA 2, dripproof, with lifting holes. All ventilation openings shall be protected against falling dirt. On outdoor units, provide suitable weathershields over ventilation openings.
- C. Ventilation openings shall be designed such that foreign objects inserted through these openings are deflected from energized parts.

#### 2.6 RATINGS

- A. Transformers 15KVA and above shall have voltage and kVA ratings indicated on the drawings, with four 2-1/2% taps – two above and two below rated voltage.
- B. Dry-type transformers shall be low-loss type with minimum efficiencies per 2016 Department of Energy (DOE) standards.
- C. Transformer sound levels shall not exceed the following ANSI and NEMA levels for self-cooled ratings:
  - 1. 10 to 50KVA – 45dB

## 2.7 WIRING/TERMINATIONS

- A. Recommended external cable shall be rated 90 degrees C for all designs. Connectors should be selected on the basis of the type and cable size used to wire the specific transformer. Provide primary and secondary lugs per the Tighe & Bond transformer schedules.

## 2.8 MISCELLANEOUS

- A. All terminal compartments shall be located near the bottom of the transformers.
- B. Mounting: Transformers shall be suitable for floor or wall mounting as shown on the Drawings.
- C. Isolate core and coil from enclosure using vibration-absorbing mounts.
- D. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.
- E. Terminal Connections: Copper bus or lead wire

## PART 3 EXECUTION

### 3.1 INSTALLATION OF TRANSFORMERS

- A. Set transformer plumb and level.
- B. Mount transformers on vibration isolating pads for isolating the transformer noise from the building.
- C. Name all wiring connections, including grounding.
- D. Install separate grounding electrode for bonding of neutral and all ground connections and grounding electrode system.
- E. Furnish and install supports for all transformers.

### 3.2 FIELD QUALITY CONTROL

- A. Check for damage and tight connections prior to energizing transformer.
- B. Measure primary and secondary voltages and make tap adjustments.
- C. Perform routine, design, prototype, and sound level tests for each unit rating.

END OF SECTION

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## SECTION 26 24 16

### PANELBOARDS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Panelboards
  - 2. Molded case circuit breakers
- B. Related Sections
  - 1. Section 26 05 53 – Electrical Identification
  - 2. Section 26 28 16– Circuit Breakers

##### 1.2 REFERENCES

- A. NEMA PB 1 - Panelboards.
- B. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less

##### 1.3 SUBMITTALS

- A. Provide outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS - PANELBOARDS

- A. Panelboards, 208/120 volt with mains from 100 amperes to 400 amperes, max 42-84 branch circuits and no branch breakers over 100 amperes, shall be:
  - 1. Eaton, PRL-1
  - 2. Square D, NQ
  - 3. Siemens, P1
  - 4. ABB/General Electric, AQ
  - 5. or equal

##### 2.2 PANELBOARDS

- A. Panelboards: NEMA PB-1; circuit breaker type
- B. Enclosure: As indicated in drawings.
- C. Provide cabinet front with hinged cover, and hinged door with flush lock. Finish in manufacturer's standard gray enamel.

- D. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards. Provide separate insulated neutral bus, where required.
- E. Provide factory installed lockable hasps for all breakers.
- F. Provide an integral surge protection device (SPD) where shown on drawings.
- G. Ratings
  - 1. All panels and individually mounted circuit breakers shall have short circuit ratings as specified in Section 26 05 00.
  - 2. All panelboards shall be UL listed and labeled. Panels shall have ratings not less than the short circuit ratings available from the power sources.
  - 3. Panelboards shall be labeled with a UL short circuit rating. Panelboards shall be fully rated.
- H. Trims
  - 1. Trims for all panelboards shall be supplied with a door-in-hinged-door. Interior door shall cover all circuit breaker handles and not uncover any live parts. Outer hinged door shall have a piano/continuous hinge and shall open to provide access to all wire gutter space on both sides of circuit breakers. Doors shall have a semi-flush cylinder lock and catch assembly. Doors over 48 inches in height shall have auxiliary fasteners. Refer to drawings for surface or recessed mounted. Switching device handles shall be accessible.

### 2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Provide circuit breakers in accordance with Section 26 28 16.
- B. Provide bolt-in circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
- C. Provide factory installed lockable hasps for all breakers.
- D. Field-Adjustable Trip Circuit Breaker: NEMA AB 1; provide circuit breakers with frame sizes 200 amperes and larger with mechanism for adjusting long time, short time continuous current, short time, long time pickup current, and instantaneous setting for automatic operation.
- E. Trip-free mechanism independent of manual handle control.
- F. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- G. Provide ground fault interrupter circuit breakers for circuits indicated on Drawings.
- H. Do not use single pole breakers with handle tie for multipole use.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Panel board shall be wall mounted as shown on the Drawings.

- B. Install wall mounted panelboards plumb in conformance with NEMA PB 1.1, at a height of 6 feet to the top of the panelboard.
- C. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- D. Make all electrical connections including grounding.
- E. Provide engraved nameplates in accordance with Section 26 05 53.
- F. Provide a red marking "Fire Alarm Circuit" on the fire alarm control panel circuit breaker. Provide a red lock for this circuit breaker indicating "Fire Alarm", ELOCK-FA circuit lockout kit by Space Age Electronics or equal. Provide a permanent sign for the fire alarm control panel stating the location of this circuit breaker.

### 3.2 FIELD QUALITY CONTROL

- A. With all equipment connected and functioning normally, measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20%, rearrange circuits in the panelboard to balance the phase loads within 20%. Take care to maintain proper phasing for multi-wire branch circuits.
- B. Visual and Mechanical Inspection - Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

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SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Wall switches
  - 2. Occupancy Sensors
  - 3. Receptacles
  - 4. Cover plates
  - 5. Miscellaneous
- B. Related Sections
  - 1. Section 26 05 33.16 - Boxes

1.2 SUBMITTALS

- A. Product Data: Provide catalog sheets for wiring devices.

PART 2 PRODUCTS

2.1 WALL SWITCHES

- A. Single Pole Switch - 20 Amp, 120/277 VOLT
  - 1. Specification grade, standard toggle, handle color shall be brown
    - a. Hubbell - Model 1221
    - b. Equal by Pass & Seymour
    - c. Equal by Bryant
    - d. or equal
- B. Dimmer Switch – 8A 120/277V Switch with 0-10V dimming controls
  - 1. Specification grade, compatible with controlled fixtures and rated for the wattage of the controlled lighting circuit.
  - 2. Manufacturers
    - a. Leviton
    - b. Lutron – DVSTV
    - c. Cooper

2.2 RECEPTACLES

- A. Single 20A, 125V, 1 phase, 3 wire, grounding

1. Heavy duty, specification grade, nylon, straight blade, brown
  - a. Hubbell - Model 5361
  - b. Equal by Pass & Seymour
  - c. Equal by Bryant
  - d. or equal
- B. Duplex 20A, 125 V, 1 phase, 3 wire, grounding
  1. Specification grade, nylon, straight blade, brown
    - a. Hubbell - Model 5362
    - b. Equal by Pass & Seymour
    - c. Equal by Bryant
    - d. or equal
- C. GFI/GFCI Receptacle - 20 A, 120 V duplex
  1. Specification grade, nylon, brown, straight blade, brown
    - a. Hubbell - Model GFR5362
    - b. Equal by Pass & Seymour
    - c. Equal by Bryant
    - d. or equal

## 2.3 COVER PLATES

- A. Decorative Cover Plate - smooth stainless steel
  1. Hubbell - Catalog Number
    - a. One gang GFCI duplex receptacle - S26
    - b. One gang toggle switch - S1
    - c. Two gang toggle switch - S2
    - d. Three gang toggle switch - S3
    - e. Four gang toggle switch - S4
    - f. Blank, one gang - S13
  2. Equal by Pass & Seymour
  3. Equal by Bryant
  4. or equal
- B. Weatherproof Cover Plate – copper free aluminum, for general use snap switches in cast device boxes, including gasket
  1. Crouse - Hinds – Cat. No. DS181

2. Equal by Killark
  3. Equal by Appleton
  4. or equal
- C. Lockable Toggle Switch Cover, Metallic – Die cast aluminum snap switch cover with exposed lockable switch and gasket.
- a. Eaton DS185
  - b. Equal by Killark
  - c. Equal by Thomas & Betts
- D. Weatherproof Cover – Weatherproof while in use type for outdoor, wet and damp locations.
1. Sealing gasket and stainless steel mounting screws, for duplex GFCI receptacle, vertical orientation
  2. Cast metal base and cast metal cover where metallic conduit is used and nonmetallic PVC base and clear polycarbonate cover where nonmetallic conduit is used.
- a. ABB Red Dot Installation Products
  - b. Equal by Hubbell, Inc.
  - c. Equal by Pass & Seymour
  - d. Equal by Bryant

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

#### 3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

#### 3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on bottom.

- E. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
- F. Connect wiring devices by wrapping conductor around screw terminal.
- G. Install corrosion resistant, weatherproof cover plates on all devices located outside in areas subject to water spray or as indicated on drawings. Cover plate material and coating shall match the box unless otherwise specified.
- H. Install decorative stainless steel plates on switches and receptacles in other dry areas.
- I. Install weatherproof while in use type covers for receptacles located outdoors and in damp or wet locations.
- J. Use jumbo size plates for outlets installed in masonry walls.
- K. Install galvanized steel plates on metallic outlet boxes and junction boxes in unfinished areas, and on surface mounted outlets.
- L. Use stainless steel screws and hardware for mounting, device plates, fixtures, etc. in wet, damp, and corrosive areas.

#### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 to obtain mounting heights specified and indicated on Drawings.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 18 inches above finished floor unless otherwise noted on plans.

#### 3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

#### 3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

END OF SECTION

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SECTION 26 28 16

SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Circuit Breakers
  - 2. Switch Assemblies
- B. Related Sections
  - 1. Section 26 05 29 – Electrical Hangers and Supports

1.2 REFERENCES

- A. NEMA AB 1 - Molded Case Circuit Breakers.
- B. NEMA KS 1 – Enclosed Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

1.3 SUBMITTALS

- A. Shop drawings, product data, and reports.
- B. Circuit breaker trip current and let-through current curves, outline dimensions, and terminal lug sizes.

1.4 REGULATORY REQUIREMENTS

- A. Use circuit breakers and switch assemblies listed by Underwriter's Laboratories, Inc., and suitable for specific application.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eaton
- B. Square D
- C. Siemens
- D. Or equal

2.2 MOLDED CASE CIRCUIT BREAKER

- A. CIRCUIT BREAKER: NEMA AB-1. FS W-C-375.
- B. Service Conditions:
  - 1. Temperature: 40 C.
- C. Interrupting Rating: For circuit breakers that are part of a panelboard or other equipment, the interrupting rating shall be equal to or greater than that of the

equipment. For stand-alone circuit breakers, the interrupting rating shall be a minimum of that listed in 26 05 00.

- D. Enclosure: NEMA 12 dust tight industrial indoor dry locations, NEMA 3R raintight (lockable) for outdoor locations, NEMA 4 for wet and damp locations, unless otherwise noted on the drawings.
- E. Configuration: Inverse time automatic tripping. Instantaneous automatic tripping, for motor circuit protection.
- F. Field-Adjustable Trip Circuit Breaker: NEMA AB 1; provide circuit breakers with frame sizes 200 amperes and larger with mechanism for adjusting long time, short time continuous current, short time, long time pickup current, and instantaneous setting for automatic operation.
- G. Ratings: NEMA AB 1; as scheduled.
- H. Provide a lockable hasp with each circuit breaker.

### 2.3 SWITCH ASSEMBLIES

- A. Interrupting Rating: The interrupting rating shall be a minimum of that specified in section 26 05 00.
- B. Nonfusible Switch Assemblies: NEMA KS 1; FS W-S-865; heavy duty, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF and ON positions.
- C. Fusible Switch Assemblies: NEMA KS 1; FS W-S-865; heavy duty, quick-make, quick-break load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF and ON positions. Fuse Clips: FS W-F-870. Designed to accommodate Class R fuses unless otherwise indicated.
- D. The switch ampacity shall meet or exceed the circuit ampacity shown on the drawings.
- E. Accessories:
  - 1. Unless shown otherwise, provide all fusible disconnect switches with fuses rated for the full ampacity of the disconnect switch frame.
- F. Enclosure: NEMA 12 for indoor dry locations, NEMA 3R raintight (lockable) for outdoor locations, and NEMA 4 for wet and damp locations. For corrosive areas, provide NEMA 4X nonmetallic enclosures.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify field measurements are as shown on Drawings.
- C. Verify that required utilities are available, in proper location, and ready for use.

### 3.2 INSTALLATION

- A. Install circuit breakers and switch assemblies where shown on Drawings, in accordance with manufacturer's instructions.
- B. Provide all necessary hardware and supports and make all wiring connections.
- C. Support equipment of this Section in accordance with Section 26 05 29.
- D. Provide fuses in all fusible switch assemblies, whether fuses are shown on the drawings or not. For HVAC equipment, coordinate fuse size required with HVAC contractor.

### 3.3 ADJUSTING

- A. Adjust trip settings so that circuit breakers coordinate with other overcurrent protective devices in the circuit. Use trip settings provided by the Engineer. Coordinate with Engineer to request settings at least 2 weeks prior to starting up the equipment.

### 3.4 FIELD QUALITY CONTROL

- A. Inspect visually and perform several mechanical ON-OFF operations on each circuit breaker and switch assembly.
- B. Verify circuit continuity on each pole in closed position.

END OF SECTION

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SECTION 26 51 00

LUMINAIRES

PART 1 GENERAL

1.1 SUMMARY

- A. Examine all drawings and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.
- B. Coordinate work with that of all other Trades affecting or affected by work of this Section. Cooperate with such Trades to ensure the steady progress of all work under the Contract.
- C. Provide all material, labor and equipment, to complete the work of this Section in strict accordance with the design engineer's plans and specifications, and with all applicable codes, rules, and standards.
- D. The work under this Section shall include furnishing and installing interior and exterior lighting fixtures.
- E. The work under this Contract shall also include all labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items essential for proper installation and operation, even though not specifically mentioned or indicated on the drawings, but which are usually provided or are essential for proper installation and operation of all systems as indicated on the drawings and specified herein.
- F. The specifications and drawings describe the minimum requirements that must be met by the Contractor for the installation of all work as shown on the drawings and as specified hereinunder.

1.2 SUBMITTALS

- A. Prepare and submit complete shop drawings of lighting fixtures required on this project to the Engineer for approval. Refer to specification section 01 33 00 for additional information.
- B. Submit samples of each material under this Section requested by the Engineer for approval. Samples shall be in size and form requested by the engineer, and reasonable to show characteristics, color and finishes of the materials.
- C. Submit complete manufacturer's product data of all materials and systems to the engineer for approval, consisting of complete product description and specifications, complete performance test data, complete preparation and installation instructions, dimensions and all other pertinent technical data required for complete product and product use information.
- D. All shop drawings shall have clearly marked the appropriate specification number of drawing designation for identification of the submittal.
- E. Disposition of shop drawings shall not relieve the Contractor from the responsibility for deviations from drawings or specifications unless he has submitted, in writing, a

letter itemizing or calling attention to such deviations at time of submission and secured written approval from the Engineer, nor shall such disposition of shop drawings relieve the Contractor from responsibility for errors in shop drawings or schedules.

F. Shop drawings, samples, test data and certificates shall be submitted for approval in accordance with the requirements of the Contract Documents. Fixtures or other materials shall not be shipped, stored or installed into the work unless prior approval has been received, based upon the submittal of shop drawings, samples, catalogue cuts, test data, certificates or other materials submitted for approval. Make modifications to fixtures in accordance with Engineers comments concerning submittals, as a part of the work of this Section.

1. For each and every light fixture type the manufacturer shall submit the following information in the order listed below.

- a. Light fixture cut sheet
- b. Fixture accessories
- c. Ballast/Driver cut sheet
- d. Lamp cut sheet

### 1.3 REFERENCED STANDARDS

A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of, the Contract Documents:

1. NFPA 70: National Electrical Code
2. UL: Underwriters' Laboratories
3. NEC: National Electrical Code
4. CBM: Certified Ballast Manufacturers Association
5. IES: Illuminating Engineering Society
6. ASTM: American Society for Testing and Materials
7. ANSI: American National Standards Institute

### 1.4 SUBSTITUTIONS

A. No substitutions shall be permitted. The Contractor shall submit one (1) of the fixtures listed for each fixture type as indicated on the lighting fixture schedule.

### 1.5 COORDINATION

A. For exterior pole mounted fixtures, furnish bolt templates and pole mounting accessories to installer of pole foundations.

### 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of materials shall be made to the project by the materials supplier in accordance with the instructions of the Contractor.

- B. The Contractor shall provide adequate storage space for the materials, shall be responsible for all items of materials after receipt from the supplier, and shall replace all materials lost or damaged after delivery and receipt.
- C. The Contractor shall furnish the materials supplier with receipts for all materials and accessory items received, and shall send copies of these receipts to the Engineer.

## PART 2 MATERIALS

### 2.1 GENERAL

- A. Provide materials, equipment, appurtenances and workmanship for the work of this Section conforming to the highest commercial Standards as specified and indicated on the drawings. Make fixture parts and components not specifically identified or indicated on the drawings, of materials most appropriate to their use or function, and resistant to corrosion and to thermal and mechanical stresses encountered in the normal application and function of the fixtures.

### 2.2 MARKING OF FIXTURES

- A. Where applicable, mark fixtures according to proper lamp type. Provide markings that are clear and readily visible to service personnel, but invisible from normal viewing angles when lamps are in place.

### 2.3 MATERIALS AND FABRICATION

- A. Provide fixtures, completely factory assembled, wired, and equipped with necessary sockets, wiring, shielding, reflectors, channels, lenses and other parts and appurtenances necessary to complete the fixture installation and deliver to project site ready for installation.

### 2.4 FINISHES

- A. The engineer shall select finishes and indicate the color selections on the shop drawing submittals.

### 2.5 FIXTURE WIRING

- A. Provide wiring channels and wireways free from projections and rough or sharp edges throughout. At points or edges over which conductors shall pass and may be subject to injury or wear, round bush to make a smooth contact surface with the conductors.
- B. Install insulated bushings at points of entrance and exit of flexible wiring.

### 2.6 LED LIGHT FIXTURES, DRIVERS AND MODULES

- A. Provide drivers for LED lamps that are suitable for the electrical characteristics of the supply circuits to which they are to be connected, and which are suitable for operating the specified lamps.
- B. Provide drivers conforming to UL, ETL and ANSI Specifications and displaying labels or symbols of approval by the UL or ETL and of certification as tested by the UL / ETL. Design, fabricate and assemble component parts of drivers in accordance with the latest requirements of the NEC. This Driver protection shall be provided by a built-in self-resetting thermally actuated device that shall remove the driver from line when excessive driver temperature is reached.

- C. Rigidly mount drivers to the inside of the top of the fixture housing, with driver surfaces and housing in complete contact for efficient conduction of driver heat, unless specifically indicated to the contrary. Permanently affix driver mounting screws to the fixture housing. Provide only fixtures whose design, fabrication and assembly prevent overheating or cycling of LED's and drivers under any condition of use.
- D. Provide identical drivers within each fixture type unless otherwise noted.
- E. Switched fixtures which incorporate battery inverter packs for emergency lighting circuits shall include a second "hot leg" conductor to allow for fixtures to be switched without activating the battery inverter pack. Battery inverter packs shall only be activated during loss of normal power.
- F. LED light fixtures shall be Reduction of Hazardous Substances (RoHS) – compliant.
- G. LED drivers shall include the following features unless otherwise indicated:
  - 1. Minimum efficiency: 85% at full load
  - 2. Minimum Operating Ambient Temperature: -20° C (-4 ° F).
  - 3. Input Voltage: 120/277V ( $\pm 10\%$ ) at 60Hz.
  - 4. Integral short circuit, open circuit, and overload protection
  - 5. Power Factor:  $\geq 0.95$ .
  - 6. Total Harmonic Distortion:  $\leq 20\%$
  - 7. Comply with FCC 47 CFR Part 15
  - 8. Provide 0-10V dimming controls.
- H. LED modules shall include the following features unless otherwise indicated:
  - 1. Comply with IES LM-79 and LM-80 requirements.
  - 2. Minimum color rendering index (CRI) 82.
  - 3. Color temperature shall be 4100K unless otherwise specified in Lighting Fixture Schedule. Color temperature shifts shall comply with ANSI C78 377A for LED binning with further sub-binning restrictions of chromatic to be at or below the visual threshold of perceivable color variation not exceeding the 3 step MacAdam Ellipse line that crosses the black body locus as indicated on the LM79 report. Such restrictions documentation compliance shall be submitted as part of the submittal process.
  - 4. Minimum Rated Life: 50,000 hours per IES L70
  - 5. Light output lumens in accordance to the specified manufacturer and catalog number as indicated in the Lighting Fixture Schedule.

## 2.7 BLUETOOTH LIGHTING CONTROL SYSTEM

- A. Description: Networked lighting control system comprised of individually addressable Bluetooth Low Energy (BLE) wireless networked components, including control devices, wall switches, dimmers, occupancy/vacancy sensors with photosensors,

outdoor occupancy and photosensors, luminaire embedded sensors, 120V 20A plug load controllers, power packs, and UL924 bypass.

- B. Distributed control not requiring any head-end or backbone device communications.
- C. Communications between control components adhering to UL1376 and IOXT standards.
- D. DLC Networked Lighting Control System Specification V5.0 compliant, or equal.
- E. Mobile smartphone programming interface for wireless devices (iOS and Android)
- F. Support of up to 100 devices per zone, with capability for unlimited zones and groups.
- G. Dimming controls, daylight harvesting, and occupancy controls within each fixture programmable via the smartphone interface.
- H. Manual/automatic, on/off, and automatic partial on/off control capabilities within the wall switches and programmable via the smartphone interface.
- I. Time scheduling for individual lights/groups, energy monitoring capabilities
- J. UL924 emergency lighting control capabilities.

## 2.8 EXTERIOR FIXTURES

- A. Provide fixtures designed and manufactured specifically for outdoor service. Make components, including nuts, bolts, rivets, springs, and similar parts, of materials of effective corrosion resistance, or of materials which have been subjected to finishing treatment which shall ensure such resistance.
- B. Provide fixtures for use outdoors or in areas designated as wet or damp locations, which are suitably and effectively gasketed to prevent access of moisture into electrical components or enclosing diffusers, lenses or globes.
- C. Provide metal parts of fixtures for use in outdoor, wet or damp locations which are specified as requiring painting with suitable weather and moisture resisting qualities equal to epoxy-based coatings.
- D. Provide anodized aluminum for aluminum parts of exterior fixtures which are not specified as requiring a painted finish.
- E. Poles:
  - 1. Poles shall be provided in accordance with the Lighting Fixture Schedule.
  - 2. Pole finish shall match that of the light fixture.
  - 3. Furnish light pole bolt template/pattern to concrete pole foundation/base supplier. Coordinate with General Contractor.

## 2.9 FIXTURE DESCRIPTIONS

- A. Provide fixtures that conform to the above Standards and criteria as indicated on the drawings.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrate and supporting grids for luminaires.
- B. Examine each luminaire to determine suitability for lamps specified.
- C. Examine excavation and concrete foundation for lighting poles.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturers instructions, NEC, and as indicated on Drawings.
- B. Install suspended luminaires using pendants supported from swivel hangers, 15 degree free swing from vertical, ½ inch hub, 200 pound (minimum) fixture weight. Provide pendant length required to suspend luminaire at indicated height.
- C. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- D. Install accessories furnished with each luminaire.
- E. Unless otherwise shown, connect emergency lighting units and exit signs to same circuit that feeds the surrounding lighting. Use flexible conduit as indicated.
- F. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- G. Bond products and metal accessories to branch circuit equipment grounding conductor.
- H. Exterior Light Poles:
  - 1. Install in accordance with manufacturer's instructions.
  - 2. Install lighting poles at locations indicated.
  - 3. Install poles plumb. Double nuts to adjust plumb. Grout around each base.
  - 4. Bond metal luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor.

### 3.3 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

### 3.4 ADJUSTING

- A. Adjust exit sign directional arrows as indicated.
- B. Replace fixtures that have failed at Substantial Completion.
- C. Aim and adjust exterior luminaires to provide illumination levels and distribution as directed.

### 3.5 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosure.
- C. Clean finishes and touch up damage.
- D. Clean photometric control surfaces as recommended by manufacturer.

END OF SECTION

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SECTION 31 05 13

BORROW MATERIALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Processed Gravel Borrow for Pavement Sub-base
  - 2. Sand Borrow
  - 3. Stone Borrow
  - 4. Ordinary Borrow
- B. Related Sections
  - 1. Section 031 23 00 – Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

- A. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- B. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- C. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb./ft<sup>3</sup>)
- D. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- E. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- F. AASHTO – Standard Specification for Transportation Materials and Methods of Sampling and Testing, 1986 Edition as amended
- G. Commonwealth of Massachusetts Highway Department “Standard Specification for Highways and Bridges,” 1988 Edition as amended

1.3 SUBMITTALS

- A. Representative Samples of borrow materials taken from the source. Tag, label, and package the Samples as requested by Engineer. Provide access to the borrow site for field evaluation and inspection.
- B. Provide sieve analysis (ASTM C136) and permeability analysis (ASTM D2434) from certified soils testing laboratory for all borrow materials. Take and test a sample, at no additional cost to the Owner for each 1,500 c.y. of borrow material placed.
- C. Provide modified proctor analysis (ASTM D1557) from certified soils testing laboratory for all borrow materials. Borrow materials shall be tested once unless more

frequent testing is deemed necessary by the Engineer or Owner due to material variation.

- D. The Engineer reserves the right to require more frequent testing than that which is specified above should the borrow characteristics change.

1.4 QUALITY ASSURANCE

- A. No borrow shall be placed prior to the approval of Samples by the Engineer.

1.5 PROJECT/SITE CONDITIONS

- A. Existing Conditions

- 1. Comply with any environmental requirements and restrictions.
- 2. Keep all public and private roadway surfaces clean during hauling operations and promptly and thoroughly remove any borrow or other debris that may be brought upon the surface before it becomes compacted by traffic. Frequently clean and keep clean the wheels of all vehicles used for hauling to avoid bringing any dirt upon the paved surfaces.

PART 2 PRODUCTS

2.1 PROCESSED GRAVEL BORROW FOR PAVEMENT SUBBASE

- A. The compacted Processed Gravel Borrow to be used for gravel access roads and pavement subbase, or other area where a firm, free-draining subgrade is needed shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.
- B. Gradation requirements shall conform to the following:

Sieve	Percent Passing
3"	100
1 ½"	70 - 100
¾"	50 - 85
No. 4	30 - 60
No. 200	0 - 10

- C. Stockpile the processed materials in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

2.2 SAND BORROW

- A. Sand Borrow material shall be supplied from an off-site borrow area approved by the Engineer. Testing of the off-site Sand Borrow shall be at the Contractor's expense.
- B. Sand Borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable, rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by ASTM-C117 shall not exceed 10% by weight.

- C. Material shall consist of a clean, non-plastic, granular material conforming to the requirements of a SW, SP or SM under the Unified Soil Classification System (USCS) (ASTM D2487).
- D. The material shall have the characteristics that when placed and compacted, the soil particles will bind together so as to form a solid, stable surface capable of supporting rubber-tired vehicular traffic during wet weather periods as well as extended dry weather periods. The borrow material shall not contain fines to the extent that the surface layer becomes “greasy” when wet.
- E. The material shall not contain stones larger than 3/8 inch in diameter.
- F. Material consisting of frozen clogs, ice and snow will be rejected.
- G. All sand borrow material to be used shall be subject to approval by Engineer, and Engineer reserves the right to reject any borrow material from the job that does not meet the above requirements.

### 2.3 STONE BORROW

#### A. Crushed Stone Borrow

1. Crushed stone borrow shall consist of one of the following materials:
  - a. Durable crushed rock consisting of the angular fragments obtained by breaking and crushing solid or shattered natural rock, and free from a detrimental quantity of thin, flat, elongated or other objectionable pieces. A detrimental quantity will be considered as any amount in excess of 15% of the total weight. Thin stones shall be considered to be such stones whose average width exceeds 4 times their average thickness. Elongated stones shall be considered to be stones whose average length exceeds 4 times their average width.
  - b. Durable crushed gravel stone obtained by artificial crushing of gravel boulders or fieldstone with a minimum diameter before crushing of 8 inches.
2. The crushed stone shall be free from clay, loam or deleterious material and not more than 1.0% of satisfactory material passing a No. 200 sieve will be allowed to adhere to the crushed stone.
3. The crushed stone shall have a maximum percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T-96) as follows:
  - a. For Class 1 Bit. Conc. 30%\*\*
  - b. For Cement Concrete Aggregate 45%\*\*\*
  - c. Crushed Stone for Subbase 45%

\*\*Crushed stone for this use shall consist of crushed or shattered natural rock only. Crushed gravel stone will not be permitted.

\*\*\*Except for 5000 psi or greater cement concrete and prestressed concrete which shall be 30%.

4. The crushed stone shall conform to the grading requirements shown in the following grading Table.

Sieve Size	Percent by Weight Passing Through	
	Minimum	Maximum
<b>1 ½" Crushed Stone</b>		
2"	100	--
1 ½"	95	100
1"	35	70
¾"	0	25
<b>¾" Crushed Stone</b>		
1"	100	--
¾"	90	100
½"	10	50
3/8"	0	20
No. 4	0	5

5. Stone gradations shall vary depending on field use and shall be determined by Engineer.

**B. Dense Graded Crushed Stone for Sub-base**

1. Dense Graded Crushed Stone for Sub-Base shall consist of hard, durable particles of fragments of stone. Materials that break up when alternatively frozen and thawed or wetted and dried shall not be used.
2. Coarse aggregate shall have a percentage of wear, by the Los Angeles test, of not more than 45.
3. The composite material shall be free from clay, loam or other plastic material, and shall conform to the following gradation requirements.

Sieve	Percent Passing
2"	100
1 ½"	70-100
¾"	50-85
#4	30-55
#50	8-24
#200	3-10

## 2.4 ORDINARY BORROW

- A. Ordinary borrow shall have the physical characteristics of soils designated as type GW, GP, GM, SW, SP or SM, under USCS and shall not be specified as gravel borrow, sand borrow, special borrow material or other particular kind of borrow. It shall have properties such that it may be readily spread and compacted for the formation of embankments. The borrow shall not include rocks with a major dimension greater than 8 inches.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Prior to the placement of borrow material, site preparation shall be completed as required by the Contract Documents, and approved by the Engineer.
- B. Ensure that all materials are properly stockpiled on site to prevent contamination by other materials.
- C. Place borrow material over the entire area in uniform lifts and compact in accordance with Section 31 23 00.
- D. Utilize on-site soils prior to using off-site borrow provided on-site soils meet the requirements of the specifications.
- E. Utilize gravel borrow in all locations where a surface treatment has not been specified but requires a firm finish surface.
- F. Processed gravel for pavement subbase is intended to provide a stable foundation for driveways, sidewalk and roadway repair where a gravel base has been specified.
- G. Borrow shall be used as a replacement for unsuitable materials where poor soil conditions are encountered during the progress of the work, where approved by the Engineer. Borrow type will be determined by the Engineer. Borrow material used as a replacement for unsuitable soil is not intended to be an aid to dewatering.
- H. Shape borrow used for pipe foundation material so that it supports the pipe properly and will not damage the pipe, bells, collars, or the pipe fittings.
- I. Place all borrow to keep it free of other materials and to prevent segregation.
- J. Carry out compaction testing in accordance with ASTM D1556 (sand cone), or D6938 (Nuclear Methods), as specified in Section 31 23 00.
- K. Maintain and repair all eroded areas during the life of this contract at no additional cost to the Owner.

END OF SECTION

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SECTION 31 05 19

GEOSYNTHETICS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes
  - 1. Non-woven geotextiles
  - 2. Woven geotextiles
  - 3. Temporary degradable erosion control blankets
  - 4. Temporary 100% degradable erosion control blankets

1.2 REFERENCES

- A. Data Sheet DS1 - Non-Woven Geotextiles
- B. Data Sheet DS2 - Woven Geotextiles
- C. ASTM D1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials
- D. ASTM D1388 - Test Methods for Stiffness of Fabrics
- E. ASTM D3786 - Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics: Diaphragm Bursting Strength Tester Method
- F. ASTM D4218 - Test Method for Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- G. ASTM D4491 - Test Methods for Water Permeability of Geotextiles by Permittivity
- H. ASTM D4533 - Test Method for Trapezoid Tearing Strength of Geotextiles
- I. ASTM D4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles
- J. ASTM D4751 - Test Method for Determining the Apparent Opening Size of a Geotextile
- K. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles Geomembranes and Related Products
- L. ASTM D5261 - Test Method for Measuring Mass per Unit Area of Geotextiles

1.3 SUBMITTALS

- A. Product samples and data for all geosynthetics proposed for use on this project.

1.4 QUALITY ASSURANCE

- A. Obtain from the geosynthetic product manufacturers a warranty that their products are free from defects in materials and workmanship at the time of delivery to the project site.

- B. Material found to be defective or which does not conform to these specifications will be rejected.

#### 1.5 DELIVERY, STORAGE AND PROTECTION

- A. The Engineer reserves the right to reject and require replacement of any damaged materials delivered to the site, at no additional cost to the Owner.
- B. Stockpile and store the materials in accordance with the manufacturer's recommendations.
- C. Label and bag all geosynthetic rolls in packing that is resistant to photo degradation by ultraviolet (UV) radiation.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Group 1 Non-Woven Geotextile
  - 1. "C-46NW" as manufactured by Contech Construction Products, Inc.
  - 2. "FX-40HS" as manufactured by Carthage Mills
  - 3. "140NC" as manufactured by Mirafi Inc.
  - 4. Or equal
- B. Group 2 Non-Woven Geotextile
  - 1. "4506" as manufactured by Amoco Fabrics and Fibers
  - 2. "FX-60HS" as manufactured by Carthage Mills
  - 3. "160N" as manufactured by Mirafi Inc.
  - 4. Or equal
- C. Group 1 Woven Geotextile
  - 1. "2000" as manufactured by Amoco Fabrics and Fibers
  - 2. "FX-44" as manufactured by Carthage Mills
  - 3. "100X" as manufactured by Mirafi Inc.
  - 4. Or equal
- D. Group 2 Woven Geotextile
  - 1. "2002" as manufactured by Amoco Fabrics and Fibers
  - 2. "FX-55" as manufactured by Carthage Mills
  - 3. "500X" as manufactured by Mirafi Inc.
  - 4. Or equal
- E. Temporary Degradable Erosion Control Blankets
  - 1. "LANDLOK C2" as manufactured by SI Geosolutions, Inc.,



2. "C125" as manufactured by North American Green,
  3. Or equal
- F. Temporary 100% Degradable Erosion Control Blankets
1. "LANDLOK ENC2" as manufactured by SI Geosolutions, Inc.,
  2. "C125 BN" as manufactured by North American Green,
  3. Or equal

## 2.2 MATERIALS

- A. Non-woven geotextiles shall be manufactured from a continuous polypropylene filament. A needle punching process shall achieve bonding.
- B. Woven geotextiles shall be manufactured from a polypropylene slit-film monofilament.
- C. Non-woven protection geotextiles shall have a minimum mass per unit area of 32oz/yd<sup>2</sup>.
- D. Temporary, degradable erosion control blankets (ECBs) shall be composed of a core of 100% coconut fiber and two external confining meshes of non-degradable material. The minimum manufacturer's suggested design life of the ECB shall be 12 months.
- E. Temporary, 100% degradable ECBs shall be composed of a core of 100% coconut fibers encased between two confining meshes of degradable material.
  1. As a minimum, 100% degradable ECBs shall be recommended by the manufacturer for use on 2:1 slopes.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Inspect all products prior to the installation for any defects that may have been the result of storage and handling. The Engineer reserves the right to reject and require replacement of any damaged product, at no additional cost to the Owner.

### 3.2 INSTALLATION

- A. Install geosynthetic products in accordance with the approved manufacturer's QA/QC manuals, project details, and pertinent sections of these Specifications.

### 3.3 QUALITY CONTROL

- A. The Engineer may remove a sample (i.e. a strip that is 3 feet long by the entire roll width) from a maximum of 1 roll of each 10 rolls of all geosynthetic materials delivered to the project, and submit the samples to an independent laboratory for analysis of the product to ensure that the geosynthetics meet the specifications herein.

END OF SECTION

(DATA SHEETS FOLLOW)

<b>Data Sheet DS1 - Non-Woven Geotextile Mechanical Properties</b>								
<b>Property</b>	<b>Test Method</b>	<b>Units</b>	<b>Testing Frequency</b>	<b>Value</b>				
				<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>	<b>Group 4</b>	<b>Group 5</b>
<b>Mass per Unit Area</b>	<b>ASTM D5261</b>	<b>oz/yd<sup>2</sup></b>	<b>1/150,000 ft<sup>2</sup></b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>12</b>	<b>16</b>
<b>AOS</b>	<b>ASTM D4751</b>	<b>US Sieve</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>70</b>	<b>70</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Permitivity</b>	<b>ASTM D4491</b>	<b>gal/min/ft<sup>2</sup></b>	<b>1/150,000 ft<sup>2</sup></b>	<b>140</b>	<b>90</b>	<b>80</b>	<b>70</b>	<b>50</b>
<b>Puncture Strength</b>	<b>ASTM D4833</b>	<b>lbs</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>60</b>	<b>90</b>	<b>130</b>	<b>195</b>	<b>245</b>
<b>Mullen Burst Strength</b>	<b>ASTM D3786</b>	<b>lbs/in<sup>2</sup></b>	<b>1/150,000 ft<sup>2</sup></b>	<b>225</b>	<b>350</b>	<b>400</b>	<b>650</b>	<b>800</b>
<b>Trapezoidal Tear Strength</b>	<b>ASTM D4533</b>	<b>lbs</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>35</b>	<b>65</b>	<b>80</b>	<b>115</b>	<b>145</b>
<b>Grab Tensile/Elongation</b>	<b>ASTM D4632</b>	<b>lbs(%)</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>95 (50)</b>	<b>150 (50)</b>	<b>200 (50)</b>	<b>300 (50)</b>	<b>400 (50)</b>

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<b>Data Sheet DS2 - Woven Geotextile Mechanical Properties</b>							
<b>Property</b>	<b>Test Method</b>	<b>Units</b>	<b>Testing Frequency</b>	<b>Value</b>			
				<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>	<b>Group 4</b>
<b>Puncture Strength</b>	<b>ASTM D4833</b>	<b>lbs</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>60</b>	<b>90</b>	<b>120</b>	<b>135</b>
<b>Mullen Burst Strength</b>	<b>ASTM D3786</b>	<b>lbs/in<sup>2</sup></b>	<b>1/150,000 ft<sup>2</sup></b>	<b>300</b>	<b>400</b>	<b>600</b>	<b>480</b>
<b>Trapezoidal Tear Strength</b>	<b>ASTM D4533</b>	<b>lbs</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>45</b>	<b>75</b>	<b>115</b>	<b>95/55</b>
<b>Grab Tensile/Elongation</b>	<b>ASTM D4632</b>	<b>lbs(%)</b>	<b>1/150,000 ft<sup>2</sup></b>	<b>120 (15)</b>	<b>200 (15)</b>	<b>300 (15)</b>	<b>350/250 (15)</b>

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SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Clearing and Grubbing
  - 2. Stripping and Stockpiling of Soil and Sod

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. Confine all work to the limits of construction as indicated in the Drawings, as well as any temporary easements obtained for the Work.
- B. Carry out all clearing and grubbing in accordance with the Contract Documents. Minimize removal of all vegetation with particular care to protect all trees. In residential yard areas, remove only those trees specifically identified by Engineer.
- C. Prior to commencing Work, all temporary erosion and pollution control devices shall be installed at locations shown on the Drawings or as ordered.
- D. Burning of trees, brush, and stumps will not be permitted. Provide a satisfactory method of disposal.
- E. If sufficient quantities of material are available on-site, a chipper may be used for branches, limbs, etc. obtained during clearing, to produce woodchips. The chips shall be the property of the Contractor and shall be removed from the Site by the Contractor.
- F. In all cleared areas and under all embankments, grub and remove stumps of all trees, brush and major roots.
- G. For tree trimming and pruning, painting with an approved tree dressing or paint will be required on all cuts 2 inches or over in diameter. Apply the dressing or paint no later than two days after the cuts are made. All limbs and branches which require removal and all stubs, regardless of age, must be cut flush either to a union with the next larger sound limb or branch or flush to the trunk of the tree. The cutting shall be performed by experienced arborist. Trained tree climbers are required for pruning of tall growth. Take care not to damage major root systems of trees and shrubs to remain during grading operations. Repair an injury to limbs, bark or roots of such plants, or replace the plants at no additional cost to the Owner. If within one (1) year of the acceptance of the Project, any tree affected by the Work dies, replace it with a tree of equal value as determined by the Engineer.
- H. All trees and branches 4 inches to 12 inches in diameter shall be cut in 4 foot lengths and stockpiled on a site designated by the Engineer and shall become the property of the Contractor. Satisfactorily dispose of all remaining wood, stumps, brush, twigs,

leaves, roots and trash as soon as practicable and in such a manner as not to detract from the appearance of the area.

### 3.2 STRIPPING TOPSOIL AND UNSUITABLE MATERIAL

- A. As necessary to properly complete the work, and in areas to be excavated, all stumps, roots, foreign matter and unsuitable earth shall be stripped from the ground surface. Topsoil and loam which is deemed suitable by the Engineer shall be stockpiled and used, where possible, for finished surfacing and to construct earth beams and graded mounds.
- B. Keep stockpile of salvage material separate from the other stockpiles of excavated material.
- C. Excess topsoil is the property of the Contractor and shall be legally disposed of off-site.
- D. Unsuitable earth, stumps, roots and foreign matter shall be legally disposed of off-site by the Contractor.

### 3.3 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

- A. All cleared and grubbed unsuitable materials unless otherwise noted shall become the property of the Contractor and shall be removed from the Site and disposed of in compliance with Federal, State and local Laws and Regulations.
- B. Dutch Elm Wood
  - 1. Dispose of Dutch Elm diseased wood in accordance with the provisions of Massachusetts General Law, Chapter 87, Section 5 and Chapter 132, Sections 8 and 11, as amended; and in accordance with any additional local Regulations.
  - 2. Dispose of elm trees or limbs immediately after cutting or removal and in such a manner as to prevent the spread of Dutch Elm disease. Accomplish by covering them with earth to a depth of at least 6 inches in areas outside the right-of-way locations where the Contractor has arranged for disposal.
  - 3. Where the work includes the removal and disposal of stumps of elm trees, completely dispose of such stumps immediately after cutting in the manner specified above.

### 3.4 CLEANING UP

- A. During construction, maintain the Project Site and adjacent areas clean and free of all rubbish, debris, surplus materials and unnecessary construction equipment.
- B. Where material or debris has washed, flowed or in any way accumulated in watercourses, ditches, gutters, drains, pipes or structures during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of as necessary, and upon completion of the work shall be cleaned, flushed and left in neat conditions to the satisfaction of the Engineer.
- C. Restore or replace, when and as directed, any public or private property damaged by the Work to a condition at least equal to that existing immediately prior to the beginning of operations. All drainage structures, curbstones, signs, guardrails, fences

and stone walls which are removed or damaged as a result of the work under this contract shall be reset or replaced as required.

### 3.5 PROTECTION

- A. Save trees and shrubs that are specifically designated by the Engineer not to be cut, removed, destroyed or trimmed from harm and injury. All damage done to trees by the Contractor's operation and all branches of trees extending within the roadway shall be trimmed and painted where cut or as necessary to provide adequate vertical clearance for construction, including selective trimming of such trees as directed.
- B. Use all necessary precautions to prevent injury to other desirable growth in all areas. If the existing ground in the area is disturbed by any of the Work or equipment, rough-grade, loam and seed the disturbed areas. After removal, dispose of all stumps including the major root systems where the material will not cause obstructions to streams and will not detract from the appearance of the roadside.

END OF SECTION

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SECTION 31 23 00

EXCAVATION, BACKFILL, COMPACTION AND DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Excavation, backfill and compaction for buildings, retaining walls and other structures
2. Excavation, backfill and compaction for subsurface utilities
3. Removal, handling and disposal of rock not covered under Section 33 05 23.16
4. Earth retention systems
5. Excavation, backfill and compaction for the abandonment of existing pipe

B. Temporary dewatering systems

1. Related Sections
2. Section 01 57 00 - Temporary Controls
3. Section 02 31 00 - Subsurface Investigations
4. Section 31 05 13 - Borrow Materials
5. Section 33 05 23 - Rock Excavation

1.2 REFERENCES

- A. ASTM D1557-07 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))
- B. Federal Register 40 CFR Part 122, United State Environmental Protection Agency (USEPA) Administered Permit Programs (National Pollution Discharge Elimination System or NPDES), Storm Water Discharge
- C. ASTM D1556-07 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- D. ASTM D2487-06e1 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- E. ASTM D6938-08a - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- F. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F
- G. 520 CMR 14.00 Excavation and Trench Safety
- H. Commonwealth of Massachusetts Highway Department "Standard Specifications for Highways and Bridges," 1988 Edition as amended

- I. Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, latest edition

### 1.3 DEFINITIONS

- A. Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- B. Earth Retention Systems - Any structural system, such as sheeting and bracing or cofferdams, designed to retain in-situ soils in place and prevent the collapse of the sides of an excavation in order to protect employees and adjacent structures.
- C. Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
- D. Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include earth retention systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
- E. Registered Professional Engineer - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.
- F. Licensed Site Professional - A person who is registered by the Commonwealth of Massachusetts to render Hazardous Waste Site Cleanup Activity Opinions.
- G. Shield System - A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."
- H. Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
- I. Temporary Dewatering System - A system to lower and control water to maintain stable, undisturbed subgrades at the lowest excavation levels. Dewatering shall be provided for all pipelines, structures and for all other miscellaneous excavations.
- J. Trench - A narrow excavation (in relation to its length) made below the surface of the ground, of at least three feet in depth. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

#### 1.4 SUBMITTALS

- A. Drawings and calculations for each Earth Retention System required in the Work. The submittal shall be in sufficient detail to disclose the method of operation for each of the various stages of construction required for the completion of the Earth Retention Systems.
  - 1. Submit calculations and drawings for Earth Retention Systems prepared, signed and stamped by a Professional Engineer registered in the state where the work is performed.
- B. Performance data for the compaction equipment to be utilized
- C. Construction methods that will be utilized for the removal of rock
- D. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:
  - 1. For suitable soil materials removed during Excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.
  - 2. For borrow materials; perform tests at frequency specified in Section 31 05 13, Borrow Materials.
- E. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled or at a minimum of one test per lift. The Engineer will determine the locations and lifts to be tested. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.
  - 1. Methods and equipment proposed for compaction shall be subject to prior review by the Engineer. Compaction generally shall be done with vibrating equipment. Static rolling without vibration may be required by the Engineer on sensitive soils that become unstable under vibration. Displacement of, or damage to existing utilities or structure shall be avoided. Any utility or structure damaged thereby shall be replaced or repaired as directed by the Engineer.
  - 2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
    - a. Any costs associated with correcting and retesting as a result of a failure to meet compaction requirements shall be borne by the Contractor.
  - 3. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than the project requirements, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.
  - 4. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where trenches are so narrow that trench walls impact the attenuation of the gamma radiation, when adjacent to concrete that impacts the

accuracy of determining moisture content, or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.

## 1.5 QUALITY CONTROL

- A. The following test procedures will be performed by the Contractor's inspection agency. Results will be submitted to the Engineer for review.
1. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:
    - a. For suitable soil materials removed during excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.
    - b. For borrow materials; perform tests at frequency specified in Section 31 05 13 - Borrow Materials.
  2. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled. The Engineer will determine the locations and lifts to be tested.
    - a. The Engineer may specify additional compaction testing when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
    - b. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than 95% of maximum dry density at optimum moisture content, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.
    - c. Compaction testing by nuclear methods may not be effective where excavation sidewalls impact the attenuation of the gamma radiation or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.
- B. Contractor shall notify the Engineer at least 48 hours prior to placement of backfill below structures, including building foundations, slabs, retaining walls and other structures. Backfill shall not be placed over subgrades until subgrades have been prepared as described herein and the Engineer or their representative has reviewed the prepared subgrades or notified the Contractor that review is not required for the location of consideration.
- C. Contractor shall notify the Engineer at least 48 hours prior to placement of concrete for footings, slabs, or construction of retaining walls or other structures. Concrete, retaining walls, or other structures shall not be placed over subgrades until subgrades have been prepared as described herein and the Engineer or their representative has reviewed the prepared subgrades or notified the Contractor that review is not required for the location of consideration.

- D. When testing or subgrade review identify, in the opinion of the inspection agent or Engineer or their representative that subgrades, fills or backfills have not achieved the required degree of compaction required, scarify and moisten or aerate, or remove and replace soil materials to the depth directed, recompact, and retest to the satisfaction of the inspection agent or Engineer or their representative.

#### 1.6 QUALITY ASSURANCE

- A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), 520 CMR 14.00, and other State and local requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
- B. Contractor shall notify the Engineer for inspection of subgrades as described in 1.5B and 1.5C. The Engineer shall review subgrades for footings, slabs, or construction of retaining walls or other structures at the frequencies determined by the Engineer.
- C. Employ the services of a dewatering specialist or firm when well points, deep wells, recharge systems, or equal systems are required. Specialist shall have completed at least 5 successful dewatering projects of equal size and complexity and with equal systems.

#### 1.7 PROJECT CONDITIONS

- A. Notify Dig Safe and obtain Dig Safe identification numbers.
- B. Notify utility owners in reasonable advance of the work and request the utility owner to stake out on the ground surface the underground facilities and structures. Notify the Engineer in writing of any refusal or failure to stake out such underground utilities after reasonable notice.
- C. Make explorations and Excavations to determine the location of existing underground structures, pipes, house connection services, and other underground facilities in accordance with Paragraph 3.2.D of this Section.
- D. In accordance with 520 CMR 14.00, no person shall, except in an emergency, make an excavation in any public way, public property, or privately owned land until a permit is obtained from the appropriate designated permitting authority. For this project, the permit should be obtained from the City of Fall River.

### PART 2 PRODUCTS

#### 2.1 SOIL MATERIALS

- A. Fill material is subject to the approval of the Engineer and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.
- B. Satisfactory fill materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP. Additional requirements are included in Section 31 05 13.
- C. Satisfactory fill materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones

over 6 inches in diameter. Unless otherwise stated in the Contract Documents, organic matter shall not exceed minor quantities and shall be well distributed.

D. Fill type shall be as indicated below and/or as shown on the drawings:

Location	Acceptable Materials
Areas beneath Footings, Floor Slabs or Structures	Granular Fill, Gravel Borrow, Crushed Stone
Structure Backfill	Granular Fill, Gravel Borrow, Crushed Stone
Areas within 10' of Existing or Proposed Building or Structure Footing or Slab	Granular Fill, Gravel Borrow, Crushed Stone
Areas Beneath Pavements	Granular Fill, Gravel Borrow, Crushed Stone
Landscaped Areas	Ordinary Fill, Granular Fill, Gravel Borrow, Crushed Stone

- E. Satisfactory fill materials shall not contain frozen materials nor shall backfill be placed on frozen material.
- F. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material, if processed to the required gradation and compacted to the required degree of compaction. In no case shall salvaged materials be substituted for the required gravel base.

**2.2 CONTROLLED DENSITY FILL**

- A. Controlled density fill shall be flowable, excavatable and shall require no vibration for placement. Compressive strength at 28 days shall be 30 to 80 psi and the slump shall be 10 to 12 inches.

**2.3 DEWATERING MATERIALS**

- A. Provide haybales and silt fence in accordance with Section 01 57 00.
- B. Provide silt filter bags (Dandy Dewatering Bag, Dirtbag, JMP Environ-Protection Filter Bag, or equal) of adequate size to match flow rate.
- C. Provide dewatering equipment and materials for engineered dewatering systems.

**PART 3 EXECUTION**

**3.1 PREPARATION**

- A. Public Safety and Convenience
  1. Adhere to the requirements of 520 CMR 14.00 for all excavation work.
  2. Take precautions for preventing injuries to persons or damage to property in or about the Work.
  3. Provide safe access for the Owner and Engineer at site during construction.
  4. Do not obstruct site drainage, natural watercourses or other provisions made for drainage.

### 3.2 CONSTRUCTION

#### A. Earth Retention Systems

1. Provide Earth Retention Systems necessary for safety of personnel and protection of the Work, adjacent work, utilities and structures.
2. Maintain Earth Retention Systems for the duration of the Work.
3. Remove Earth Retention Systems, unless designated to be left in place, in a manner that will not endanger the construction or other structures. Backfill and properly compact all voids left or caused by the withdrawal of Earth Retention Systems.

#### B. Excavation

1. Perform excavation to the lines and grades indicated on the Drawings. Backfill unauthorized over-excavation in accordance with the provisions of this Section, at no additional cost to the Owner.
2. Excavate with equipment selected to prevent damage to existing utilities or other facilities. Hand excavate as necessary to locate utilities or avoid damage.
3. Sawcut the existing pavement in the vicinity of the excavation prior to the start of excavation in paved areas, so as to prevent damage to the paving outside the requirements of construction. The sawcut shall be neat in appearance with no ragged lines; trim pavement as necessary.
4. Prior to backfilling or placement of structures, excavate and/or prepare subgrades as follows:
  - a. Building and retaining wall footprints: Suitable subgrades for supporting building footings consist of up to 1 foot of existing fill, glacial till or bedrock. Suitable subgrades for supporting slabs and retaining walls consist of existing fill, glacial till or bedrock. Where bedrock is encountered at or above footing bearing elevations, or within 12 inches of footing bearing elevations, the bedrock shall be over-excavated to 12 inches below the bottom of the footing and to at least 12 inches beyond the edge of footings, and be replaced with compacted Crushed Stone. Excavated soil subgrades shall be proof compacted with either 10 passes of a 10-ton vibratory drum roller for open excavations or 6 passes of a large, reversible, walk behind vibratory compactor capable of exerting a minimum force of 2,000 pounds in trench or pit excavations. Unsuitable existing fill as well as soft or weak spots, if encountered, shall be over-excavated and replaced with compacted Granular Fill, Gravel Borrow or compacted Crushed Stone wrapped in a non-woven geotextile, as directed by the Engineer. Below footings and retaining walls, the lateral extent of over-excavation of unsuitable or weak soils shall include the footing and retaining wall base bearing zone which is defined by a 1H:1V plane extending downward and outward from one foot beyond the edge of footings or the retaining wall base. If proof compaction will prove detrimental to the subgrade due to the presence of groundwater, static rolling may be allowed at the discretion of the Engineer.

- b. Pavements and Other Structures: Excavated subgrades consisting of existing fill or glacial till shall be proof compacted with either 10 passes of a 10-ton vibratory drum roller for open excavations or 6 passes of a large, reversible, walk behind vibratory compactor capable of exerting a minimum force of 2,000 pounds in trench or pit excavations. Soft or weak spots shall be over-excavated and replaced with compacted Granular Fill or compacted Crushed Stone wrapped in a non-woven geotextile, as directed by the Engineer or their representative. If proof compaction will prove detrimental to the subgrade due to the presence of groundwater, static rolling may be allowed at the discretion of the Engineer.
5. If satisfactory materials are not encountered at the design subgrade level, excavate unsatisfactory materials to the depth directed by the Engineer and properly dispose of the material. Backfill the resulting extra depth of excavation with satisfactory fill materials and compact in accordance with the provisions of this Section.
6. Soil bearing surfaces shall be protected against freezing and the elements before and after concrete placement. If construction is performed during freezing weather, structures shall be backfilled as soon as possible after they are constructed. Insulating blankets or other means shall be used for protection against freezing at the discretion of the Engineer.
7. During excavation, material satisfactory for backfill shall be stockpiled in an orderly manner at a distance from the sides of the excavation equal to at least one half the depth of the excavation, but in no case closer than 2 feet.
  - a. Excavated material not required or not suitable for backfill shall be removed from the site and disposed of in accordance with local, State and Federal laws and regulations.
  - b. Perform grading to prevent surface water from flowing into the excavation.
  - c. Pile excavated material in a manner that will endanger neither the safety of personnel in the excavation nor the Work itself. Avoid obstructing sidewalks and driveways.
  - d. Hydrants under pressure, valve pit covers, valve boxes, manholes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed.
8. Grade or create berms or swales to direct surface water from excavations to appropriate structures designed to accommodate storm water. If no structures exist, direct water to areas that minimize impacts to adjacent structures and properties.
9. Make pipe trenches as narrow as practicable and keep the sides of the trenches undisturbed until backfilling has been completed. Provide a clear distance of 12 inches on each side of the pipe.



10. Perform the excavation in such a manner as to prevent disturbance of the final subgrade. If excessive subgrade disturbance is occurring, as judged by the Engineer, then the final 6 inches of the excavation shall be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer, at no additional cost to the Owner.
  - a. Grade the excavation bottom to provide uniform bearing and support for the bottom quadrant of each section of pipe.
  - b. Excavate bell holes at each joint to prevent point bearing.
  - c. Remove stones greater than 6 inches in any dimension from the bottom of the trench to prevent point bearing.

C. Backfill and Compaction

1. Unless otherwise specified or indicated on the Drawings, use satisfactory material removed during excavation for backfilling trenches. The Engineer may require stockpiling, drying, blending and reuse of materials from sources on the Project.
2. Spread and compact the material promptly after it has been deposited. When, in the Engineer's judgment, equipment is inadequate to spread and compact the material properly, reduce the rate of placing of the fill or employ additional equipment.
3. When excavated material is specified for backfill and there is an insufficient amount of this material at a particular location on the Project due to rejection of a portion thereof, consideration will be given to the use of excess material from one portion of the Project to make up the deficiency existing on other portions of the Project.
  - a. Use borrow material if there is no excess of excavated material available at other portions of the Project.
4. Backfilling and compaction methods shall attain at least 95% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557. All backfill shall be firm and stable after compaction.
  - a. In areas outside the building and retaining wall footprints where structures are not supported (landscaped areas), backfilling and compaction methods shall attain at least 90% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557.
  - b. In areas outside the building and retaining wall footprints where pavements or sidewalks are to be supported, backfilling and compaction methods shall attain at least 90% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557, except the final 2 feet below pavement or sidewalk section subgrades shall attain at least 95% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557. The section subgrade shall be defined as the elevation of the bottom of the aggregate base/subbase, whichever is lower.

- c. Where Crushed Stone is placed, the Crushed Stone shall be compacted with heavy compaction equipment to achieve an unyielding subgrade.
5. Do not place stone or rock fragment larger than six inches in greatest dimension in the backfill.
6. Maximum loose lift height for backfilling existing or borrow material shall be 12 inches, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. In no case shall loose lift height for backfilling exceed 3 feet.
7. Do not drop large masses of backfill material into the trench endangering the pipe or adjacent utilities.
8. Install pipe in rock excavated trenches on a 3/4" crushed stone bedding with a minimum depth of 6 inches. Shape the stone bedding at the pipe bells to provide uniform support. Encase the pipe in the 3/4" crushed stone bedding to a grade 6 inches over the top of the pipe and the full width of the trench.
9. Backfill from the bottom of the trench to the centerline of the pipe with the specified material. This initial backfill is to be placed in layers of no more than 6 inches and thoroughly tamped under and around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously.
10. Electrical conduit not encased in concrete, shall be backfilled with sand borrow conforming to the requirements of Section 31 05 13. The backfill shall be placed in the trench for its full width and shall extend to 12 inches over the conduit.
11. Where excavation is made through permanent pavements, curbs, paved driveways, or paved sidewalks, or where such structures are undercut by the excavation, place the entire backfill to sub-grade with granular materials and compact in 6 inch layers, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. Use approved mechanical tampers for the full depth of the trench. If required, sprinkle the backfill material with water before tamping so as to improve compaction. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required to correct the problem, and shall then be refilled and properly compacted with the surface restored to required grade at no additional expense.
12. The Contractor shall not place backfill against or on structures until they have attained sufficient strengths to support the loads to which they will be subjected, without distortion, cracking, or other damage. As soon as possible after the structures are adequate, they shall be backfilled with suitable backfill material.
13. Place and compact backfill around manholes, vaults, pumping stations, gate boxes or other structures in six inch layers unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing, from a point one foot over the pipe. Exercise care to protect and prevent damage to the structures.

D. Test Pit Excavation

1. General requirements of test pits are specified in Section 02 31 00.

E. Dewatering

1. Obtain the following construction dewatering permits, as required:
  - a. US EPA Dewatering General Permit
2. Provide, operate and maintain adequate pumping, diversion and drainage facilities in accordance with the approved dewatering plan to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. Locate dewatering system components so that they do not interfere with construction under this or other contracts.
3. Conduct operations so as to prevent at all times the accumulation of water, ice and snow in excavations or in the vicinity of excavated areas so as to prevent water from interfering with the progress or quality of the work.
4. Take actions necessary to ensure that dewatering discharges comply with permits applicable to the Project. Dispose of water from the trenches and excavations in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.
5. Repair any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain all the areas of work in a suitable dry condition, at no additional cost to the Owner.
6. Exercise care to ensure that water does not collect in the bell or collar holes to sufficient depth to wet the bell or collar of pipes waiting to be jointed.
7. Take precautions to protect new work from flooding during storms or from other causes. Control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, provide temporary ditches for drainage. Upon completion of the work, all areas shall be restored to original condition.
8. Brace or otherwise protect pipelines and structures not stable against uplift during construction.
9. Do not excavate until the dewatering system is operational and the excavation may proceed without disturbance to the final subgrade.
10. Unless otherwise specified, continue dewatering uninterrupted until the structures, pipes, and appurtenances to be installed have been completed such that they will not float or be otherwise damaged by an increase in groundwater elevation.
11. Temporarily lower the groundwater level at least two feet below excavations or to the top of bedrock to limit potential "boils", loss of fines, or softening of the ground. If any of these conditions are observed, submit a modified dewatering plan to the Engineer within 48 hours. Implement the approved modified plan and repair any damage incurred at no additional cost to the Owner.

12. When subgrades are soft, weak, or unstable due to improper dewatering techniques, remove and replace the materials as required herein and in accordance with Section 31 05 13 at no additional cost to the Owner.
13. Notify the Engineer immediately if any settlement or movement is detected of survey points adjacent to excavations being dewatered. If settlement is deemed by the Engineer to be related to the dewatering, submit a modified dewatering plan to the Engineer within 24 hours. Implement the approved modified plan and repair any damage incurred to the adjacent structure at no additional cost to the Owner.
14. Dewatering discharge:
  - a. Install sand and gravel, or crushed stone, filters in conjunction with sumps, well points, and/or deep wells to prevent the migration of fines from the existing soil during the dewatering operation.
  - b. Transport pumped or drained water without interference to other work, damage to pavement, other surfaces, or property. Pump water through a silt filter bag or other approved sedimentation device prior to discharge to grade of drainage system.
  - c. Do not discharge water into any sanitary sewer system.
  - d. Provide separately controllable pumping lines.
  - e. The Engineer reserves the right to sample discharge water at any time.
15. Install erosion/sedimentation controls for velocity dissipation at point discharges onto non-paved surfaces.
16. Removal
  - a. Do not remove dewatering system without written approval from the Engineer.
  - b. Backfill and compact sumps or ditches with screened gravel or crushed stone in accordance with Section 31 05 13.
  - c. Remove well points and deep wells. Backfill abandoned well holes with cement grout having a water cement ratio of 1 to 1 by volume.

### 3.3 PROTECTION

#### A. Protection of Existing Structures

1. All existing foundations, conduits, wall, pipes, wires, poles, fences, property line markers and other items which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor. Should such items be damaged, they shall be restored by the Contractor to at least as good condition as that in which they were found immediately before the Work began.

#### B. Accommodation of Traffic

1. Streets and drives shall not be unnecessarily obstructed. The Contractor shall take such measures at his own expense to keep the street or road open and safe for two-way traffic unless otherwise indicated.
2. Construct and maintain such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians and vehicles. Provide substantial barricades at crossings of trenches, or along the trench to protect the traveling public.
3. Where deemed necessary, such additional passageways as may be directed shall be maintained free of such obstructions. All material piles, open excavations, equipment, and pipe which may serve as obstructions to traffic shall be protected by proper lights, signage, or guards as necessary.
4. All traffic controls shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

C. Erosion and Sedimentation Control

1. Take all necessary steps to prevent soil erosion.
2. Plan the sequence of construction so that only the smallest practical area of land is exposed at any one time during construction.
3. Temporary vegetation and/or mulching shall be used to protect critical areas exposed during construction as judged by the Engineer.

END OF SECTION

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SECTION 32 12 16

HOT MIX ASPHALT (HMA) PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Temporary HMA pavement trench repair in roadways, driveways and sidewalks
  - 2. Permanent HMA Trench Repair
  - 3. HMA Driveway
- B. For the purposes of this Section, Hot Mix Asphalt (HMA) and bituminous concrete have the same meaning.
- C. Related Requirements
  - 1. Section 31 23 00 - Excavation, Backfill, Compaction and Dewatering
  - 2. Section 32 17 23 - Pavement Markings

1.2 REFERENCES

- A. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended
- B. ASTM D2041 - Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- C. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1990 Edition, as amended
- D. AASHTO M 320
- E. AASHTO T 96 - L.A. Abrasion Test
- F. AASHTO T 195 (Ross Count)
- G. TAI - (The Asphalt Institute) - MS-3 Asphalt Plant Manual
- H. TAI - (The Asphalt Institute) - MS-8 Asphalt Paving Manual

1.3 SUBMITTALS

- A. Job mix formula for each mix specified under this Section.
- B. Product data sheets for all additives proposed in the mix design.
- C. Certificate indicating the mixes specified meet or exceed the requirements specified herein.
- D. Certificate indicating the mix plant conforms to TAI Manual MS-3, Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended.

- E. Equipment Data Sheets for all equipment proposed for use placing the Hot Mix Asphalt (HMA).
- F. A contract specific Quality Control Plan (QCP).

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with TAI Manual MS-8., Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended.
- B. Mixing Plant: Conform to TAI Manual MS-8., Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended.
- C. Obtain materials from same source throughout.
- D. Prior to placing permanent HMA, hold a pre-paving meeting on the Site. All parties directly involved in the preparation and placement of permanent HMA on the Project shall attend, including but not limited to the paving subcontractor(s) project manager(s), QC representative, crew foreman, General Contractor's Superintendent, and the Engineer.
- E. Material samples shall be taken at the plant for every 500 tons or daily, whichever is more frequent, and analyzed for asphalt content and theoretical maximum density. Test results from the design mix material will not be accepted.
- F. Schedule crews and equipment to perform rolling operations in accordance with the heat flow model outlined in the latest version of the paving software "PaveCool," developed by University of Minnesota and weather data input into the software. Weather data shall be gathered approximately 12 hours prior to paving operations, using the website, [www.weather.com](http://www.weather.com), for forecasted conditions for the time of paving.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. General
  - 1. Bituminous materials shall conform to the requirements of these Specifications.
  - 2. Bitumen delivered to the Project or to a mix plant must be accompanied by a proper certificate signed by the producer's authorized representative. Shipments of material not accompanied by a certificate will not be accepted for use in the Work.
- B. Hot Mix Asphalt Paving shall be Class I, Type I-1, as specified in Sections 460 and M3.11.0 of the above referenced Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 edition, as amended.
- C. Hot Mix Asphalt
  - 1. These mixtures shall be composed of mineral aggregate, mineral filler (if required), bituminous material, and reclaimed asphalt pavement (RAP). The



use of RAP shall be at the Contractor's option unless otherwise provided by the special provisions of the contract.

2. Plants producing recycled mix shall be equipped so that they can properly proportion, blend and mix all components of a recycled mixture so that the end product is in conformance with the designated job-mix formula.
3. The mineral aggregate, filler (if required), bituminous material, asphalt modifier (if required) and RAP shall be proportioned and mixed to conform with the designated mixture as tabulated in Table A hereafter.
4. In order to obtain standard texture, density and stability, provide a specific Job-Mix Formula for the particular uniform combination of materials and sources of supply to be used on the Project. The Job-Mix Formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of bituminous material to be added to the aggregate and for batch plants, the number of seconds for dry mixing time and the number of seconds for wet mixing time. AASHTO T 195 (Ross Count) with a coating factor of 98% will be used when necessary to evaluate proper mixing time. The Job-Mix Formula shall also specify a single source or uniform blend of particular sources for fine aggregate, a single source for each nominal size of coarse aggregate, a single source of supply for minor filler and sources for asphalt. The Job-Mix Formula shall bind the Contractor to furnish paving mixtures not only within the master ranges, but also conforming to the exact formula thus set up for the Project, within allowable tolerances as follows:

No. 4 and larger sieve	±7.0%
No. 8 and smaller sieves, except No. 200	±4.0%
Passing No. 200 sieve	±2.0%
Asphalt	±0.4%

TABLE A PERCENT BY MASS PASSING SIEVE DESIGNATION								
Standard Sieves	HMA Base Course	HMA Binder Course	HMA Dense Binder Course	HMA Top Course	HMA Modified Top Course	HMA 3/8" Modified Top Course	HMA Dense Mix	HMA Surf. Treat.
2 in.	100							
1 in.	57-87	100	100		100	100		
3/4 in.		80-100	80-100		95-100	100		
5/8 in.				100				
1/2 in.	40-65	55-75	65-80	95-100	79-100	95-100	100	
3/8 in.				80-100	68-88	68-88	80-100	100
No. 4	20-45	28-50	48-65	50-76	48-68	48-68	55-80	80-100
No. 8	15-33	20-38	37-49	37-49	33-46	33-53	48-59	64-85
No. 16				26-40	20-40	20-40	36-49	46-68
No. 30	8-17	8-22	17-30	17-29	14-30	14-30	24-38	26-50
No. 50	4-12	5-15	10-22	10-21	9-21	9-21	14-27	13-31
No. 100*				5-16	6-16	6-16	6-18	7-17
No. 200	0-4	0-5	0-6	2-7	2-6	2-6	4-8	3-8
Bitumen	4-5	4.5-5.5	5-6	5.6-7.0	5.1-6	5-6	7-8	7-8

\*Percentages shown in table above for aggregate sizes are stated as proportional percentages of total aggregate for the mix. Unless authorized by the Engineer, no Job-Mix Formula will be approved which specifies:  
 Less than 6% binder for HMA Top Course  
 Less than 5.5% binder for HMA 3/8" Modified Top Course and HMA Modified Top Course for mixes containing RAP.

Should a change of sources of materials be made, a new job mix formula shall be established by the Contractor before the new material is used. When unsatisfactory results or other conditions make it necessary, the Engineer may establish a new Job-Mix Formula.

The aggregate will be accepted in stockpile at the plant site. The bituminous material will be accepted on certification. If the Contractor elects to furnish HMA from more than one plant, the job mix formula must be adhered to by all plants.

5. The use of RAP will be permitted at the option of the Contractor and provided that the end product is in conformance with the designated Job-Mix Formula. The proportion of RAP to virgin aggregate shall be limited to a maximum of 40% for drum mix plants and 20% for modified batch plants. The maximum amount of RAP for surface courses shall be 10%.
6. Two or more Job-Mix Formulas may be approved for a particular plant; however, only material conforming to one Job-Mix Formula will be permitted to be used on any given calendar day. The Job-Mix Formula shall bind the Contractor to furnish paving mixtures not only within the master ranges, but also conforming to the exact formula thus set up for the Project.
7. Coarse Aggregate
  - a. The coarse mineral aggregate shall be clean, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, free from a detrimental quantity of thin or elongated pieces, free from dirt or other objectionable materials, and shall have a percentage of wear, as determined by the Los Angeles Abrasion Test (AASHTO T 96), of not more than 30. It shall be surface dry and shall have a moisture content of not more than 0.5% after drying. The use of crushed gravel stone will not be permitted.

8. Fine Aggregate

- a. The fine aggregate shall consist of one of the following:
  - 1) 100% Natural Sand
  - 2) 100% Stone Sand
  - 3) A blend of sand and stone screenings the proportions of which shall be approved by the Engineer
  - 4) A blend of natural sand and stone sand
- b. Natural sand shall consist of inert, hard, durable grains of quartz or other hard, durable rock, free from topsoil or clay, surface coatings, organic matter or other deleterious materials. When the primary source of material, passing the No. 200 sieve, is obtained from natural sand, these fines must be approved prior to use.
- c. Stone sand shall be a processed material prepared from stone screenings to produce a consistently graded material conforming to specification requirements.
- d. The stone screenings shall be the product of a secondary crusher and shall be free from dirt, clay, organic matter, excess fines or other deleterious material.
- e. The fine aggregate as delivered to the mixer shall meet the following requirements:

Sieve Designation	Percent Passing	
	Minimum	Maximum
3/8 in.	95	100
No. 8	70	95
No. 50	20	40
No. 200	2	16

- f. In the fine aggregate sieve analysis (passing No. 8), the amount between two successive sieves (No. 16, No. 30, No. 50 and No. 100) shall not exceed 33% of the fine aggregate total.
- g. Plants that experience a large variation in the quality and gradation of their primary fine aggregate sources and have difficulty in consistently providing fine aggregate that conforms to the requirements of this specification, shall be equipped with an approved fine aggregate system for processing fine aggregate that *will* meet the requirements of this specification.

D. Reclaimed Asphalt Pavement (RAP)

- 1. Reclaimed Asphalt Pavement (RAP) shall consist of the material obtained from highways or streets by crushing, milling or planing existing pavements. This material shall be transported to the mix plant yard and processed through an approved crusher so that the resulting material will contain no particles larger than 1½ inches. The material shall be stockpiled on a free draining base and

kept separate from the other aggregates. The material contained in the stockpiles shall have a reasonably uniform gradation from fine to coarse and shall not be contaminated by foreign materials.

E. Mineral Filler

1. Mineral filler shall consist of approved Portland Cement, limestone dust, hydrated lime, stone float or stone dust. Stone dust shall be produced from crushed ledge stone and shall be the product of a secondary crusher so processed as to deliver a product of uniform grading. Mineral filler shall completely pass a No. 50 sieve and at least 65% shall pass a No. 200 sieve.

F. Bituminous Materials

1. The asphalt cement for the mixture shall be the grade designated by the Engineer and shall conform to the requirements of M3.01.01. When required an approved anti-stripping additive conforming to M3.10.0 shall be added to the asphalt cement.
2. Tack coat shall consist of either emulsified asphalt, Grade RS-1 conforming to Section M3.03.0.
3. For any bituminous mixture containing RAP, submit in addition to the Job-Mix Formula, the amount and type of asphalt modifier to be added to the mixture to restore the asphalt properties of the RAP to a level that is reasonably consistent with the requirements of current specifications for new asphalt. The restored asphalt when recovered by the Abson Method from the recycled mixture shall have a minimum penetration at 77 degrees Fahrenheit of 50 and a maximum absolute viscosity at 140 degrees Fahrenheit of 800 pascal seconds.
4. Only Performance Graded Asphalt Binder grades PG 64-28 or PG 52-34 will be used as modifiers and shall meet the requirements of AASHTO M 320.

PART 3 EXECUTION

3.1 PAVING – GENERAL

- A. Maintain pavement under this Contract during the guarantee period of one year and promptly (within 3 days of notice given by the Engineer) refill and repave areas which have settled or are otherwise unsatisfactory for traffic.
- B. All pavement thicknesses referred to herein are compacted thicknesses. Place sufficient mix to ensure that the specified thickness of pavement results.
- C. Paving operations shall be conducted so that there is no physical or thermal segregation of the hot mix asphalt material during transport or placement of the mix. Should segregation be observed by the Engineer, suspend paving operations immediately. The Engineer may reject material, which appears to be defective based on observation. Such rejected material shall not be used in the Work and shall be removed and replaced by the Contractor at no additional cost to the Owner.
- D. Existing drainage patterns shall not be altered by the new pavement construction unless otherwise shown on the Drawings.

- E. Furnish and spread calcium chloride on disturbed surfaces to control dust conditions when necessary, or upon direction of the Engineer.
- F. No permanent mixtures shall be placed when the air temperature is below 40 degrees Fahrenheit, or when the material on which the mixtures are to be placed contains frost or has a surface temperature that the Engineer considers too low.
- G. When the air temperature falls below 50 degrees Fahrenheit, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials and placing and compacting the mixtures.
- H. Pavement markings damaged during the course of the work shall be repaired in accordance with Section 32 17 23.
- I. In no case will pavement be placed until the gravel base is dry and compacted to at least 92.0% maximum density at optimum moisture content.
- J. All pavement edges that have been damaged shall be sawcut again if necessary to re-establish a straight clean line between the existing pavement and trench patch.
- K. Tack Coats
  - 1. Apply tack coat on the binder prior to placing the top course. The tack coat shall be RS-1 emulsion and shall be applied at a rate of 0.05 gallons per square yard on binder courses and streets to be overlaid.
  - 2. Perform a test pass with tack truck. Test pass shall be used to determine how long the tack coat needs to cure prior to beginning paving operations and for operator to adjust spray bar and nozzles as necessary. Tack shall be uniformly sprayed; "streaking" will not be allowed. Placement of top course shall not occur until the tack coat cures or "breaks," with color changing from brown to black.
  - 3. The edges of the existing pavement where the joints are to be formed shall be thoroughly coated with tack coat to ensure adhesion between the two pavements.
  - 4. The contact surfaces of curbs, castings, and other structures shall be painted with a tack coat prior to placement of paving.
- L. Place temporary HMA as soon as possible after the gravel base has been prepared, shaped and compacted for all streets, driveway and sidewalk repair. Temporary HMA shall be placed no later than the Friday following the work.
- M. Temporary Pavement Guarantee Period
  - 1. No permanent paving shall proceed until a minimum of 90 days has elapsed since placement of any temporary pavement.
- N. Until such time as the final paving is performed, maintain all temporary HMA by filling any holes that may develop and by adding additional bituminous material to maintain the surface of the trench even with the adjacent pavement.
- O. No pavement used as temporary trench repair shall remain as part of a final or permanent repair.

- P. Top course mixes shall provide for 4% air voids in the finished product. The initial in-place voids shall not exceed 7.5%. Final in-place voids shall not be below 2.5%. Additional asphalt content shall not be added for the sole purpose of reducing the in-place voids. If the in-place voids are too high or the paving is expected to occur during cold weather, more compactive effort will be required to adjust the void content rather than increasing the asphalt content.
- Q. Breakdown rolling shall not occur before the HMA has cooled to a temperature of 320 degrees Fahrenheit, and shall be completed before the HMA mat has cooled to a temperature of 275 degrees Fahrenheit. Intermediate rolling shall be completed prior to the HMA mat attaining a temperature of 200 degrees Fahrenheit. Finish rolling shall be completed prior to the HMA mat attaining a temperature of 150 degrees Fahrenheit. Roller and paver speeds shall be agreed upon with the Engineer prior to placing HMA to ensure mix temperature requirements will be met.
- R. Thermal segregation of the HMA shall be limited to a maximum of 20 degrees Fahrenheit.
- S. Cascading HMA material on the top of the finished mat with rakes or shovels will not be permitted. Coarse Aggregate dislodged as a result of unavoidable hand work shall be removed from the surface prior to rolling.
- T. Place and compact HMA materials by steel-wheeled rollers of sufficient weight to compact the HMA to 92.5% of the calculated Theoretical Maximum Density (TMD) in accordance with ASTM D2041.
- U. Along curbs, structures and all other places not accessible with a roller, the paving mixture shall be thoroughly compacted with tampers. Such tampers shall not weigh less than 25 pounds and shall have a tamping face no more than 50 square inches in size. The surface of the mixture after compaction shall be smooth and true to the established line and grade.
- V. No vehicular traffic shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled to below 140 degrees Fahrenheit or sufficiently to prevent distortion or loss of fines. HMA delivery trucks (loaded or empty) shall not be permitted on the newly completed pavement until the asphalt has cooled to below 90 degrees Fahrenheit. If the climatic or other conditions warrant, the period of time before opening to traffic may be extended at the discretion of the Engineer.
- W. Following all paving, the area along the edge of all pavement shall be backed up with gravel, or loam and seed as required, so that it is flush with the adjacent paving. Whenever possible, the final surface of the backup material shall slope away from the surface edge for drainage runoff.
- X. Following all paving, clean all catch basins and remove and dispose of all debris.

### 3.2 PAVING – BINDER COURSE

- A. Place binder course as soon as possible after the gravel base has been prepared, shaped and compacted for all streets.
- B. Binder course shall be placed on reclaimed or fully reconstructed roads as shown on the Drawings and as specified herein in preparation for the full-width top course.

C. Structure Adjustments

1. All manhole frames, catch basin frames and utility boxes are to be lowered prior to placement of the binder course. After placing the binder course, they shall be raised to the grade of the binder course until such time as the top course is placed, unless the period of time between the placement of the binder course and the placement of the top course is less than 2 weeks, in which case the frames may be raised to the grade of the top course. All excavated materials removed for raising of the frames and utility boxes are to be replaced with concrete. This ring of concrete shall be filled flush with the surrounding binder course.
2. Adjustments to existing municipally owned utility structures and appurtenances such as drainage manholes, catch basins and gate valve boxes, both within the area of excavation and within the existing paved surface, will be carried out by the Contractor prior to installation of the top course. The raising of other structures (privately owned utilities) as required to properly complete the final paving work should be completed by the structure owners. It is the responsibility of the Contractor to coordinate all such work and to assure that all structures are properly raised in a timely manner.

D. Maintain binder course in a condition suitable for traffic throughout the construction period. Defects shall be repaired within 3 days of notification.

E. Prepare the binder course for placement of the top course. The base shall be graded prior to the placement of the binder course. The binder course shall be regraded, placing additional HMA where settling has occurred, repairing the existing surface and replacing broken or damaged sections at no additional cost to the Owner. The binder course surface shall be in all respects acceptable to the Engineer before the final pavement is placed. The surface shall then be broom cleaned.

3.3 FULL-WIDTH TOP COURSE

A. Roads shall be cold planed, reclaimed, or fully reconstructed as shown on the Drawings and as specified herein in preparation for the full-width binder and/or top course.

B. Prior to the start of spreading the permanent HMA top course the road surface shall be prepared. This shall include, but not be limited to sweeping, repairing, removing of debris, adjustment of all structures for the finished, compacted overlay thickness, and tack coating the surface of the road to be overlaid.

C. Surface preparation shall also include filling and shimming all trench repair and pavement areas that have not been milled, reclaimed or reconstructed which require preparation prior to the placement of the overlay. Overlays shall not be placed over pavement areas with open seams, substantial cracks, pot-holes, depressions or other defects until proper filling and shimming has been completed.

D. When top course is placed on a new binder course, a butt joint shall be provided between new pavement and any adjoining road surfaces.

E. The final surface shall be properly graded and cambered to provide a smooth surface of proper cross-section and blended into all adjacent existing pavements. Any permanent pavement repair that in the opinion of the Engineer does not meet this

requirement, or that will form puddles 1/16-inch deep or greater shall be repaired or replaced at the Contractor's expense.

- F. The finished top course shall blend smoothly with all rim elevations of catch basins, manhole covers, gate box covers, and any other utilities, and shall in no way interfere with or alter the existing surface drainage.

### 3.4 TEMPORARY HMA TRENCH REPAIR IN ROADWAYS

- A. All manhole frames, catch basin frames and utility boxes are to be set to the grade of the trench patch until such time that permanent paving is performed. They shall then be adjusted as required by the type of permanent paving called for in this Section. Frames and utility boxes shall not be allowed to protrude above the surface of the trench patch.
- B. Prior to the excavation, sawcut the existing pavement in the vicinity of the work to prevent damage to the pavement outside of the specified paylines and/or the requirements of construction. Sawcut shall be straight and neat in appearance, any milled areas adjacent to the trench patch area shall have the edges sawcut.
- C. Immediately after completing the backfill, or in no event later than the end of the work day, place and compact a gravel subbase in 2 lifts of equal thickness. The gravel subbase shall be provided at a thickness that will result in a final thickness of 12-inches after permanent paving is performed. The Contractor will be allowed to backfill the remaining trenches to grade with gravel during the work week.
- D. All temporary pavement and structures shall be set to the existing roadway elevations. Care shall be taken to avoid the formation of puddles.
- E. A temporary HMA top course with a thickness as specified in the Drawings shall then be placed and compacted so that the upper surface shall provide the proper roadway cross-section.

### 3.5 PERMANENT HMA TRENCH REPAIR

- A. Permanent trench repairs may only occur after a period of 90 days, or such other period as determined by the Engineer, has elapsed, or 24 hours after backfill using Controlled Density Fill as approved by the Engineer.
- B. At the time of permanent patching, remove any temporary HMA trench patch or gravel materials to a depth as specified in the Drawings below the adjacent grade. Then sawcut the existing pavement beyond the edges of the trench to expose one foot of undisturbed soils and remove pavement on either side of the trench.
- C. All manhole frames, catch basin frames and utility boxes are to be lowered prior to placement of the permanent patch. After placing the permanent patch, they shall be raised to the grade of the patch until such time as the top course is placed, unless the period of time between the placement of the patch and the placement of the top course is less than 2 weeks, in which case the frames may be raised to the grade of the top course. All excavated materials removed for raising of the frames and utility boxes are to be replaced with concrete. This ring of concrete shall be filled flush with the surrounding patch.



- D. An HMA binder of the required thickness as specified in the Drawings shall then be placed and compacted to the appropriate elevation to allow the top course to be placed flush with the existing pavement.
- E. Then place and compact HMA as shown on the Drawings, using a paving screed so that the upper surface is flush with the existing roadway after compaction.
- F. The final surface shall be properly graded and cambered to provide a smooth surface of proper cross-section and blended into all adjacent existing pavements. Any permanent pavement repair that in the opinion of the Engineer does not meet this requirement, or that will form puddles 1/16-inch deep or greater shall be repaired or replaced at the Contractor's expense.

### 3.6 QUALITY CONTROL

- A. Provide a written Quality Control Plan (QCP) for the Project. As a minimum, the QCP shall contain the following information:
  - 1. QCP shall be contract specific, stating how the contractor proposes to control the materials, equipment, and construction operations including subcontractors and suppliers as well as production facilities and transportation modes to the Project for the HMA pavement operations.
  - 2. The QCP shall be submitted no later than 15 days prior to commencing the paving operations.
  - 3. The QCP shall contain the name, telephone number, duties, and employer of all quality control personnel necessary to implement the QCP. A Quality Control Technician (QCT) shall be required. The person(s) responsible for conducting quality control and inspection activities to implement the QCP. There may be more than one QCT on a project.
  - 4. The Engineer may require the replacement of ineffective or unqualified equipment or Quality Control personnel. Construction operations may be required to stop until Quality Control corrective actions are taken.
- B. All roller operators shall use infrared pistol thermometers to measure the temperature of the mat during rolling operations.

### 3.7 ACCEPTANCE

- A. When placing permanent HMA, in-place density shall be evaluated by comparing the in-place density to the TMD. The TMD shall be determined using an actual sample of plant produced HMA for production placement according to ASTM D2041 - 03a Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures. The TMD shall be calculated each day. The TMD calculated during the mix design will not be accepted. A nuclear density gauge may be used for spot checking in-place density and developing roller patterns but acceptance testing will be solely based bulk density measurement of cores taken from the final in-place mat.
- B. One core sample is to be taken for every 9000 square yards, per lift, or at least one per street, per lift (whichever is greater), at a location randomly selected by the Engineer. Cores taken for the purpose of acceptance testing shall extend the full depth of the pavement structure. Cores shall be taken no sooner than the day following

placement of the HMA. The core shall be allowed to air dry 24 hours prior to measuring density. Drying in an oven will not be permitted. Pavement at core locations shall be repaired with new HMA and made consistent with adjacent surfaces with infrared technology.

- C. Acceptance testing shall prove density of the HMA to be at least 92.5% of the TMD, not to exceed 97%.

END OF SECTION

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SECTION 32 12 17

BITUMINOUS CONCRETE BERM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Bituminous concrete berm
  - 2. For the purposes of this Section, berm and curb have the same meaning.

1.2 REFERENCES

- A. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition as amended
- B. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 2020 Edition, as amended
- C. ASTM D446 – Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers
- D. ASTM D2939 – Standard Test Methods for Emulsified Bitumens Used as Protective Coatings
- E. AASHTO T 96 – L.A. Abrasion Test
- F. AASHTO T 195 (Ross Count)
- G. TAI - (The Asphalt Institute) - MS-3 Asphalt Plant Manual
- H. TAI - (The Asphalt Institute) - MS-8 Asphalt Paving Manual

1.3 SUBMITTALS

- A. Product information and mix design for each mix specified under this Section.
- B. Sieve analysis and L.A. Abrasion test results for aggregate proposed for use in the various mixes specified.
- C. Product data sheets for all additives proposed in the mix design.
- D. Certificate indicating the mixes specified meet or exceed the requirements specified herein.
- E. Certificate indicating the mix plant conforms to Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges."

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges."
- B. Mixing Plant: Conform to Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges."

- C. Obtain materials from same source throughout.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. General

- 1. Bituminous materials shall conform to the requirements of these Specifications.
- B. Bituminous Concrete Berm shall be Class I, Type I-1, as specified in Sections 470 and M3.11.0 of the above referenced Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 edition, as amended.
- C. Tack coat shall consist of either emulsified asphalt, Grade RS-1 conforming to Section M3.03.0.

## PART 3 EXECUTION

### 3.1 PAVING – GENERAL

- A. Install bituminous concrete pavement in accordance with Section 460 of the Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 2020 edition, as amended.
- B. Paving operations shall be conducted so that there is no physical or thermal segregation of the hot mix asphalt material during transport or placement of the mix. Should segregation be observed by the Engineer, the Contractor shall suspend paving operations immediately. The Engineer may reject material, which appears to be defective based on inspection. Such rejected material shall not be used in the work and shall be removed and replaced by the Contractor at no additional cost to the owner.
- C. No mix shall be placed on wet or damp surfaces.
- D. When the air temperature falls below 50°F, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials and placing and compacting the mixtures.
- E. No mixtures shall be placed when the air temperature is below 40°F, or when the material on which the mixtures are to be placed contains frost or has a surface temperature Engineer considers too low.
- F. Regardless of any temperature requirements, no mix conforming to the requirements of these specifications shall be placed after October 31 or before May 1 of any year.
- G. Prepare the binder course for placement of the bituminous concrete berm. The binder course shall be regraded, placing additional bituminous concrete where settling has occurred, repairing the existing surface and replacing broken or damaged sections at no additional cost to the Owner. The binder course surface shall be in all respects acceptable to the Engineer before the berm is placed. The surface shall then be broom cleaned.
- H. Apply tack coat to surfaces receiving berm for proper adhesion of the new bituminous concrete pavement to the existing.

- I. Following all paving, the area along the berms shall be backed up with gravel, or loam and seed as required, so that it is flush with the adjacent paving. Whenever possible, the final surface of the backup material shall slope away from the surface edge for drainage runoff.
- J. Following all paving, all catch basins shall be cleaned. All construction debris shall be removed and disposed of at the Contractor's expense.

### 3.2 BITUMINOUS CONCRETE BERM

- A. Berm installation shall be consistent with the details of the design for 'Modified Type A Bituminous Berm' (Cape Cod Style).
- B. The ends of the existing berm shall be cut with a saw prior to construction of bituminous concrete curb repairs.
- C. Prior to the installation of berm, the pavement shall be swept with a power sweeper to remove all trash, sand, dirt, organic matter, and other undesirable material, to the satisfaction of the Engineer. The pavement shall then be prepared with a layer of tack coat to ensure proper adhesion.
- D. Construction methods and procedures for bituminous concrete curb shall be in accordance with Section 470 of the Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 edition, as amended.
- E. Repairs shall be neat in appearance, and shall blend in with the existing adjoining pavement.
- F. Protection of the bituminous concrete berm is the Contractor's responsibility. The Engineer shall perform a visual inspection of the berm 3 days after placement. Based on the inspection of berm, portions of berm which do not meet the requirements of the Contract Documents based on appearance, vandalism, workmanship, or for any other aesthetic reason, shall be corrected or removed and replaced at no additional cost to the owner.

END OF SECTION

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SECTION 32 16 13

GRANITE CURBING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Vertical Granite Curbing
- B. Related Sections
  - 1. Section 00 73 00, Supplementary Conditions
  - 2. Section 31 05 13, Borrow Material
  - 3. Section 03 30 00, Cast-In-Place Concrete

1.2 REFERENCES

- A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.
- B. Commonwealth of Massachusetts Department of Transportation – Highway Division “Standard Specifications for Highways and Bridges,” Current Edition

1.3 SUBMITTALS

- C. Submit to the Engineer, shop drawing showing dimensions, layouts and details of construction and accessories required.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Granite Curbing
  - 1. In accordance with the Commonwealth of Massachusetts Department of Transportation – Highway Division “Standard Specifications for Highways and Bridges,” Current Edition, granite curbing shall conform to the requirements of Article M.9.04.1.
  - 2. Granite curbing shall be hard and durable, fundamentally of light color, of general uniform texture, of smooth splitting appearance, and free from seams or imperfections.
  - 3. No top projections of greater than 1/8 inch shall exist, and no more than 1” projections shall exist on the back and bottom of each section.
  - 4. Vertical Granite Curbing
    - a. Granite curbing shall be Type VA4 in accordance with Commonwealth of Massachusetts Department of Transportation – Highway Division “Standard Specifications for Highways and Bridges,” Current Edition.

- b. Vertical granite curbing shall conform to the requirements of Article M.12.06 of the State of Connecticut Department of Transportation – Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004.
  - c. Standard laying length shall be no less than 6-feet.
- B. Mortar
- 1. In general, mortar shall be one part Portland cement and two parts (by volume) dry fine aggregate.
  - 2. Hydrated lime in an amount of less than 4 pounds of lime to each bag of Portland cement may be added if approved by the Engineer.
- C. Gravel Base
- 1. Processed gravel base shall be as specified in Section 31 05 13 (Borrow Materials).
- D. Concrete Base
- 1. Concrete fill shall be Massachusetts Department of Transportation (formerly MHD) Standard 3000 psi mix.
  - 2. Concrete fill shall meet the requirements of Section 03 30 00 (Cast-In-Place Concrete).

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. All granite curbing, inlets, and corners shall be installed in accordance with the "Commonwealth of Massachusetts Department of Transportation – Highway Division “Standard Specifications for Highways and Bridges,” Current Edition.
- B. Excavation shall be made of sufficient depth and width to accommodate the granular base.
- C. The line of the curbing shall be set straight and true for the full depth.
- D. Granite edging shall be set on an 8 inch minimum depth compacted processed gravel base. The gravel base shall be fine graded and thoroughly compacted with approved mechanical compactors. Concrete fill shall be placed on the front and back of the granite curbing in lieu of gravel backfill in locations where a sidewalk does not directly abut the back of the curb. In locations where a sidewalk directly abuts the back of the curb, concrete fill is only required on the front side.
- E. All granite edging shall have a 4 inch reveal from the finished pavement surface, except in the case of transition curbing, and shall be flush with adjacent sidewalks.
- F. Where edging is to be set on a radius between 10 feet and 160 feet, the maximum laying length shall be 3 foot. Where edging is to be set on a radius of 10 feet or less, the maximum laying length shall be 1 foot.
- G. The joints of all granite curbing shall be filled with cement mortar and neatly pointed on exposed surfaces. The joints of the stone curbing shall be pointed with mortar for



the full depth of the curbing. Excess mortar shall be satisfactorily cleaned from the curb.

- H. At approximately 50-foot intervals, a ½ inch joint shall not be filled with mortar to be left free for expansion.

**END OF SECTION**

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SECTION 32 16 23

PORTLAND CEMENT CONCRETE SIDEWALKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Sidewalks including wheelchair ramps
- B. Related Sections
  - 1. Section 31 23 00 - Excavating, Backfilling, Compaction and Dewatering
  - 2. Section 31 05 13 - Borrow Material
  - 3. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

- A. ACI 301 (American Concrete Institute) - Specifications for Structural Concrete for Buildings.
- B. ACI 304 (American Concrete Institute) - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- C. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- D. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- E. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- F. ASTM C33 - Concrete Aggregates.
- G. ASTM C94 - Ready Mix Concrete.
- H. ASTM C150 - Portland Cement
- I. ASTM C260 - Air-Entraining Admixtures for Concrete.
- J. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- K. ASTM C494 - Chemical Admixtures for Concrete.
- L. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- M. ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- N. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland cement concrete shall be an Air-Entrained 4,000 psi, ¾-inch mix in accordance with Section 03 30 00 – Cast-in-Place Concrete.
- B. Premolded expansion joint filler shall meet the requirements of AASHTO Designation M153, Type II.
- C. Gravel borrow for the sidewalk base shall be in accordance with Section 31 05 13 - Borrow Material.
- D. Sheet membrane curing compounds shall meet the requirements of ASTM C 309.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Shape the subgrade parallel to the proposed surface and compact thoroughly. Fill depressions with suitable material and compact again until the surface is smooth and hard.
- B. Install a gravel base to a depth of 8 inches on top of the subgrade. Fine grade the gravel base and compact thoroughly with approved mechanical tampers.
- C. Place Portland cement panels 4 inches thick for sidewalks and 6 inches thick for driveways and driveway aprons in accurately set, smooth wooden or steel forms of sufficient strength to resist springing out of shape. The gravel base shall be fine graded and recompact immediately ahead of pouring the concrete. Sidewalks shall match the top of the existing adjacent sidewalk panels.
- D. Completely remove mortar and dirt from forms that have been previously used. The forms shall be well staked and thoroughly graded and set to the established lines with their upper edge conforming to the grade of the finished walk. Oil forms before placing concrete.

#### 3.2 INSTALLATION

- A. Reinforce the concrete slab with welded wire fabric, 6x6-W4 x W4.
- B. Place concrete to half the desired depth at which point the welded wire fabric shall be placed or raised to the surface. The remaining concrete can then be placed. Care should be exercised to avoid walking in areas with reinforcing
- C. No finish work shall be performed while free water is present. After water sheen has disappeared and concrete has started to stiffen, edging operations, where required, shall be completed. After edging and joining operations, the surface shall be floated. Immediately following floating, the surface shall be steel-troweled. Following troweling, the concrete sidewalk shall be given a broom finish.
- D. Cure the concrete by covering with burlap or other acceptable material that shall be kept moist for at least five (5) days after placing the concrete.
- E. Cure the concrete by the application of a liquid membrane-curing compound as soon as free water has disappeared and the surface cannot be marred. The application should be uniform and without puddles.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. All labor, materials, accessories, service and equipment necessary to furnish and apply all pavement striping, parking stalls, and traffic markings as indicated on the Drawings and as specified herein.
  - a. New painted pavement markings
  - b. Replacement of pavement markings disturbed as part of construction activities
  - c. Replacement of pavement markings in permanent pavement repair areas

B. Related Sections

1. Section 00 73 00 – Supplementary Conditions
2. Section 32 12 16.15 - Bituminous Concrete Pavement

1.2 REFERENCES

- A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.
- B. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition, as amended.

1.3 SUBMITTALS

- A. Submit manufacturers literature and material specifications for all materials furnished under this Section including, but not limited to, the following:
  1. Pavement marking paint
  2. Reflectorized glass beads
  3. Paint application system and equipment
- B. Submit affidavit stating submitted materials comply with the above-noted Standards.

1.4 WARRANTY

- A. Provide a written one-year unconditional guarantee against fading, chipping, peeling, wearing, etc.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Waterborne Pavement Marking Paint

1. In accordance with the Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended, pavement marking paint shall conform to the requirements of Articles M.7.01.10 and M.7.01.11 for waterborne pavement marking paint.
2. All paint for parking stall and traffic markings shall be fast drying white or yellow traffic paint complying with the applicable paragraphs of the Standard Specifications. The paint shall be capable of being applied to bituminous and portland cement concrete pavements with striping equipment that does not require heating above ambient temperatures.
3. The following additional pavement marking paint requirements shall be met:
  - a. The total nonvolatile content shall not be less than 70% by weight.
  - b. Pigment shall be 45-55% by weight.
  - c. Weight per gallon shall not be less than 12.5 pounds.
  - d. Drying time to no pickup shall be 15 minutes.
4. Reflectorized Glass Beads
  - a. Glass beads shall also meet the requirements of AASHTO M247, Type 1.
  - b. In accordance with the Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended, pavement marking paint shall conform to the requirements of Articles M.7.01.10 and M.7.01.11 for waterborne pavement marking paint.
5. The material shall not lift from the pavement in the freezing weather, and shall not smear or spread under normal traffic conditions or at temperature below 120 degrees F.
6. The paint shall not deteriorate by contact with sand, sodium, chloride, calcium chloride or other chemicals used against the formation of ice on the pavement, because of the oil content of pavement materials, or from gasoline, grease and oil drippings from vehicles.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Protect the building, walks, pavement, curbing, trees, shrubs, mulch, etc. from over-spray of paint and damage.
- B. Clean and sweep all areas to be striped or re-striped of all sand, dirt, grease, oil, etc. Large areas of tar, grease or foreign materials may require sand blasting, steam cleaning or power brooming to accomplish complete removal.
- C. Application of markings shall not proceed until authorization is received from Engineer.
- D. Bituminous concrete pavements shall have been in place for at least 7 days prior to the application of pavement markings.

### 3.2 INSTALLATION

- A. Installation shall be by skilled workers who are experienced and normally employed in the Work of installing pavement markings.
- B. All permanent pavement repair areas shall be repainted to match the original pavement markings.
- C. New pavement markings shall be as shown on the Drawings and as specified herein.
- D. Painting shall be in accordance with Section 860 of the Massachusetts DPW “Standard Specifications for Highway and Bridges”, 1988 Edition, as amended.
- E. Stripe all stalls as shown on the Drawings, accurately and paint all parking stall striping in white four (4) inch wide single stripes. Striping, symbols, and arrows shall be painted to the size, length, and spacing as specified and indicated on the Drawings.
- F. All stripes shall be applied one coat with brush, spray or marking machine over dry clean pavement only.
- G. All paint shall be installed at a rate of not more than 300 linear feet of 4- inch wide lines per gallon of paint (approximately 0.016 inch dry film thickness).
- H. If material is applied to the pavement by an extrusion method, one side of the shaping die shall be the pavement and the other three sides are contained by, or are part of, suitable equipment for controlling the flow of paint.
- I. All stalls shown on the plan are to be "single stripe," and shall be spaced equally, each stall being separated from the next by a single line marking the stall width. The line indicated on the Drawings is on the center line of the stall striping. The line between rows of stalls shall be a single line.
- J. Where entire areas are to be cross-hatched as directed by the Drawings, the 4-inch-wide straight white parallel stripes 36 inches on center shall be laid out and painted in solid lines.
- K. After application and proper drying time, the material shall show no appreciable deformation or discoloration under traffic conditions and in air and/or road temperature ranging from 0 - 120 degrees F.
- L. The stripe shall maintain its original dimensions and placement. The exposed surface shall be free from tack. Cold ductility of the material shall permit normal movement with the pavement surface without chipping or cracking.
- M. No paint or pavement marking material shall be heated above the temperature allowed per manufacturer’s instructions.
- N. All painting shall be performed in a neat and workmanlike manner.
- O. Lines shall sharp and clear with no feathered edging or fogging.
- P. If, for any reason, material is spilled or tracked on the pavement or any markings applied by Contractor, in Engineer’s judgment, are not acceptable, then the Contractor shall remove such material by a method that shall not damage the roadway surface and is acceptable to Engineer, clean and prepare the surface for a reapplication of markings, and reapply the markings as directed.

Q. Application Requirements

1. Marking paint shall be applied at a rate of 100 to 115 square feet per gallon.
2. Material application temperature shall be from 40°F to 120°F.
3. No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Engineer.
4. Glass beads shall be applied at a rate of 6 pounds per gallon.
5. Minimum finished paint thickness shall be 15 mils.

3.3 PROTECTION

- A. Markings shall remain protected until sufficiently dry to bear traffic on roadways that are open to traffic.
- B. Precautions shall be taken to prevent tracking by tires of the striping equipment.
- C. Traffic cones used for protection of markings shall be not less than 28 inches in height.

END OF SECTION

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## SECTION 32 31 11

### MOTORIZED GATE

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Motorized gate
2. Gate operator system including all necessary power supplies, safety devices, and access control system, including a PC-programmable access system, including double gooseneck proximity card reader entry devices mounted on a double gooseneck-style mounting post outside the gate.
3. Entry cards

###### B. Related Sections

1. Section 32 31 13 – Chain Link Fences and Gates
2. Section 03 30 00 – Cast-in-Place Concrete

##### 1.2 REFERENCES

- A. ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- B. ASTM A787 – Electric Resistance Welded Metallic Coated Carbon Steel Mechanical Tubing
- C. ASTM B86 – Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- E. ASTM F2200 – Standard Specification for Automated Vehicular Gate Construction.
- F. UL 325 – Standards for Safety – Door, Drapery, Louver, and Window Operators and Systems
- G. UL 991 – Tests for Safety – Related Controls Employing Solid-State Devices

##### 1.3 FUNCTIONAL DESCRIPTION

- A. The gate shall open by waving a passive tag (card) within 4” of the proximity reader or by pressing a button on a radio transmitter. Visitors may request access by pressing a button adjacent to the proximity reader that will sound a buzzer inside the facility. The gate may then be opened by a toggle button located inside the Facility.
- B. The gate shall automatically open for a vehicle exiting the facility (via loop detector wiring installed under this Contract) and close after the vehicle passes (via loop detector wiring installed under this Contract) or after a timed delay, whichever occurs first.

- C. In the event of a power failure, the gate shall be manually operable with a pin assembly that can be locked with a pad lock for manual override.
- D. The gate shall have an override switch that allows it to be locked in the open position by means of either a special access code or RFID card.

#### 1.4 SUBMITTALS

##### A. Motorized Gate

- 1. Submit shop drawings showing the plan layout with dimensions and details, spacing and finishing of components, post foundation dimensions, hardware anchorage, gates and a schedule of components.
- 2. Product Data: Submit manufacturer's catalog cuts and installation instructions indicating material compliance with these Specifications.

##### B. Gate Operator and Access Control System

- 1. Evidence for all electrical components of listing with a Nationally Recognized Testing Laboratory.
- 2. Manufacturer's installation and operation and maintenance data sheets describing the features of each piece of equipment.
- 3. Block diagrams of electrical equipment
- 4. Wiring diagrams for electrical installation and loop detectors

#### 1.5 QUALITY ASSURANCE

##### A. Motorized Gate

- 1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- 2. Perform installation in accordance with manufacturer's instructions.
- 3. The Contractor shall furnish manufacturer's 5-year factory warranty against defects in materials and workmanship including cracking, peeling, blistering, and corroding.
- 4. Intermediate vertical members shall be used - with spacing between verticals to be less than 50% of the gate frame height.
- 5. Gate truck assemblies shall be tested for continuous duty and shall have precision ground and hardened components. Bearings shall be pre-lubricated and contain shock resistant outer races and captured seals.
- 6. Gate truck assemblies shall be supported by a minimum 5/8" plated steel bolt with self-aligning capability, rated to support a 2,000 lb. reaction load.
- 7. Hanger brackets shall be hot dipped galvanized steel with a minimum 3/8" thickness that is also gusseted for additional strength.

##### B. Gate Operator and Access Control System

1. Installation shall comply with all applicable codes.
2. All equipment shall be new and in current production.
3. Manufacturer shall guarantee availability of parts for a minimum of seven (7) years from the date of shipment.
4. The gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.
5. System shall be installed by a factory-authorized contractor with technicians specifically trained in this system.
6. On-site maintenance and repair service shall be available locally and within four hours of notification for emergency conditions.
7. The installation warranty shall cover the equipment, wire, and installation for five (5) years from the date of acceptance.

#### 1.6 PRODUCT HANDLING

- A. Deliver gates, posts, and accessories in packed cartons.
- B. All packages shall be labeled with the manufacturer's name.
- C. Store all fence components and accessories in a secure and dry place.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURER

- A. The gate system shall be Z series manufactured by Hoover Fence Co., Newton Falls, OH, or equal.
- B. The gate operator shall be Door King, Inc., Inglewood, CA, or approved equal.

##### 2.2 MATERIALS

- A. Material furnished shall be new and first quality.
- B. Gate manufacturer shall certify gate is manufactured in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction.
- C. Gate
  1. Gate Frame
    - a. The gate frame shall be fabricated from galvanized HF40 or aluminum Sch40 framework with notched or hammered joints.
    - b. Provide reflective striping on horizontal gate members.
  2. All welds on the gate frame shall conform to Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 Structural Welding Code. All individual welders shall be certified to AWS D1.2 welding code. See 1.02 D.

##### 2.3 GATE OPERATOR

- A. The drive shall be 1 HP continuous duty motor, 208VAC, single- phase.

- B. Gate operator speed shall be adjustable and shall incorporate a slow-start and slow-stop function. Variable speed operators shall be adjustable from 1-ft/sec to 2-ft/sec.
- C. Motor shall be directly coupled to the primary gear reduction system.
- D. Primary reduction and power transfer shall be provided by a heavy-duty worm gear running in a continuous oil bath.
- E. Operator limit switches shall be internally driven and shall not be accessible, easily tampered with or activated from outside the operator cabinet.
- F. Pulling medium shall provide a positive mechanical connection to the gate system. Friction driven rail type pulling mediums shall not be allowed. Roller chain pulling medium shall be minimum size #50.
- G. Operator shall function as a fail-secure device and shall provide a positive gate lock without the need of additional hardware or equipment.
- H. Operator shall be capable of being mounted at the front or center of the gate system and shall be designed for either left or right hand mount.
- I. Operator housing shall be G90 galvanized steel painted charcoal gray, to protect internal components.
- J. Operator shall have two 120 VAC convenience outlets available for accessory transformer power and shall have a built-in lockable power disconnect and reset switch.
- K. Gate operator shall be mounted on a minimum 12-inch thick concrete pad with the length and width 3 inches larger than the footprint of the gate operator device in each direction.
  - 1. Provide manufacture's pedestal mounting stand.
- L. Control Circuit shall be microprocessor based with the following features:
  - 1. An adjustable timer shall be built into the control board to allow the gate to automatically close.
  - 2. Operator shall allow a stop or a stop and reverse function from a safety-related input.
  - 3. A dry set of relay contacts shall be available for external use and shall have four programmable functions.
  - 4. To help reduce tailgating, a timer override function shall cause an opening gate to stop and then reverse direction when the reverse loop is clear even if the gate has not reached the full opening position.
  - 5. The control board shall have separate inputs for external contact and non-contact entrapment protection devices.
- M. Minimum Safety Features:
  - 1. Gate operator shall incorporate a fail safe design that will allow manual operation of the gate either from inside or outside without the need of hand cranks, keys, or other mechanical devices.

2. Entrapment Protection – the gate operator shall stop upon sensing an entrapment per UL 325 safety standard and assume a fail safe condition to allow any entrapment the opportunity to free itself without the need of outside assistance.
3. The gate operator shall be designed in such a way that if an obstruction is met during the opening or closing cycles, the gate operator will automatically reverse the gate. Should the primary sensing system fail to reverse the gate, an automatic secondary system will reverse the gate direction upon sensing an entrapment.

N. Control Circuit:

1. A warn-before-operate function shall activate the internal operator alarm 3-5 seconds prior to gate movement.
2. Control board shall have connections for optional Gate Tracker board. Gate tracker shall record operator cycles (x100), input errors, loop detector errors, obstruction hits, and power up events. Record shall be time and date stamped.
3. Control board shall allow a stop or a stop and reverse function (settable) from a reverse related input.
4. Control board shall have two ports for plug in of vehicular loop detectors, (DoorKing, Models 9409 or 9410).
5. A dry set of relay contacts shall be available for external use, and shall have four programmable functions.
6. A special input shall allow the gate to be partially opened.
7. A timer override function shall cause an opening gate to stop and then reverse direction when the reverse loop(s) or reverse input is clear even if the gate has not reached the full open position, to help reduce tailgating.
8. Control board shall have separate inputs for external contact and non-contact entrapment protection devices.
9. Functions will be user programmable by DIP-switches located on the control board.
10. Entrapment Protection – the gate operator shall stop upon sensing an entrapment per UL 325 safety standard and assume a fail safe condition to allow any entrapment the opportunity to free itself without the need of outside assistance.

O. Loop Detectors

1. Loop detectors shall plug into the main control board.
2. Loop detector shall prevent the gate from closing on vehicular traffic entering or leaving the facility.
3. Loop detector shall automatically open the gate for vehicle leaving the facility.

4. Loop detector shall automatically close the gate after a vehicle has entered the facility.
  5. Saw cut interior and exterior loop detectors into the existing asphalt drive and patch the cut with suitable asphalt patch.
- P. Photo cells
1. Non-contact sensors shall be use a secondary entrapment protection devices and prevent gate from closing on persons or vehicles.
- Q. Contact Edges
1. Padded contact edge sensors shall reverse gate on contact with any object.
- R. Operator unit shall also contain the receiver for the radio transmitters for entry of trucks.

#### 2.4 ACCESS CONTROL SYSTEM AND PROXIMITY CARD READER

- A. The access control system shall consist of a surface-mount style proximity card reader furnished under the security system allowance and mounted to a plate on a gooseneck-style mounting post, linked to an access control system within the WTP.
- B. A proximity card reader shall be installed outside the gate in the location shown on the Drawings. The proximity card reader shall be suitable for outdoor installation. A weather-proof "Push to Call" trigger button shall be installed adjacent to the card reader.
- C. The gate shall be opened by:
1. Waving a passive tag (card) within 4" of the card reader,
  2. Pressing a button on a remote radio transmitter, or
  3. Pressing the toggle switch in the vestibule of the facility. The "Press to Call" button adjacent to the proximity card reader shall sound a buzzer over the facility intercom system, requesting that the gate be opened by a facility operator.
- D. The PC shall be linked to the control system such that the PC may be used to program the system and record transactions (entries) allowed by the system.

### PART 3 EXECUTION

#### 3.1 GATE INSTALLATION

- A. Gate shall be installed in strict accordance with manufacturer's instructions and as specified in this Section.
- B. Contractor shall excavate, place concrete, and install 4" posts in footings as detailed and in accordance with Section 03 30 00. The process for installing the gate posts shall be as described below:
1. Hole shall be drilled in firm undisturbed or compacted soil.
  2. Holes shall have a diameter 4 times greater than the nominal outside dimension of the post, and depths approximately 6" deeper than the bottom of

the post. Holes shall be excavated deeper as required for adequate support in loose and soft soils, and for posts with heavy lateral loads.

3. Post bottoms shall be set 36" below surface when in firm, undisturbed soil, with concrete placed around post in a continuous pour. Trowel finish around posts and slope to direct water away from the posts.
  4. Each post shall be checked for vertical and top alignment and maintain in position during placement and finishing operation.
  5. Fence panels shall be aligned between posts and rail brackets firmly attached to posts with ¼" bolt and lock nut, with panels and posts remaining plumb.
- C. The gate and installation shall also comply with ASTM F 2200 and UL 325. See 1.02 A and 1.02 B.
- D. The gate shall be adjusted properly and then operated at a sufficient frequency to ensure that it is performing properly.
- E. Acceptance of the gate will require a demonstrated period of performance to the satisfaction of the Engineer.

### 3.2 GATE OPERATOR AND ACCESS CONTROL SYSTEM INSTALLATION

- A. Contractor shall mount gate operator to concrete pad, and secure it firmly, plumb, and level.
- B. Proximity card reader and "Push to Call" button shall be mounted to the faceplate of a double gooseneck-style mounting post. Mounting post shall be in-ground mount style; pole shall be recessed at least 22 inches and supported below grade by a concrete encasement as shown on the Drawings.
1. The double gooseneck-style mounting post shall be constructed of steel and painted black.
- C. One (1) Knox Box shall also be supplied, and shall be affixed to the fence, adjacent to the gate.

### 3.3 SYSTEM STARTUP

- A. Contractor shall start up and adjust system to meet the specified requirements.
- B. Contractor shall demonstrate the full function, operation, and maintenance of the system in the presence of the Owner and Engineer.
- C. Contractor shall conduct up to 4 hours of instruction in the use and operation of the system to a designated owner's representative.

### 3.4 OPERATION AND MAINTENANCE MANUALS

- A. Contractor shall provide the Owner with three (3) copies of the manufacturer's operation and maintenance manuals for the complete system. Manuals shall include wiring diagrams for the installed systems.

END OF SECTION

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SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Installation of fence framework, fabric, and accessories; excavation for post bases; concrete foundations for posts and center drop for gates; and manual gates and related hardware as shown on the plans and specified herein.

1.2 REFERENCES

- A. ASTM A53 - Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless
- B. ASTM A121 - Specification for Zinc-Coated (Galvanized) Steel Barbed Wire
- C. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- D. ASTM A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- E. ASTM A307 - Specification for Carbon Steel Externally Threaded Standard Fasteners
- F. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric
- G. ASTM A428 - Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles
- H. ASTM A491 - Aluminum Coated Fabric Wire
- I. ASTM A569 - Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality
- J. ASTM A585 - Aluminum Coated Steel Barbed Wire
- K. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-dip Process
- L. ASTM A792 - Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-dip Process
- M. ASTM A824 - Metallic Coated Steel Marcellled Tension Wire for Use with Chain Link Fence
- N. ASTM B429 - Aluminum-Alloy Extruded Structural Pipe and Tube
- O. ASTM C94 - Ready Mixed Concrete
- P. ASTM F567 - Practice for Installation of Chain Link Fence
- Q. ASTM F668 - Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric
- R. ASTM F900 - Industrial and Commercial Swing Gates
- S. ASTM F934 - Standard Colors for Polymer-Coated Chain Link Fence

- T. ASTM F1043 – Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework
- U. ASTM F1083 – Pipe, Steel, Hot-dipped Zinc-Coated (Galvanized) Welded, for fence Structures
- V. ASTM F1184 – Industrial and Commercial Horizontal Slide Gates
- W. CLFMI (Chain Link Fence Manufacturers institute) – Product Manual

### 1.3 SUBMITTALS

- A. Shop drawings showing the plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates and a schedule of components.
- B. Data indicating compliance with these specifications for the fabric, posts, accessories, fittings and hardware.
- C. Two fence samples complete with all typical hardware and components. The samples shall be representative of the type of construction for the project and color of all components.

### 1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Supply material in accordance with CLFMI – Product Manual.
- C. Perform installation in accordance with ASTM F567.
- D. Furnish a 10-year factory warranty against corrosion and rust for the entire fencing system.

### 1.5 PRODUCT HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Packages shall be labeled with the manufacturer’s name.
- C. Store fence fabric and accessories in a secure and dry place.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. General - Material furnished shall be new and first quality and shall not have been painted. Steel shall be copper bearing, containing not less than 0.2% pure copper. Materials are to be galvanized, then PVC coated - color to be selected by the Owner.
- B. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1043 Type A on pipe exterior and interior.
- C. Fabric Wire (Steel): ASTM F668 PVC coated.

- D. Barbed Wire: ASTM A121 galvanized steel; 12 gauge thick wire, 3 strands, 4 points at 3 inches on center.
- E. Concrete: ASTM C94; Air Entrained Portland Cement, 3,500 psi strength at 28 days, 3 inch slump; ¾ inch nominal sized coarse aggregate.

## 2.2 COMPONENTS

- A. Line Posts: 3 inch diameter.
- B. Corner and Terminal Posts: 4.0 inch.
- C. Gate Posts: 8 inch diameter.
- D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 2 inch diameter for welded fabrication.
- F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage thick, top selvage knuckle end closed, bottom selvage knuckle end closed.
- G. Tension Wire: 6 gage thick steel, single strand, ASTM A824.
- H. Tie Wire: Aluminum alloy steel wire.
- I. Fastener Hardware: ASTM A307

## 2.3 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel
- C. Extension Arms: Cast steel galvanized to accommodate 3 strands of barbed wire, single arm, sloped to 45 degrees.
- D. Gate Hardware: Fork latch with gravity drop with 180 degree gate hinges for each leaf and hardware for padlock. Hinges shall be non lift-off design

## 2.4 GATES

- A. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
- B. Fabricate gate frames from 1.9 inch outside diameter pipe weighing 2.72 lbs/l.f. unless note otherwise.
- C. Factory assemble gates.
- D. Gates are to be the same height as the main fence unless noted otherwise.
- E. Conform to requirements specified for PVC coated steel chain link fence except that PVC coated aluminum alloy framing conforming to ASTM B429 may be used.
- F. Design gates for operation by one person.

## 2.5 SWING GATES

- A. Fabricate gates to permit 180 degree swing.

- B. Gates Construction: ASTM F900 with welded corners. Use of corner fittings is not permitted.

2.6 CANTILEVERED SLIDING GATES

- A. Fabricate gate leaf frames and tracks of aluminum conforming to ASTM B429 alloy 6063-T6 or as required to meet performance requirements of ASTM F1184 and specified performance requirements.
- B. Frame Members: Minimum 2 inch 0.91 lb/ft aluminum tubing welded assembly forming rigid, one piece unit.
- C. Install fabric securely stretched and held in center of tubing.
- D. Brace cantilever overhang frames with 3/8 inch brace rods. For gate leaf sizes greater than 23 feet, fabricate with additional lateral support rail welded adjacent to top and bottom horizontal rails.
- E. Provide minimum overhang for each leaf opening size as follows:

Opening	Overhang
Up to 10'-0"	6'-6"
10'-0" – 14'-0"	7'-6"
14'-1" – 22'-0"	10'-0"
22'-1" – 30'-0"	12'-0"

- F. Track: Combined, integral track and rail.
- G. Rail: Aluminum extrusion; minimum total weight of 3.72 lb/ft; designed to withstand reaction load of 2.000 lbs.
- H. Roller Track Assembly: Two swivel type, zinc, die cast trucks having four, sealed lubricant ball bearing wheels minimum 2 inches diameter by 9/16 inches width designed for same reaction load as rail. Provide two side-rolling wheels for each gate leaf to maintain alignment of truck in track.
- I. Fasten trucks to post brackets by minimum 7/8 inch diameter, 1/2 inch shank ball bolts.
- J. Provide galvanized steel guide wheel assemblies consisting of two rubber wheels of minimum 4 inch diameter with oil-impregnated bearings for each supporting post.
- K. Attach guide wheel assembly to post so bottom horizontal member rolls between wheels and permitting adjustment to maintain plumb gate frames and proper alignment.

2.7 FINISHES

- A. Components and Fabric: Galvanized to ASTM A53; ASTM A123; ASTM A153, ASTM A653 for components; ASTM A392 for fabric; 2.0 oz/sq ft coating.
- B. Components and Fabric: Aluminum coating to ASTM A792, ASTM A428 for components and ASTM A491 for fabric; 0.4 oz/sq ft.

- C. Components and Fabric: Vinyl coating black color in accordance with ASTM F934 over galvanized coating to ASTM A53; ASTM A123; ASTM A153, ASTM A653 for components; ASTM A392 for fabric of 2.0 oz/sq ft galvanizing.
- D. Vinyl Components: black color to match fabric.
- E. Hardware: Galvanized to ASTM A153, 2.0 oz/sq ft coating.
- F. Accessories: Same finish as framing, fabric.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install fence with posts vertical and components to line and grade shown on Drawings.
- B. Install posts with 6 inch maximum clear opening from end posts to buildings, fences and other structures.
- C. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.
- D. Post holes shall have a plan diameter 12 inches greater than the post diameter and a minimum depth of 42 inches. Holes shall be clean and free of loose soil and debris.
- E. Line Post Footing Depth Below Finish Grade: ASTM F567, 4 feet.
- F. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567, 6 feet.
- G. Set chain link fence posts in air-entrained 3,500 psi,  $\frac{3}{4}$  inch concrete. Embed posts a minimum of 3'-0". Concrete shall be placed continuously in one operation and tamped or vibrated for consolidation.
- H. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.
- I. Extend concrete footings 1 inch above grade, and trowel, forming crown to shed water.
- J. Fill gate posts with the above specified concrete prior to the installation of gates.
- K. Where solid rock is encountered line posts shall be set to a minimum depth of 12 inches, and end, corner, gate and intermediate post to a minimum of 18 inches in the solid rock. The hole shall have a minimum width or diameter 1 inch greater than the largest dimension of the post section to be set. After the post is set and plumbed the hole shall be filled with grout consisting of one part Portland cement and one part clean, well graded sand. The grout shall be thoroughly worked into the hole so as to leave no voids.
- L. Rails, Bracing, and Fabric - Concrete shall attain 75% of the 28 day strength before rails, tension wires and/or fabric is installed. A minimum of 7 days shall pass before installation of the above items. Fabric shall not be stretched and tensioned or gates hung until the concrete attains full strength. Fabric shall be installed with two inches clear space to finish grade.

- M. Set intermediate, terminal, and gate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- N. Line post spacing shall be a maximum of 10'-0" center to center.
- O. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- P. Corner and terminal posts are to be braced horizontally and diagonally. The braces are to extend over one adjacent panel. Changes in line of 30 degrees or more shall be considered as corners.
- Q. Install top rail through line post tops and splice with 6 inch rail sleeves.
- R. On curves with a radius less than 500 feet the top rail shall be bent true to the curve.
- S. Install center, and bottom brace rail on corner gate leaves.
- T. Install framework, fabric, gates, and accessories in accordance with ASTM F567.
- U. Place fabric on outside of posts and rails.
- V. Install nuts for tension bands and hardware bolts on the side of the fence opposite the fabric.
- W. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- X. Position bottom of fabric 2 inches above finished grade.
- Y. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- Z. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- AA. Install bottom tension wire stretched taut between terminal posts.
- BB. Install support arms sloped outward and attach barbed wire; tension and secure.
- CC. Support gates from gate posts. Do not attach hinged side of gate from building wall.
- DD. Install gate with fabric and barbed wire overhang to match fence. Install three hinges on each gate leaf, latch, catches, drop bolt, foot bolts and sockets, torsion spring retainer, retainer and locking clamp.
- EE. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- FF. Miscellaneous - Install nuts for tension bands and hardware bolts on the side of the fence opposite the fabric. Repair galvanized coating where damaged using hot-applied repair compound applied in accordance with the manufacturer's recommendations.
- GG. Repair damage to galvanized coating using hot-applied repair compound in accordance with the manufacturer's recommendations.

### 3.2 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: ¼ inch in 8 feet.

B. Maximum Offset From Indicated Position: 1 inch.

END OF SECTION

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SECTION 32 32 23

SEGMENTAL RETAINING WALL SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Segmental retaining wall system

B. Related Sections

1. Section 31 05 19 – Geosynthetics
2. Section 02 81 00 – Contaminated Soil Excavation
3. Section 31 23 00 – Excavation, Backfill, Compaction and Dewatering
4. Section 31 05 13 – Borrow Materials
5. Section 33 11 13 – Ductile Iron Pipe and Fittings
6. Section 33 11 14 – Polyvinyl Chloride Pipe and Fittings
7. Section 32 12 16 – Bituminous Concrete Pavement

1.2 REFERENCES

- A. National Concrete Masonry Association Design Manual for Segmental Retaining Walls – Latest Edition.

1.3 SUBMITTALS

- A. Submit wall manufacturer product information for wall system proposed including a statement indicating project experience within the last five years of similar or greater size and complexity. Project references shall include the following minimum information:

1. Project name and location
2. Product brochures
3. Photographs of completed wall systems
4. Owner reference

- B. Final design, which shall include detailed design computations and all details, dimensions, quantities and cross sections necessary to construct the wall. Along with the requirements of the Contract, the design shall conform to the latest edition of the National Concrete Masonry Association Design Manual for Segmental Retaining Walls. The fully detailed plans shall be 24" x 36" prints with Project Name, Number and Design Firm. The plans to be submitted shall include, but not be limited to, the following items:

1. A plan and elevation sheet or sheets for each wall, containing the following:

- a. An elevation view of the wall which shall indicate the elevation at the top of the wall, at all horizontal and vertical break points and at least every twenty-five (25) feet along the wall, elevations at the top of leveling pads, elevations of reinforcement (if any), the designation as to the type of unit, and the location of the original and final ground line.
  - b. A plan view of the wall, which shall indicate: the offset from the construction centerline or baseline to the face of the wall at all changes in horizontal alignment and the limit of the widest unit.
  - c. Any general notes required for design and construction of the wall.
  - d. All horizontal and vertical curve data affecting wall construction.
2. All details for leveling pads, as well as allowable and calculated maximum bearing pressures.
  3. Backfill gradation, placement, and compaction requirements.
  4. Detailed design computations, including global stability calculations.
  5. The plans and calculations shall be prepared, stamped and signed by a Registered Professional Engineer in the Commonwealth of Massachusetts.
  6. The computations shall include all detailed explanation of any symbols and computer programs used in the wall design.

#### 1.4 CLOSEOUT SUBMITTALS

##### A. As-Built Drawings

1. After completion of the installation and prior to final acceptance, the Contractor shall submit as-built Drawings of the wall construction stamped by a Registered Professional Engineer in the Commonwealth of Massachusetts.

#### 1.5 QUALITY ASSURANCE

##### A. Certifications

1. The wall designer shall inspect the wall construction and provide a stamped Certification to the Engineer that it has been constructed in accordance with their design.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. All backfill material used in the wall construction shall be as specified by the wall designer on the approved wall plans. Backfill material requirements shown on the Drawings indicate the maximum particle size and maximum percentage of fines acceptable for use in the wall design. On-site material is not expected to be suitable as wall backfill.
- B. Retaining wall systems to be used on this Project shall be the product of one of these manufacturers:
  1. Versa-Lok Bronco

2. Keystone
3. Redi-Rock
4. Or equal

### PART 3 EXECUTION

#### 3.1 PREPARATION

##### A. Foundation Preparation

1. The foundation for the structure shall be graded level for a width as shown on the submitted wall plans. Prior to wall construction, the foundation, if not on sound, intact, bedrock, shall be compacted as indicated on the submitted wall plans. Any foundation soils found to be unsuitable shall be removed and replaced as directed by the Engineer. Subgrade preparation shall be performed in accordance with Section 31 23 00.

#### 3.2 WALL ERECTION

- A. The wall system, including but not limited to, blocks, reinforcement, and backfill materials, shall be constructed in accordance with the manufacturer's recommendations and the latest edition of the National Concrete Masonry Association Design Manual for Segmental Retaining Walls, unless superseded by these Specifications or the submitted wall plans.
- B. Backfill placement shall closely follow erection of each course of wall units. Backfill shall be placed in such a manner as to avoid any damage to the wall materials or misalignment of the units. Any wall components, which become damaged or disturbed during backfill placement, shall be either removed and replaced or corrected at the Contractor's expense, as directed by the Engineer. All backfill material shall meet the requirements contained in Section 31 23 00 unless superseded by the submitted wall plans.

END OF SECTION

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SECTION 32 92 00

LANDSCAPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Loam Borrow
  - 2. Preparation of Backfill Mix
  - 3. Planting of Trees, Shrubs and Bushes
  - 4. Maintenance

1.2 REFERENCES

- A. Massachusetts Department of Public Works Standard Specifications for Highways and Bridges (MDPW) 1988, as amended.
- B. American Nursery & Landscape Association (ANLA) standards

1.3 SUBMITTALS

- A. Samples
  - 1. Submit representative Samples to Engineer for selection and approval. Delivered materials shall match the approved Samples.
    - a. Loam Borrow: Provide representative Samples for testing and approval as directed by the Engineer. Deliver Samples to testing laboratory, having testing report sent directly to the Engineer, and pay all costs.
      - 1) Mechanical and chemical (pH soluble salts) analysis shall be by a public extension service agency or a certified private testing laboratory in accordance with the current standards of the "Association of Official Agricultural Chemists."
      - 2) Report shall be submitted before any loam is to be placed. Soil shall be tested for organic content, Nitrate-Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts and acidity.
    - b. Mulch: Submit one sample and provide the name and address of the Supplier.
- B. Anti-desiccant: Submit manufacturer information.
- C. Tree Paint: Submit manufacturer information.
- D. Planting Soil Analysis: A standard soil test shall be performed by a licensed commercial testing laboratory or government agency approved by the Engineer. Soil test shall provide recommendation for the addition of fertilizer, lime, and other amendments.

- E. Furnish complete written instructions for maintenance of the plant materials to the Owner at least ten days prior to the end of the maintenance period in order to familiarize the Owner with the proper care and development of the plantings.
- F. Furnish certifications from plant Suppliers indicating the botanical name, quantity, and size of plants to be delivered to the Project.
- G. Inspection and Acceptance: Submit inspection notice and planting plan.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work with experienced personnel under the direction of a skilled foreman with a minimum three years of experience with similar type and size projects.
- B. Plants are subject to inspection and approval by the Engineer before delivery for conformity to Specification requirements as to quality, size and variety.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Only deliver plant materials immediately prior to installation.
- B. Deliver plant materials to the Site in accordance with the best horticultural practices to prevent damage.
- C. Move and handle plant materials so as to prevent damage to roots and crowns.
- D. "Heal-in" plants that cannot immediately be installed with bark mulch or wood chips in a location that protects the plants from sun and wind. Root balls and containers shall be completely covered and kept consistently moist until installation.
- E. Replace damaged and unhealthy plant materials prior to installation.

#### 1.6 SITE CONDITIONS

- A. Examination of Conditions
  - 1. All areas to be planted shall be inspected by the Contractor before starting Work and any defects such as incorrect grading, etc., shall be reported to the Engineer prior to beginning this Work. The commencement of Work by the Contractor shall indicate his acceptance of the areas to be planted, and he shall assume full responsibility for the Work of this Section.

### PART 2 PRODUCTS

#### 2.1 LOAM

- A. Loam shall consist of loose friable topsoil with no admixture of refuse or material toxic to plant growth. Loam shall be generally free from stones, lumps, stumps, or similar objects larger than 1 inch in greatest diameter, subsoil, roots, and weeds. The term as used herein shall mean that portion of the soil profile defined technically as the "A" horizon by the Soil Science Society of America. The pH shall be from 5.5 to 7.6. Loam shall contain a minimum of three percent and a maximum of ten percent of organic matter as determined by loss by ignition. Not more than 65 percent shall pass a No. 200 sieve as determined by the wash test in accordance with ASTM D 1140. In no instance shall more than 20 percent of that material passing the No. 4 sieve consist of clay size particles.

- B. The topsoil stripped and stockpiled on the Site may be used provided that, after testing and addition of necessary additives, it meets the above specifications. The Provide additional loam as required. All excess loam shall become the property of the Contractor and be legally disposed of off-site.

2.2 SOIL ADDITIVES

- A. Commercial fertilizer, peat, humus or other additives shall be used to counteract soil deficiencies as recommended by the soil analysis and as directed by the Engineer.

- 1. Commercial fertilizer shall be a product complying with State and Federal requirements. Deliver to the Site in the original unopened containers, which shall bear the manufacturer's Certificate of Compliance covering analysis, which shall be furnished to the Engineer. At least 50 percent by weight of the nitrogen content shall be derived from organic materials. Fertilizer shall contain not less than the percentages of weight of ingredients as follows or as recommended by the soil analysis:

	<b>Nitrogen</b>	<b>Phosphorous</b>	<b>Potash</b>
For deciduous trees & shrubs	10%	6%	4%
For evergreen trees & shrubs	7%	7%	7%

- B. Planting soil shall be prepared based on the following proportions.
  - 1. Three parts loam with a pH of 6.0 to 6.5.
  - 2. One part dehydrated sterilized manure
    - a. Manure shall be well-rotted, unleached stable manure not less than eight months and not more than two years old. It shall be free from sawdust, shavings, or refuse of any kind and shall not contain over 25 percent straw. Furnish information as to kind of disinfectant or chemicals, if any, that may have been used in storage of the manure.
  - 3. One part peat moss
    - a. Peat moss shall be composed of the partly decomposed stems and leaves of any or several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue, mineral matter such as sulfuric and iron harmful to plant life. It shall have a water absorbing capacity of 1100 percent to 2000 percent, and a moisture content of 30 percent. It shall have an acidity range of 3.5 pH to 5.5 pH as determined in accordance with the test methods of A.O.A.C.
- C. Humus shall be natural humus, reed peat or sedge peat. It shall be free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C. latest edition, the acidity range shall be approximately 5.5 pH to 7.6 pH and the organic matter shall be not less than 85 percent as determined by weight on an over-dry basis.
- D. Leaf mold shall be highly organic dark brown to black spongy residue resulting from the well aerated composting of deciduous tree leaves. It shall be at least three years old, without recognizable leaf parts, free of plants and their roots, debris and other

extraneous matter and shall be uncontaminated by foreign matter and substances harmful to plant growth. The organic matter shall not be less than 85 percent by weight as determined by the loss on ignition of oven-dried Samples. Test Samples shall be oven-dried to a constant weight at a temperature of 110° C. The inorganic residue after ignition shall not be finer textured than 4 percent by weight passing the number 200 sieve with washing.

- E. The following amendments shall be incorporated into the prepared planting soil prior to backfilling of planting pits in accordance with the recommendations of the planting soil analysis.
1. Fertilizer: Complete with 70 percent of the nitrogen derived from organic sources.
  2. Lime: Ground dolomite limestone; 95 percent passing through a 100-mesh sieve.
  3. Super Phosphate: Finely ground phosphate rock as commonly used for agricultural purposes containing not less than 18 percent available phosphoric acid.
  4. Bone Meal: Bone meal shall be fine ground, steam-cooked, packing house bone with a minimum analysis of 18 percent phosphoric acid and 1.0 percent nitrogen.
  5. Peat Moss

### 2.3 PLANT MATERIALS

- A. Installation of plants larger than specified will be acceptable only if approved by the Engineer, and at no increase to the Contract price. All plants shall be nursery grown unless specifically authorized to be collected.
- B. Plant Material Requirements:
1. Plants shall be in accordance with the U.S.A. Standard for Nursery Stock of the ANLA, latest edition.
  2. Hardy under climatic conditions similar to those in the locality of the Project. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within the hardiness of Zones 4 through 6, as established by the Plant Hardiness Zone Map Miscellaneous Publications No. 814, Agricultural Research Service, US Department of Agriculture latest revision, will be accepted. Suppliers must certify in writing that the stock has actually been grown under required zones. Plants not so certified will not be accepted.
  3. Plants shall be typical of their species or variety, with a normal habit of growth. The root system of each shall be well provided with fibrous roots. All parts shall be moist and show active green cambium when cut. They shall be sound, healthy and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae.
  4. Dimensions shall conform to Specifications in the current edition of Horticultural Standards of the ANLA.



C. Trees

1. The height of the trees (measured from the crown of the roots to the tip of the top branch) shall be not less than the minimum size designated. Take caliper measurement six inches above ground level up to and including four inch caliper size and twelve inches above ground for larger sizes. The trunk of each tree shall be a single trunk growing from a single un-mutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or abrasions resulting from fire or other causes. No pruning wounds shall be present having a diameter exceeding two inches and such wounds must show vigorous bark on all edges. Plants shall not be pruned prior to delivery.

D. Shrubs

1. Shrubs shall meet the requirements for spread or height stated in the Plant List. The measurements for height are to be taken from the ground level to the average height of the shrub and not to the longest branch. The thickness of each shrub shall correspond to the trade classification "No. 1." Single stemmed or thin plants will not be accepted. The side branches must be generous, well-twigged, and the plant as a whole wee-branched to the ground. The plants must be in a moist vigorous condition, free from dead wood, bruises or other root or branch injuries. Plants shall not be pruned prior to delivery.

E. Plant Transport and Delivery

1. All plants must be moved with the root system as solid units with balls of earth firmly wrapped with untreated eight ounce burlap, firmly held in place by a stout cord or wire. The diameter and depth of the balls of earth must be sufficient to encompass the fibrous and root feeding system necessary for the healthy development of the plant. No plant shall be cracked or broken preparatory to or during the process of planting or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and balls shall remain intact during all operations. All plants that cannot be planted at once must be heeled in by setting in the ground and covering the balls with soil and then watering them.
2. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in the container.
3. Plants delivered by truck and plants requiring storage on Site shall be properly wrapped and covered to prevent wind-drying and desiccation of branches, leaves or buds. Plant balls should be firmly bound, unbroken, and reasonably moist to indicate watering prior to delivery and during storage, and tree trunks should be free from fresh scars and damage in handling. No trees with double-leaders or twin-heads shall be acceptable without the written approval of the Engineer. The Contractor shall reject such plants at time of delivery by the nursery/Supplier unless such plants were selected by the Engineer as indicated by tags and seals. No plant material from cold storage will be accepted.

2.4 STAKES, WIRE AND HOSE

- A. Stakes for supporting trees shall be of sound hardwood of uniform size, reasonably free of knots, with a maximum allowable deflection of one-half inch for every one foot of length, free from insects and fungi and capable of standing in the ground at least two years. Stakes eight to ten feet long shall have a minimum diameter of between two to two and one-half inches. Stakes twelve feet long shall have a minimum diameter of three inches. Stakes shall be pointed at one end and shall be stained dark brown.
- B. Hose to encase wires shall be new two ply reinforced rubber garden hose not less than one-half inch inside diameter. Wire for guying plants shall be new pliable annealed galvanized steel wire, A.S.&W. twelve-gauge or gauge as shown on the Drawings.
- C. The size and quality of cables, turnbuckles, thimbles, leg hooks, eye bolts, rods, washers and nuts shall be as shown on the Drawings or as approved by the Engineer.
- D. Drive anchors and guy wire assembly shall be as manufactured by Laconia Malleable Iron Works, Laconia, New Hampshire, or equal. Sizes used shall be in accordance with the manufacturer's recommendations.

## 2.5 MULCH

- A. Mulch shall be aged pine bark mulch aged sufficiently so that it will not float in water or aged for a period of six months, whichever is greater. The mulch shall be dark brown in color, free of chunks and pieces of wood thicker than one-quarter inch. Mulch must be free of stringy material and shall not contain, in the judgment of the Engineer, an excess of fine particles.

## 2.6 WRAPPING MATERIAL

- A. Wrapping material shall be first quality, eight to ten inches wide heavy waterproof crepe paper or six-inch wide burlap manufactured for this purpose. Twine for tying shall be a lightly tarred medium or coarse sisal yarn, two ply for trees three inches or less in diameter and three ply for trees over three inches in diameter.

## 2.7 ANTI-DESICCANTS

- A. Anti-desiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Anti-Desiccant shall be "Wilt-Pruf" or equal.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions
  - 1. Refer to Drawings showing finish grades. No installation of plants shall take place until all subgrade elevations have been completed.
  - 2. Prior to planting, verify locations and depth of underground utilities. Exercise care when digging in these areas. Assume responsibility for any damage and replace or repair any damage at the Contractor's expense to the satisfaction of the Engineer.

### 3.2 PREPARATION

A. Field Measurements

1. Make all necessary measurements to properly locate the plants as shown on the Drawings. Location and arrangement of plants shall be approved by the Engineer prior to installation.
2. Plants installed prior to approval by the Engineer shall be relocated, if necessary, at no additional cost to the Owner.

3.3 INSTALLATION

A. Time of Planting

1. The time of planting shall be guided by the schedule below unless otherwise approved by the Engineer based on plant types, weather conditions or other factors that may be detrimental to plant growth.

Material Type	Spring	Fall
Deciduous	March 15 <sup>th</sup> to June 1 <sup>st</sup>	October 15 <sup>th</sup> to November 1 <sup>st</sup>
Evergreen	March 15 <sup>th</sup> to June 1 <sup>st</sup>	August 15 <sup>th</sup> to October 1 <sup>st</sup>
Wetland Plants	March 15 <sup>th</sup> to June 1 <sup>st</sup>	August 15 <sup>th</sup> to October 1 <sup>st</sup>

B. Plantings General

1. All plantings shall be in accordance with ANLA standards.
2. Location for all plants and outlines for planting areas shall be staked on the ground by the Contractor for approval by the Engineer before any plant pits or plant beds are excavated.
3. At least ten days prior to the expected planting date, the Contractor shall request, in writing, that the Engineer provide a representative to select and tag stock to be planted under this section.
4. Plants shall be selected by the Engineer at the place of growth for conformity to specification requirements as to quality, size, and variety. Such approval shall not impair the right of inspection and rejection upon delivery at the Site or during the progress of the Work. Cost of replacement shall be borne by the Contractor.
5. Maintain at all times during the planting operations one or more stockpiles of approved planting soil.
6. If planting is done after lawn preparation or installation, proper protection of lawn areas shall be provided and any damage resulting from planting operations shall be repaired immediately at no cost to the Owner.
7. In the event that rock or obstructions are encountered in any plant pit or bed excavation, alternate locations may be selected by the Engineer.
8. Absolutely no debris may be left on the Site. Excavated material shall be removed as directed by the Engineer. Repair any damage to Site or structures to restore them to their original condition as directed by the Engineer.

### 3.4 INSTALLATION—GENERAL

#### A. Planting Pits

1. Excavate to the depths and widths necessary to achieve the dimensions indicated on the Drawings.
2. Excavated soil and material may be used as a portion of the backfill and planting soil provided it meets the requirements of paragraph 2.1.
3. Plant pits shall be excavated with sloped sides. Plant trees and shrubs in pits 12 inches greater in width than the diameter of the root ball. Pit depth shall be sufficient to ensure a minimum of 6 inches of planting soil mixture under plant root system.
4. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation and on the ground until the final planting. Set plants in center of pits, plumb and straight and at level that top of root ball is 1 inch lower than surrounding finished grade after settlement.

#### B. Cover, Watering, and Fill

1. Compact planting soil thoroughly around base of root ball to fill all voids, when plant material is set. Cut all burlap and lacing and remove from top of root ball. Do not pull burlap from under any root ball. Backfill pits halfway with planting soil mixture and thoroughly puddle before backfilling pit. Water planting, again, when each backfill operation is complete.
2. Immediately after plant pit is backfilled, form a shallow saucer slightly larger than pit with ridge of soil to facilitate and contain watering. Grub out sod or other growth and remove from bed area. Rake bed area smooth and neat. All plants shall be flooded with water twice within the first 24 hours of planting and all plants shall be watered at least twice each week during the maintenance period. At each watering the soil around each tree or shrub shall be thoroughly saturated. If sufficient moisture is retained in the soil, as determined by the Engineer, the required watering may be reduced. Trees will require a minimum of ten gallons of water each; shrubs a minimum of five gallons each.
3. Pine bark mulch is to be placed in a 3 inch thickness around the planting, not later than one week after planting. The area to be mulched shall be circular with a diameter of 12 inches greater than the plantings root ball. No mulch shall be applied prior to the first watering of plant materials. Mulch is to be contained around the circumference of the planting by means of installing a metal edge strip. Metal edge strips shall be fastened securely in place with tapered metal stakes at 30 inch intervals along the strip. Set edge strips to finished grade.
4. Planting soil shall be to a minimum depth of 24 inches or as shown on the Drawings.
5. Ground cover beds shall be dug to a depth of one foot below final grade. Supply sufficient planting mix where required to provide one-foot-deep beds.

#### C. Staking and Anchoring

1. All trees and plantings 10 feet or higher shall be firmly staked, guyed or anchored at the time of planting as shown on the Drawings, unless otherwise approved or directed by the Engineer. A minimum of two stakes shall be installed plumb and neat in appearance and shall not injure plant balls.

D. Anti-Desiccant Application

1. Apply anti-desiccant to all evergreen trees and shrubs and to all deciduous plant materials which are leafed out at time of planting. Rate and method of application shall be in accordance with manufacturer's recommendations. Anti-desiccant shall be applied to all plants before digging at the nursery and/or as directed by the Engineer once the plants have been delivered to the Site.

E. Pruning

1. Prune each tree and shrub in accordance with ANLA standards to preserve natural form and character of plant. All pruning is to be done with clean, sharp tools and carried out only by workmen thoroughly familiar with this type of Work.
2. All dead wood or suckers and all broken or badly bruised branches shall be removed. In addition, one-fourth of the wood shall be removed by thinning out and shortening branches to balance root loss due to retransplanting.
3. Cuts over one inch in diameter shall be painted with an approved tree paint. Paint shall cover all exposed living tissues.

3.5 MULCHING DECIDUOUS AND EVERGREEN PLANTS

- A. Cover all tree pits and shrub beds with bark mulch. Neatly outline the edges of the saucer at a uniform radius from the tree trunk.

3.6 REPLACEMENT OF DECIDUOUS AND EVERGREEN PLANTS

- A. Dead or declining plant material shall be removed immediately and replaced as soon as possible with a new, healthy plant of the same type and size as specified, at no additional cost to the Owner. Replacement plants shall be maintained and guaranteed for 1 year from time of replacement.
- B. All plant material required under this contact, deemed by the Engineer to be unsightly, unhealthy, or excessively pruned, during and at the end of the guarantee period, shall be replaced as soon as conditions permit.
- C. At the end of the maintenance period all plant material shall be in a healthy growing condition.

3.7 PLANT MAINTENANCE

- A. Begin maintenance immediately after planting and continue for 1 year from date all plantings have been installed or until the final acceptance of the Project. Plantings done in late fall after November 1st shall be maintained until the second spring leafing.
- B. Continue the maintenance period at no additional cost to the Owner until all previously noted deficiencies have been corrected, at which time the final inspection will be made. Plants that die during the maintenance period shall be replaced as directed by the Engineer.

- C. Maintenance shall consist of keeping the plants in a healthy growing condition and shall include watering, weeding, cultivating, remulching, removal of dead material, resetting plants to proper grades or upright position and maintaining the planting saucer. Spraying for both insect pests and diseases shall be included during the maintenance period as required and as directed by the Engineer.
- D. Provide all equipment and means for proper application of water to plants. All plants shall be watered at least twice each week. At each watering, the soil around each tree or shrub shall be thoroughly saturated during the maintenance period. If sufficient moisture is retained in the soil, as determined by the Engineer, the required water may be reduced. Trees will require a minimum of ten gallons of water each; shrubs a minimum of five gallons each.
- E. Stakes shall be kept plumb and neat in appearance. Guys shall be tightened and repaired weekly.
- F. Planting beds and individual plant pits shall be kept free of weeds and mulch shall be replaced as required to maintain a 4" layer of mulch. Beds and individual pits shall be neat in appearance and maintained to the lines originally laid out.
- G. Fertilize plants in spring and fall.
- H. Protect all planted areas against damage, including erosion and trespassing by providing and maintaining proper safeguards.

### 3.8 INSPECTION AND ACCEPTANCE

- A. The Engineer shall be the sole judge of acceptance.
- B. All materials and workmanship will be subject to inspection and examination by the Engineer, and he/she shall have the right to reject defective materials and workmanship or require corrections.
- C. Submit planting plans indicating the dates plants were installed for purposes of establishing warranty and replacement dates.
- D. Certification of Acceptance and Guarantee
  - 1. Submit written notice requesting inspection by the Engineer at least 10 days prior to the end of the maintenance period. If the plant material and workmanship are acceptable, written notice will be given by the Engineer to the Contractor stating that the guarantee period begins from the date of the Certificate of Acceptance.
  - 2. If a substantial number of plants are sickly or dead at the time of inspection, acceptance will not be granted, and the Contractor's responsibility for maintenance of all the plants shall be extended until replacements are made. All dead and unsatisfactory plants shall be promptly removed from the Project. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner.
  - 3. Plants shall be true to botanical name and size, and in vigorous healthy growing condition.

4. Plants shall be guaranteed for a period of one year after inspection and acceptance and shall be alive and in satisfactory growth at the end of the guarantee period.
5. At the end of the guarantee period, inspection will be made again. Any plant required under this Contract that is dead or unsatisfactory shall be removed from the Site. Each plant shall show at least 80 percent healthy growth and shall have the natural character of a plant of its species in accordance with the American Nurserymen's Association standards. These plants shall be replaced during the normal planting season, until the plants live through one year. A final inspection for acceptance will be made after the replacement plantings have lived through one year.
6. All replacements shall be plants of the same kind and size specified in the plant list. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.
7. Provide a physical handbook of maintenance instructions for all plant material installed. This handbook shall contain all necessary maintenance information, which will enable the Owner to maintain new plantings in a vigorous condition. Before planting Work is completed, submit two handbook copies to the Engineer for approval. Upon the acceptance of the planting Work, one handbook copy shall be furnished to the Owner for his future reference. The Engineer may require resubmittal of the Owner maintenance instructions if it is determined that the information provided is not sufficient to allow for proper maintenance.

END OF SECTION

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SECTION 32 92 19

LAWNS AND GRASSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Restoration of all vegetated areas disturbed during construction including:
  - a. Lawn areas
2. New loam and seed areas
3. Loam, starter fertilizer, lime, lawn seed, and hydric seed
4. Mulch

1.2 SUBMITTALS

- A. Lawn seed mixture including percent by weight of each seed type, and manufacturer/Supplier name.
- B. Suitable laboratory analysis of the topsoil to determine the quantity of fertilizer and lime to be applied.
- C. Lime and starter fertilizer application rates based on laboratory soil tests.
- D. A sworn certificate indicating each variety of seed, weed content, germination of seed, net weight, date of shipment and manufacturer's name shall accompany each seed shipment.

1.3 QUALITY ASSURANCE

- A. Place seed only between the periods from April 15<sup>th</sup> to June 1<sup>st</sup>, and from August 15<sup>th</sup> to October 1<sup>st</sup>, unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Loam

1. Loam from offsite, as required for Work, shall be taken from a well-drained, arable site, and shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Loam shall not be delivered or used for planting while in a frozen or muddy condition. Topsoil as delivered to the Site or stockpiled shall have pH between 6.0 and 7.0 and shall contain not less than 5 percent or more than 8 percent organic matter as determined by loss of ignition of moisture-free Samples dried at 100 degrees Celsius.

2. Onsite loam may be available from stripping of onsite topsoil. Onsite topsoil shall be tested as specified below and shall be amended as necessary to meet Specification requirements for loam.
3. Soil Analysis: The Contractor shall submit representative Samples of loam, which he intends to bring onto the Site, and Samples of loam from onsite sources, to a Soil and Plant Testing Laboratory acceptable to the Engineer. All reports shall be sent to the Engineer for approval. Samples of loam to be brought to the Site must be approved prior to delivery of soil. Deficiencies in the loam shall be corrected by the Contractor, as directed by the Engineer after review of the testing agency report by a soils consultant. Testing reports shall include the following tests and recommendations.
  - a. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.
  - b. The silt clay content shall be determined by a Hydrometer Test.
  - c. Percent of organics shall be determined by an Ash Burn Test or Walkley/Black Test.
  - d. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and acidity (pH).
  - e. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish particular lawn and planting objectives noted.
  - f. All tests shall be performed in accordance with the current standards of the Association of Official Agriculture Chemists.
4. Loam for General Lawn and Site Restoration Areas: Loam shall conform to the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	----
18	84	100
35	63	72
140	26	40
270	22	34
0.002 mm	2	5

<sup>1</sup>The ratio of the particle size for 80% passing ( $D_{80}$ ) to the particle size for 30% passing ( $D_{30}$ ) shall be 6 or less ( $D_{80}/D_{30} < 6$ ).

<sup>2</sup>Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

<sup>3</sup>Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

<sup>4</sup>The organic content shall be between 4.0 and 6.0 percent.

5. Place a minimum of 4 inches of loam.

**B. Typical Sand Amendment**

1. Sand to be mixed with topsoil shall meet the following requirements. The material shall be uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock and free from loam or clay, surface coatings, mica, other deleterious materials with the following gradation.

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	----
18	60	80
35	35	55
60	8	20
140	0	8
270	0	3
0.002 mm	0	0.3

<sup>1</sup>Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 10% by weight of the total sample.

<sup>2</sup>The ratio of the particle size for 70% passing ( $D_{70}$ ) to the particle size for 20% passing ( $D_{30}$ ) shall be 3.0 or less ( $D_{70}/D_{20} < 3.0$ ).

<sup>3</sup>Tests shall be combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

**C. Starter Fertilizer**

1. Starter fertilizer shall bear the manufacturer's name and guaranteed statement of analysis, and shall be applied in accordance with the manufacturer's directions.
2. Starter fertilizer shall be Scott's Starter Fertilizer, or equal, with timed nitrogen release to prevent burning.

**D. Lime**

1. Lime shall be applied at the rates recommended in the soil analysis.

**E. Seed**

1. Seed shall be of the previous year's crop.
2. Required properties:
  - a. Purity > 90%

- b. Germination > 80%
  - c. Crop < 0.5%
  - d. Weed < 0.3%
  - e. Noxious Weed - 0%
  - f. Inert < 8%
3. Grass seed shall conform to the following mixture in proportion by weight and weed content and shall pass the minimum percentages of purity and germination as indicated for same.

Open Field Mix	% Weight
Red Fescue (Creeping)	60%
Red Top	10%
Crown Vetch	30%

4. All seed shall comply with State and Federal seed Laws and Regulations.

**F. Mulch**

1. Shall be a specially processed 100 percent Virgin wood fiber mulch containing no growth or germination-inhibiting factors. Wood fiber mulch shall be Second Nature Regenerated wood fiber as by Central Fiber Corporation, Wellsville, KS or equal. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogenous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the wood fiber shall be marked by the manufacturer to show the air dry weight content and not contain in excess of 10 percent moisture.

**PART 3 EXECUTION**

**3.1 RESTORATION**

- A. In locations where the Work passes through existing grass, weed brush or tree-surfaced areas that are not covered by a specific lawn repair item, surface restoration shall be as follows:
- 1. After completion of backfilling, the existing loam and organic ground cover materials that were salvaged during excavation shall be returned to the top of the trench.
  - 2. After natural settlement and compaction has taken place, the trench surface shall be harrowed, dragged and raked as necessary to produce a smooth and level surface.

3. The area is then to be sowed with “orchard grass” or “rye grass” or other such materials to hold the soil and produce a growth similar to that existing prior to construction.

### 3.2 PREPARATION

- A. After rough grading of the subgrade has been completed and approved, the subgrade surface shall be scarified to a depth of four (4) inches. Then furnish and install a layer of loam providing a rolled four (4) inch thickness. Any depressions which may occur during rolling shall be filled with additional loam, regraded and rerolled until the surface is true to the finished lines and grades. All loam necessary to complete the Work under this section shall be supplied by the Contractor.
- B. The ground surface shall be fine graded and raked to prepare the surface of the loam for lime, fertilizer and seed.
- C. The loam shall be prepared to receive seed by removing stones and grading to eliminate water pockets and irregularities prior to placing seed. Finish grading shall result in straight uniform grades and smooth, even surfaces without irregularities to low points.
- D. All stones over one-half ( $\frac{1}{2}$ ) inch in diameter remaining on the surface after raking shall be removed.
- E. Shape the areas to the lines and grades required. The Contractor's attention is directed to the scheduling of Loaming and Seeding of graded areas to permit sufficient time for the stabilization of these areas.
- F. All areas disturbed by construction within the property lines and not covered by structures, pavement, or bark mulch shall be loamed and seeded.
- G. Limestone shall be thoroughly incorporated into the loam layer at a minimum rate of 3 ton per acre or more as recommended by the loam analysis in order to provide a pH value of 5.5 to 6.5.
- H. Fertilizer shall be spread on the top layer of loam at the minimum rate of 500 pounds per acre or more as recommended by the loam analysis and worked into the surface

### 3.3 LOAM AND SEED AREAS

- A. The seed mixtures shall be applied at a minimum rate of 4.5 pounds per 1,000 square feet.
- B. Seed shall be sown at the rates indicated above by rotary or drop spreader. Sowing shall be done on a calm, dry day. Immediately before seeding, the soil shall be lightly raked. One half the seed shall be sown in one direction and the other half at right angles to the original direction. It shall be lightly raked into the soil to a depth not over 1/4 inch and rolled with a hand roller weighing not over 100 pounds per linear foot of width.
  1. Straw mulch shall be applied immediately after seeding at a rate of 1.5 to 2 tons per acre. Mulch that blows or washes away shall be replaced immediately and anchored using appropriate techniques.

2. The surface shall be watered and kept moist with a fine spray as required, without eroding the soil, until the grass is well established. Any areas, which are not satisfactorily covered with grass, shall be reseeded, and all noxious weeds shall be removed.
- C. Unless otherwise approved, seeding shall be done between the periods from April 15<sup>th</sup> to June 1<sup>st</sup>, and August 15<sup>th</sup> to October 1<sup>st</sup>, when soil conditions and weather are suitable for such Work.

### 3.4 MAINTENANCE

- A. Maintenance shall include watering, weeding, removal of stones and other foreign objects over one half (1/2) inch in diameter, cutting the grass until final acceptance. Mow at least weekly, removing no more than 30-40 percent of the leaf tissue using well sharpened blades. Mow grass between one (1) and two (2) inches high in the spring and fall. Mowing heights shall be an additional one-half to an inch in the summer to reduce temperature stress. Leave the clippings in place to help recycle essential plant nutrients needed for growth. All bare or dead spots which become apparent shall be properly prepared, re-loamed, limed, aerated, fertilized, and reseeded as many times as necessary to secure a good growth. The entire area shall be maintained, watered and cut until final acceptance of the lawn installation.
- B. The dressed and seeded areas shall be sprinkled with water as necessary from time to time. Signs and barricades should be placed to protect the seeded areas.
- C. To be acceptable, seeded areas shall consist of a uniform stand without bare or dead spots of at least 90 percent established permanent grass species, with uniform count of at least 200 plants per square foot.
- D. The Engineer shall determine whether maintenance shall continue in any part.
- E. After all necessary corrective Work and clean-up has been completed, and maintenance instructions have been received by the Owner, the Engineer will certify in writing the acceptance of the lawns.
- F. Substantial Completion will not be achieved until the seeded areas have demonstrated a satisfactory stand of growth as determined by the Engineer. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

END OF SECTION

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## SECTION 33 01 30

### TELEVISION INSPECTION OF PIPELINES

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Closed-circuit television (CCTV) inspection of pipelines

##### 1.2 SUBMITTALS

- A. Manufacturer's product data for the television inspection equipment, including camera, television monitor, carriage, recording device, signal conductor cable, etc.
- B. Information on database/software that will be used to store and review inspection data.
- C. Sample of television inspection log that will be used. Provide a legend for all abbreviations, symbols, codes, etc. used on the logs.
- D. Documentation submittals

1. Two printed copies of the television inspection reports, provided weekly during the course of the CCTV inspection work.
2. Two copies of the television inspection video and voice audio recordings saved onto CD-R/RW or DVD-R media, provided weekly during the course of the CCTV inspection work. The electronic file names must be labeled to identify the sewer segment televised by street and upstream and downstream manholes (for example "Washington Avenue SMH 1 - SMH 2").

##### 1.3 QUALITY ASSURANCE

- A. Personnel shall have confined space entry and other training as appropriate for the work to be performed.

#### PART 2 PRODUCTS

##### 2.1 EQUIPMENT

- A. Provide all equipment necessary to complete the video inspections with voice audio recordings, including, but not limited to, inspection studio, television camera, and video capture equipment.
- B. The inspection equipment shall be capable of inspecting a minimum of 700 feet of pipe where entry into the pipe can only be made from one end. The equipment shall be capable of providing a picture of acceptable quality at these maximum lengths, regardless of the vibration caused by normal movement of the camera and the length of the signal conductor cable between the camera and the recording device.
- C. The inspection equipment shall be capable of clearly televising the interior of a six inch diameter pipe and all larger sizes.
- D. The television camera used for the inspection shall be one specifically designed and constructed for such inspection.

- E. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe.
- F. The camera shall be waterproof and operative in 100% humidity conditions.
- G. The camera, television monitor, and other components of the video system shall be capable of producing a high quality color image with clear definition of pipe internal features.
- H. A pan and tilt camera shall be used for the television inspection to provide the ability to view into the laterals to determine the accessibility of the lateral by the lateral inspection system (LIS) camera.
- I. The pan and tilt camera shall be capable of 360 degree rotational scan. The tilt arc shall not be less than 225 degrees and the viewing angle shall be a minimum of 300 degrees. The lens position shall be operated remotely. Cameras incorporating mirrors for viewing sides or cameras using exposed rotating heads are not acceptable.
- J. The camera shall be an auto-iris type with remote controlled manual override. The adjustment of focus and iris shall provide a minimum focal range of from 6 inches in front of the camera lens to infinity.
- K. The distance along the pipe in focus from the initial point of observation shall be a minimum of twice the vertical height of the pipe.
- L. The illumination must be such as to allow an even distribution of light, which will produce a clear picture around the pipe perimeter, regardless of diameter and without the loss of contrast, flare out of picture, or shadowing. The lighting system shall also minimize reflective glare and the intensity shall be fully adjustable. The camera lighthouse shall include a high-intensity side viewing lighting system to allow illumination of internal sections of lateral pipe connections.
- M. The television studio shall be insulated against noise and extremes in temperature and shall be large enough for two people for the purpose of viewing the television monitor while the inspection is in progress. The television studio shall be mounted on a mobile vehicle which allows safe and orderly movement of the inspection equipment.
- N. The television monitor screen shall be not less than 17 inches, measured on the diagonal.
- O. The television camera, monitor, and other components of the video system shall be capable of receiving and transmitting a picture having not less than 500 lines of resolution.
- P. The camera shall be mounted on a self-propelled vehicle or skid assembly that is able to ride over obstructions and cushion the camera against shock. The skid shall also have guards to keep the camera in line in the event of a turnover due to an obstruction.
- Q. The television inspection equipment shall meet the following criteria:
  - 1. Color: The following colors shall be clearly differentiated: white, yellow, cyan, green, red, blue, and black.



- 2. Linearity: The background grid shall show squares of equal size, without convergence or divergence over the whole picture. The center circle shall appear round and have the correct height and width relationship.
  - 3. Resolution: The live picture shall be displayed on a monitor capable of providing a clear, stable image free of electrical interference with a minimum horizontal resolution not less than 500 lines.
  - 4. Color Consistency: To ensure that the camera shall provide similar results when used with its own illumination source, the lighting shall be fixed in intensity prior to commencing the survey. In order to ensure color consistency, generally no variation in illumination shall take place during the survey.
- R. The monitor display shall incorporate an automatically updated record in feet and tenths of a foot of the distance along the pipe from the cable calibration point to the center point of the camera. Use a suitable metering device which enables the length of the pipe being inspected to be accurately measured to within  $\pm 0.2$  feet.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Reduce flow level in pipe being inspected by bypass pumping or by jetting to meet the requirements described below, unless otherwise agreed to:

**Maximum Depth of Flow for Television Inspection**

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6 inch to 10 inch pipe	20% of pipe diameter
12 inch to 24 inch pipe	25% of pipe diameter
Greater than 24 inch pipe	30% of pipe diameter

---

- B. Alternatively, perform television inspection during off-peak hours when flow depths are lower.

#### 3.2 INSPECTION

- A. Television inspect installed storm drainage and sewer pipes.
- B. Move the camera through the pipe at a moderate rate, stopping where necessary to permit proper documentation of all pertinent features/defects. In no case will the television camera be pulled at a speed greater than 30 feet per minute.
- C. Use manual winches, power winches, TV cable, powered rewinds or other devices to move the camera through the pipe that do not obstruct the camera view or interfere with proper documentation of the pipe conditions. All winches shall be stable with either locking or ratcheting drums.
- D. If, during the inspection operation, the television camera will not pass through the entire pipe section from one direction, set up equipment so that the inspection can be performed from the opposite direction, if possible.
- E. When manually operated winches are used to pull the television camera through the pipe, use portable radios, telephones or other suitable means of communication

between members of the crew located at each end of the pipe section being inspected to insure good communications.

- F. The importance of accurate distance measurements is emphasized. Measurement for location of pipe features/defects shall be by means of a meter device. Marking on the cable or a similar method will not be allowed. Accuracy of the distance meter shall be checked by use of a measuring wheel, tape, or other suitable distance measuring device.
- G. Record the following pipe features/defects, at a minimum, and report them on the inspection logs in accordance with National Association of Sewer Service Companies (NASSCO) developed Pipeline Assessment Certification Program (PACP) methodology:
  - 1. Pipe diameter and material of construction.
  - 2. Joint spacing and the location of joints which appear to be damaged, incorrectly installed, shifted, open, or in any way deficient.
  - 3. Location, size and orientation (clock position) of connecting pipes (such as building services in a sewer).
  - 4. Description of severity and location of pipe structural deficiencies such as cracks, breaks, collapses, corrosion/erosion, etc.
  - 5. Description of severity and location of pipe obstructions (such as sediment, roots or grease).
  - 6. Description of severity and location of grade concerns, such as pipe sags, especially in gravity pipes.
  - 7. The locations where infiltration is entering the pipe and/or connecting pipes and an estimated infiltration rate at each location.
- H. Position the camera at the location of connecting pipes, and pan/tilt appropriately in order to obtain a clear view of the interior of the connecting pipe. Make note of any defects or infiltration visible within the connecting pipes.
- I. Indicate direction of survey and distance to each feature/defect from the beginning of the inspection.
- J. Provide an audio description of each feature/defect observed.
- K. Report on the logs weather conditions, ground conditions, and surface cover.
- L. Repair pipe damaged as a result of the inspections at no cost to the Owner.
- M. Position camera head to reduce risk of picture distortion and along the longitudinal axis of the pipe. In circular pipes, position camera lens centrally,  $\pm 10\%$  of the vertical sewer dimension. In non-circular pipes, position camera lens at mid-height and centered horizontally.

### 3.3 DOCUMENTATION

- A. Television Inspection Logs

1. Prepare television inspection logs describing features/defects identified and their locations.

**B. Video Recordings**

1. Provide continuous digital video recordings of the inspection view as it appears on the television monitor. The image recorded shall be equal to or better than the quality of the original picture on the television monitor.
2. Provide a visual and voice audio description record of the pipe features/defects observed recorded simultaneously as original live recordings.
3. The audio portion of the recording shall be sufficiently free of electrical interference and background noise to produce an oral report that is clear, complete, and easily discernable. The audio portion of the video report shall include the location and identification of the pipe section inspected, the direction of travel, a description of the features/defects encountered, and the distance traveled.
4. Provide digitally formatted television inspection video/audio recordings saved onto CD-R/WR or DVD-R media with individual digital files for each recording completed. CDs and DVDs shall be properly identified by video numbers, locations, and project name.
5. Video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information as described below:
  - a. At the start of each pipe section inspected:
    - 1) Size and length of pipe and pipe material
    - 2) Pipe section reference number
    - 3) Date of inspection
    - 4) Road name/location (city/town)
    - 5) Direction of inspection (upstream or downstream)
    - 6) Starting time of inspection
  - b. Continuously during the inspection:
    - 1) Automatic update of the camera's position, in feet and tenths of feet from the beginning of the pipe section
    - 2) Upstream and downstream locations (manholes reference numbers for sewers and drains).

END OF SECTION

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## SECTION 33 01 35

### BREAKING INTO EXISTING MANHOLES AND CATCHBASINS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Breaking through the walls and inverts of existing manholes and catch basins.
2. Connecting new pipes to existing structures.
3. Ancillary work associated with making new connections to the existing structures.

##### 1.2 REFERENCES

- A. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets.
- B. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
- C. ASTM C1157 - Standard Performance Specification for Hydraulic Cement

##### 1.3 SUBMITTALS

- A. Submit shop drawings showing pipe connection details.

##### 1.4 QUALITY ASSURANCE

- A. Personnel shall have confined space entry training as appropriate for the work to be performed.

#### PART 2 PRODUCTS

##### 2.1 MATERIALS

###### A. Flexible Pipe-to-Structure Connectors

1. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
2. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
3. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
4. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
5. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
  - a. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.

- b. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
  - c. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.
- B. Non-shrink, hydraulic cement
- 1. Hydraulic cement shall be non-shrink, fast-setting, complying with ASTM C1157.
  - 2. Hydraulic cement shall have a minimum 7-day compressive strength of 3,000 psi and a minimum 28-day compressive strength of 5,000 psi.
  - 3. Hydraulic cement shall be as manufactured by UGL (Drylock Fastplug), Quikrete, Kryton, or approved equal.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### A. General

- 1. Core drill into existing structures in such a fashion as to make an opening of suitable size to accommodate the connecting pipe without excessive damage to the existing structure.

#### B. Manholes

- 1. For manholes, break out and rebuild existing inverts as required to provide an adequate base under the new channels being installed, and shaped to provide smooth continuous hydraulic flow through the manhole.
- 2. Control existing flows as required during the period of construction. No sewage or drainage will be permitted to flow directly against concrete or other masonry work until it is at least 48 hours old.
  - a. Temporary handling of sewage or drainage flows may be accomplished by inserting pipes from the inlet to the outlet of the manhole and by using temporary plugs, where appropriate, provided that such pipes do not interfere with satisfactory completion of the work and shaping of the inverts, nor cause excessive backing-up in the existing system upstream of the diversion. In cases where this type of temporary handling of flows is not possible, provide the necessary dams, plugs, etc., as required in upstream manholes, and pump the flow around the structure under construction.
  - b. When sewage is pumped or otherwise diverted around a particular structure, it shall be discharged back into the sewage system through existing downstream manholes. Under no circumstances shall sewage be permitted to run onto the surface of the ground.

#### C. Catchbasins

- 1. All catchbasin openings, created as a result of the removal and replacement of the existing drains connected to the catchbasins with new drain pipes, shall be

sealed. This work shall be performed using masonry to match existing construction, where applicable, and non-shrink hydraulic cement to provide a neat patch.

D. Pipe Connections

1. Rebuild and tightly close existing manhole walls and inverts and catchbasin walls to provide an integral, water-tight structure around the new pipes.
2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE, steel, etc), use flexible pipe-to-structure connectors.
3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal or HDPE, etc):
  - a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, hydraulic cement.
  - b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

END OF SECTION

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## SECTION 33 05 23

### ROCK EXCAVATION

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Rock excavation for structures and trenches.

###### B. Related Sections

1. Section 31 23 00 – Excavation, Backfill, Compaction and Dewatering

##### 1.2 DESCRIPTION

- A. Rock excavation near existing structures or utilities shall be conducted with utmost care to avoid damage to existing structures and utilities. Contractor shall determine means and methods for removal of rock. Injury or damage to structures and properties shall be promptly repaired by the Contractor to the satisfaction of the Owner and Engineer at his own expense.
- B. Removal of boulders greater than 1 cubic yard in volume is included under this Section of work. Removal of boulders under 1 cubic yard in volume is not considered part of this work and is considered a part of the work specified under Section 31 23 00.
- C. Rock excavation shall mean solid ledge rock or solid concrete which in the opinion of the Engineer requires drilling and blasting, wedging, sledging, firing, or breaking up with power operated hand tools for its removal.
- D. Material removed solely with a power-operated excavator or loose, previously blasted ledge, broken stone, weathered rock, cemented gravel, hardpan, glacial till, concrete, asphalt or masonry which may be encountered during excavation operations is not considered rock excavation.
- E. If blasting is used for removal of rock, the Contractor shall be responsible for design, labor, materials, tools and equipment, and performing all operations necessary for furnishing, installing, surveying, recording, interpreting, protecting, maintaining, and removing geotechnical instrumentation used to monitor vibrations specified herein. Geotechnical instrumentation shall consist of vibration monitors.
  1. The Contractor shall be responsible for providing and performing the installation, protection, and maintenance (including providing continuous power) of vibration monitors specified.
  2. The Contractor is responsible for performing survey and monitoring of all vibration monitors.
  3. The Contractor is responsible for reporting the results of vibration monitoring to the Engineer as specified herein.

##### 1.3 SUBMITTALS

- A. Construction methods that will be utilized for the removal of rock on the project.

- B. Qualifications of professional blasting Consultant and a pre-blast survey.
- C. Prior to beginning any blasting operations, submit a description of the proposed method for blasting, detailing the proposed equipment and materials to be used during blasting, and methods to be used to control vibrations, and calculations that demonstrate anticipated vibrations will not exceed limits defined herein.
- D. Prior to beginning any blasting operations, submit the following:
  - 1. Proposed locations of vibration monitors.
  - 2. Schedule and timing for instrument installation and performance of monitoring, including summary table for all instrument installations by number and location:
    - a. Timing of each instrument installation.
    - b. Timing of monitoring commencement and schedule of monitoring for each instrument.
  - 3. Individuals responsible for all monitoring, report writing and format of reporting.
  - 4. Operating manuals, specifications and installation procedures for each type of instrumentation.
  - 5. Documentation of calibration checks on individual instruments and readouts for the vibration monitors, including recalibration after any damage or disturbance.
  - 6. Procedure to confirm that instruments are working correctly following installation.
  - 7. Outline of procedures detailing how monitoring will be conducted.
  - 8. Corrective Action Plan
    - a. Details of actions to be taken in the case of deformations or vibrations exceeding the specified limits.
    - b. Include operational changes to reduce magnitude of vibration.
  - 9. Sample data forms and data output files in MS Excel format for vibration monitoring.
- E. Conduct pre-blast structure survey prior to start of blasting.
  - 1. Conduct pre-blast structure survey on structures within areas affected by work that may be damaged by blasting. Include aboveground structures within at least 200 feet of areas to be blasted.
  - 2. The purpose of the survey is to document existing conditions of structures prior to blasting. The survey is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as a result of blasting.
  - 3. Record information for each structure surveyed:
    - a. Age and type of construction

- b. Location and character of cracks
  - c. Evidence of settlement and leakage
  - d. Other pertinent information
4. Record pre-blast survey information on forms prepared specifically for pre-blast surveys.
  5. Supplement written records with photographs or videotape recording.
  6. Submit copies of written records and photographs or videotapes to respective property owner, as well as to the Engineer with the property owner's permission, prior to the start of blasting.
- F. Blasting records - For each blast, document the following and submit reports to the Engineer within 24 hours of each blast event:
1. Location of blast in relation to Project Stationing or coordinate systems and elevation.
  2. Date and times of loading and detonation of blast.
  3. Name of person in responsible charge of loading and firing.
  4. Details of blast design, as previously specified.
  5. Vibration records including location and distance of seismograph geophones to blast and to nearest structure and measured peak particle velocity. Report peak particle velocity in units of inches per second.
  6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.
  7. Comments by blaster in charge regarding damage to existing facilities, adjacent property, or completed work, misfires, fly rock occurrences, unusual results, or unusual effects.

#### 1.4 SYSTEM COMPONENTS

##### A. Vibration Monitors

1. If blasting is to be performed, provide a minimum of two vibration monitors. Vibration monitoring shall be located at the two nearest structures to the Work being monitored, but shall be at the discretion of the Engineer.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Obtain the proper Permit to Blast from authorities having jurisdiction before explosives are brought to the site.
- B. Certifications: Affidavit, for each blaster, certifying that blaster is competent in performing the type of blasting required.
- C. Pre-Rock Removal Conference: Before the rock removal work is scheduled to commence, Contractor shall schedule a conference with the Engineer for the purpose of reviewing and discussing requirements for the Work. The conference shall be

attended by the Contractor's Representative and the person supervising the rock removal operations.

## PART 2 PRODUCTS

### 2.1 SEISMOGRAPH

- A. Provide seismographs for monitoring the peak particle velocities of ground or structure vibrations resulting from blasting activities. Provide MiniMate Pro 4 as manufactured by InstanTel Inc., or approved equal with the following minimum features:
1. Seismic range: 0.005 to 10 inches per second with an accuracy of plus or minus 5 percent of the measured peak particle velocity at frequencies between 10 and 100 Hz, and with a resolution of 0.01 inch per second or less.
  2. Flat frequency response: 2 to 200 Hertz.
  3. Three component triaxial velocity transducer.
  4. Capable of internal dynamic calibration.
  5. Self-triggering waveform capture mode that provides the following information: plot of wave forms, peak particle velocities, peak overpressure, frequencies of peaks.
  6. Histogram-combination monitoring mode capable of recording peak velocities for each 15-minute time period supplemented with full two-second self-triggering waveforms for events above threshold values.
  7. Continuous monitoring mode shall be capable of recording single-component peak particle velocities, and frequency of peaks with an interval of one minute or less.
  8. Computer software for performing continuous monitoring, data downloading, analysis and producing reports. Marked with a unique identification number.
- B. Install seismographs according to the manufacturer's recommended procedures unless otherwise specified herein.
- C. Provide all necessary power for the monitoring equipment.
- D. Securely affix geophones to the ground using a minimum 20-lb weight over the geophone. The geophone shall be installed such that uniform contact is maintained between the base of the geophone and the ground/structure.
- E. Geophones shall be oriented toward the blasting activity.

## PART 3 EXECUTION

### 3.1 MECHANICAL METHODS

- A. Mechanical methods, such as an excavator-mounted ram or the use of expansive agents, may be appropriate for removal of portions of rock. Drill holes and utilize expansive tools, wedges, and mechanical disintegration compound as necessary to fracture rock.

### 3.2 BLASTING

- A. Comply with OSHA, State and Local regulations when blasting and handling explosives.
  - 1. The City of Fall River Fire Department approval is required for all blasting operations. A pre-blast survey must be completed. The Fire Chief or his designated representative may witness the survey and their discretion.
- B. Assume full responsibility for the safety of the blasting operations and perform the work in a manner that will ensure the safety of personnel and that of existing structures, adjacent buildings, and completed new construction. The Contractor will be held responsible for claims for damage to property and underground structures. Repair in kind utilities, pipelines or house services damaged while conducting pre-drilling and blasting activities. Repair and maintain roadway and paved surfaces that are cracked or damaged during the course of pre-drilling and blasting. The pay limits for paving repair shall be as noted, regardless of the limits of necessary roadway repairs due to blasting.
- C. Comply with current OSHA regulations as well as engage the services of a qualified, professional blasting Consultant who will design, review, evaluate and modify the blasting operations. Design the initial blasts and conduct test blasts (minimum four tests) until regular production-controlled blast patterns are developed that produce the desired rate of excavation while meeting the requirements for vibration and air blast control specified. Periodically, or when requested by the Engineer, review the blasting operations and make such changes in the blasting operations as are required to produce a controlled blasting operation meeting the requirements of these specifications. Review by the Engineer of the Contractor's blast design shall not relieve the responsibility for obtaining adequate rock breakage.
- D. Provide adequate notice to residents that may be affected by the use of explosives. In residential areas, provide the following:
  - 1. Certificate of Insurance to cover a blasting operation.
  - 2. Evidence that residential homes have been reviewed to satisfy all parties that pre-construction conditions are well documented.
- E. Blasting Design Criteria
  - 1. Exercise care in the drilling and blasting operations so that the remaining rock remains stable and to reduce overbreak to a minimum.
  - 2. Control blasting by limiting the charge per delay to that which produces limited levels of ground vibrations as herein specified. Hire a qualified testing agency to measure the radial particle velocities using a seismograph. Peak particle velocity shall be the measure of the level of vibration.
  - 3. The charge weight per delay used in blasting shall be such that the peak particle velocity shall not exceed 2.0 inches per second measured on the foundation material, rock, or overburden at the nearest structure and/or structure to be monitored at the discretion of the Engineer. The Contractor shall modify the size and type of explosives used to meet this criteria or other limiting criteria.
  - 4. Air blast overpressures from blasting operations shall not exceed 0.02 psi.

5. The maximum depth of lift to be removed at any one time shall not exceed 6 feet.
  6. Use blasting mats, chained logs, warning signs, guards, etc., in accordance with the best practice.
  7. All blasting operations shall be done by electronic or non-electric detonation.
  8. Restrict blasting to daylight hours. In no case will blasting operations be permitted before 8:00 AM or after 5:00 PM.
  9. These criteria may be adjusted by the Owner, if the blasting procedures based on monitoring results or in the opinion of the Owner are likely to be disruptive to nearby businesses, people, or to cause damage to structures. These changes may require the Contractor to revise blast design and reduce the size of charges.
- F. In areas where the Contractor is allowed to pre-drill and blast ledge or rock formations without first removing the over-burden, the Contractor shall be required to firmly establish a profile of the solid ledge or rock that cannot be ripped free by the excavating machine. The actual pay quantities will be based on the inspector's determination of the actual profile and extent of the rock formations drilled and blasted by the Contractor and his verification of the rock formations once the trench has been opened.
- G. Minimum excavation and clearance within rock trenches shall be per Section 31 23 00.
- H. The use of perchlorate containing explosives is prohibited.

### 3.3 BACKFILL

- A. Backfill must be with material from the excavation or where the excavated material is considered unsuitable for backfill, with material wasted from other area of the job or, when directed by the Engineer in writing, with ordinary borrow. No stones, rocks, or boulders shall be used as backfill.
- B. Minimum pipe bedding requirements shall be per Section 31 23 00.

END OF SECTION

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## SECTION 33 05 33

### PIPELINE AND UNDERGROUND STRUCTURE ABANDONMENT

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Abandonment of pipe
  - 2. Abandonment of existing water distribution pipe
  - 3. Abandonment of manholes and catch basins
- B. Related Sections
  - 1. Section 31 23 00, Borrow Material
  - 2. Section 33 11 13, Ductile Iron Pipe and Fittings

##### 1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this section.
- B. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a safe timely manner.
- C. Comply with the directions of the Engineer and the requirements of governmental agencies having jurisdiction.

#### PART 2 PRODUCTS

##### 2.1 MATERIALS

- A. Gravel borrow shall meet the requirements of Section 31 05 13, Borrow Material.
- B. Concrete shall have a 28-day compressive strength of 3000 psi and a maximum stone size of 1½ inches.
- C. Ductile iron pipe fittings shall be in accordance with Section 33 11 13.

#### PART 3 EXECUTION

##### 3.1 ABANDONING SANITARY SEWERS AND STORM DRAINS

- A. Abandon existing pipelines and manholes upon completion of installation and successful testing of the new pipelines, manholes and appurtenances.
- B. Seal gravity pipes that are to be abandoned at each end with a concrete plug not less than 1½ times the pipe diameter long in the barrel of the pipeline. For example, a 10-inch diameter pipe will require that a minimum 15-inch long plug be installed. This should be performed at the manhole unless the existing manhole is to be removed.

Similarly, open ends of pressure sewers to be abandoned shall be sealed with a concrete plug no less than 1½ times the pipe diameter long in the barrel of the pipeline.

- C. Abandonment of manholes and catch basins shall be done by carefully removing the frames, grates and covers and delivering them to the Department of Public Works storage yard. Upper portions of the masonry shall be removed to a depth two-feet below the finished grade and the remaining structure shall be completely filled with gravel borrow placed in 6-inch layers and thoroughly compacted. Dispose of masonry materials removed.

### 3.2 ABANDONING WATER MAINS

- A. The deactivation of the water mains shall be done upon completion of:
  - 1. Installation and successful testing of the new pipeline including all hydrants and appurtenances.
  - 2. Removal and reconnection of all buildings from the existing pipelines to the new pipelines.
  - 3. Approval for the deactivation of the water mains by the Engineer or Owner.
- B. Excavate and remove sections of the existing water main as shown on the Drawings.
  - 1. If the open end of the water main to be abandoned is subject to line pressure, the end of the pipe shall be sealed with a mechanical joint cap or plug in accordance with Section 33 11 13.
  - 2. If the open end of the water main to be abandoned is not subject to line pressure, the end of the pipe shall be sealed with a concrete plug with a length no less than 2 times the pipe diameter. For example, an 8-inch diameter pipe will require that a minimum 16-inch long plug be installed inside the barrel of the abandoned pipe.
- C. After the pipe has been capped, the top sections of all gate boxes shall be removed and stacked, the holes filled in with suitable backfill material and patched with bituminous concrete in the area of the gate box.

### 3.3 REPAIR/RESTORATION

- A. Match surface repairs to its immediate surrounding area. Complete this work in accordance with the applicable specification section.

END OF SECTION

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SECTION 33 05 97

UNDERGROUND WARNING TAPE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Underground Warning Tape

1.2 SUBMITTALS

- A. Shop Drawing Submittals
  - 1. Product Data

PART 2 PRODUCTS

2.1 MATERIALS

- A. Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector.
- B. Tape shall be 6 inches wide.
- C. Tape shall be as manufactured by Seton Name Plate Corp., New Haven, CT; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Neligh, NE; Mercotape, Hachensach, NJ; or equal.
- D. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

Type of Utility	Color	Warning Message
Sanitary Sewer	Green	CAUTION - SANITARY SEWER BURIED BELOW
Storm Drain	Green	CAUTION - STORM DRAIN BURIED BELOW
Water	Blue	CAUTION - WATER LINE BURIED BELOW
Electric	Red	CAUTION - ELECTRIC LINE BURIED BELOW
Telephone / Communications	Orange	CAUTION - TELEPHONE LINE BURIED BELOW
Gas	Yellow	CAUTION - GAS LINE BURIED BELOW

- E. The tape shall be of the type specifically manufactured for marking and locating utilities.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All buried pipe and fittings shall be installed with metallic-lined underground warning tape located no more than 24 inches below final grade to allow detection by a metal detector.

END OF SECTION

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## SECTION 33 08 10

### TESTING OF WATER DISTRIBUTION SYSTEMS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Testing of pipe, castings, fittings, valves and accessories

##### 1.2 REFERENCES

- A. American Water Works Association, AWWA C600, AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances
- B. American Water Works Association, AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe & Fittings for Water
- C. ASTM B88, Standard Specification for Seamless Copper Water Tube
- D. ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

##### 1.3 SUBMITTALS

- A. List of equipment and personnel to be used for the pressure test.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION

##### 3.1 TEST PARAMETERS

- A. For water mains, the pressure test shall not be conducted until the new main has been flushed clean, disinfected in accordance with Section 33 13 00 and the chlorinated water properly disposed of. After acceptable completion of the water system disinfection, the Contractor may commence pressure testing of the new water main.
- B. Run pressure test and leakage test simultaneously in accordance with ANSI/AWWA C600.
- C. Test pressure shall not be less than 1.25 times the working pressure at the highest point along the test section and not less than 1.5 times the working pressure at the lowest elevation of the test section in accordance with AWWA C600. Test pressure shall not exceed pipe or thrust-restraint design pressures.
- D. The hydrostatic test shall be of at least 2-hour duration or until such time as the Engineer indicates acceptance of the pipeline.
- E. Test pressure shall not vary by more than  $\pm 5$  psi (35 MPa or 0.35 bar) for the duration of the test.
- F. On pipelines where the elevation along the route of construction varies substantially, the Engineer reserves the right to valve off and test portions of the line.

- G. On extensive construction jobs, the Engineer reserves the right to require the testing of individual portions of the line as construction proceeds rather than await completion of the entire project in order to undertake a pressure or leakage test.
- H. Do not operate valves in either direction at differential pressure exceeding the rated valve working pressure. Use of a test pressure greater than the rated valve pressure can result in trapped test pressure between the gates of a double-disc gate valve. For tests at these pressures, the test setup should include a provision, independent of the valve, to reduce the line pressure to the rated valve pressure on completion of the test. The valve can then be opened enough to equalize the trapped pressure with the line pressure, or fully opened if desired.
- I. Test pressure shall not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.

### 3.2 TIME FOR MAKING TESTS

- A. No pipeline is to be placed under pressure or subjected to hydrostatic pressure until at least 5 days have elapsed after the concrete thrust blocks have been installed. If high early strength concrete is used in the concrete thrust blocks, the hydrostatic pressure can be applied to the main after 2 days have elapsed from time of construction of the thrust blocks.
- B. The Contractor will be allowed to complete backfilling as hereinbefore specified, prior to undertaking the leakage and pressure tests. Backfilling prior to conducting tests will be at the option of the Contractor with the exception of intersections, driveways, crosswalks and other such locations where holding open the trench may adversely affect the public.
- C. Pipelines may be subjected to hydrostatic pressure and inspected for leakage at any convenient time after the trench has been partially backfilled. Partial backfilling shall consist of filling along the center of the pipe length and leaving the joint open for inspection.

### 3.3 OPERATION OF EXISTING WATER SYSTEM

- A. Do not operate any valve or other control device on the existing water system for any purpose. Do not make any tap or cut-in to the existing water system without the approval of the Engineer and unless an authorized representative of the Owner is present.
- B. When the Contractor's operations require the adjustment of any hydrant, valves, or other control device on the existing system, the Owner will provide authorized personnel for the purpose of supervising the operation of these control devices. Provide the personnel for the operation of these devices.

### 3.4 PREPARATION

- A. Conduct connections to the existing system under the Engineer's direction.
- B. To allow for proper filling, venting, testing, etc., install any corporation stops and/or special fittings which may be required. All such installation will be subject to the Engineer's approval.

- C. Foreign materials left in pipelines during installation often results in valve or hydrant seat leakage during pressure tests. Thorough flushing is recommended prior to a pressure test by partially opening and closing valves and hydrants several times under expected line pressure, with flow velocities adequate to flush foreign material out of the main, valves and hydrants. Flushing requirements are specified in Specification 33 13 00, Part 3.1.A.2.

### 3.5 PROCEDURE

- A. On completion of the pipeline or any valved section thereof, fill pipeline with water and test. Draw water from the existing water system under the direction of the Engineer and the Water Department.
- B. Before applying the specified test pressure, expel air completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, close the corporation cocks and apply the test pressure. At the conclusion of the pressure test, either remove and plug or leave in place the corporation cocks at the discretion of the Owner.
- C. Slowly fill each valved section of pipe with water, and apply the specified test pressure as described in Part 3.1 by means of a pump connected to the pipe in a manner satisfactory to the Engineer. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. The system shall be stabilized at the test pressure before conducting the leakage test.

### 3.6 EXAMINATION UNDER PRESSURE

- A. Examine exposed pipes, fittings, valves, hydrants, and joints carefully during the test.
- B. Repair or replace any cracked or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure tests with sound material, and repeat the test until it is satisfactory to the Engineer.

### 3.7 LEAKAGE TEST

- A. Leakage is defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof to maintain pressure after the pipe has been filled with water and the air has been expelled. Testing shall include all hydrants and hydrant branches. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
- B. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148,000}$$

- Where:
- L = allowable leakage, in gallons per hour
  - S = length of pipe tested, in feet
  - D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test,  
in pounds per square inch (gauge)

This formula is based on an allowable leakage of 10.5 gpd/mi/in of nominal diameter at a pressure of 150 psi.

- C. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gph/in. of nominal valve size will be allowed.
- D. When hydrants are in the test section, the test shall be made against the closed main valve in the hydrant.
- E. Acceptance of Installation - acceptance will be determined on the basis of allowable leakage. If any test of laid pipe discloses leakage greater than that specified in this section, locate and make approved repairs as necessary until the leakage is within the specified allowance at no additional cost to the Owner.
- F. Visible leaks are to be repaired, regardless of the amount of leakage.

END OF SECTION

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SECTION 33 08 30

TESTING OF SANITARY SEWER AND STORM DRAINAGE SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. Testing of Storm Drainage Systems
  - 2. Testing of Gravity Sewer Systems
- B. Related Sections
  - 1. Section 33 31 13.23 – Polyvinyl Chloride (PVC) Pipe and Fittings
  - 2. Section 33 01 30.11 – Television Inspection of Pipelines

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING OF STORM DRAINAGE SYSTEMS

- A. Television inspect storm drainage pipes included in the Work in accordance with Section 33 01 30.11 to ensure that pipes are straight between structures, correctly sloped, clean of debris and sediment, and generally free flowing. Alignment shall meet the requirements of Paragraph 3.2.G of this Section.
- B. Visually inspect all storm drainage structures included in the Work to ensure that all structures are clean of debris and sediment, and have frames, covers, grates, inverts, sumps, and other required appurtenances.
- C. All flexible pipe types including polyvinyl chloride (PVC), high-density polyethylene (HDPE), or polypropylene (PP) shall be tested for deflection in accordance with Paragraph 3.2.E of this Section at least forty five (45) days after it has been backfilled.

3.2 TESTING OF GRAVITY SEWER SYSTEMS

- A. Test all gravity sewers and manholes as described herein.
- B. No building shall be connected to a newly installed sewer until the sewer has been satisfactorily tested.
- C. Leak Testing
  - 1. Test gravity sewers using either a low pressure air test or an exfiltration water test. Test method shall be approved by Engineer.
  - 2. Low Pressure Air Test
    - a. After completing backfill of a section of pipe including laterals, conduct a line acceptance test using low-pressure air. Perform the test under the supervision of the Engineer.

- b. Seal-test pneumatic plugs before use in the actual test installation. Lay one length of pipe on the ground and seal at both ends with the pneumatic plugs to be checked. Introduce air into the plugs to 25 psig. Pressurize the sealed pipe to 5 psig. Satisfactory pneumatic plugs will hold against this pressure without bracing and without movement of the plugs out of the pipe.
- c. After a manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs have been checked, place a plug in each end of the line (at each manhole), and inflate the plugs to 25 psig. Introduce low pressure air into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. Allow a minimum of two minutes for the air pressure to stabilize. After the stabilization period (3.5 psig minimum pressure in the pipe), disconnect the air hose from the control panel to the air supply. The portion of the line being tested has passed the test if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any groundwater that may be over the pipe) is not less than the time shown for the given diameters and lengths in Table 1 at the end of this Section.
- d. Air tests shall cover a 1.0 psig pressure drop; 0.5 psig pressure drop tests are not acceptable.
- e. In areas where groundwater is known to exist, install a one-half inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. The nipple shall be installed at the time the sewer line is installed. Immediately prior to the line acceptance test, determine the elevation of the groundwater by removing the pipe cap, blowing air through the pipe nipple to remove any obstructions, and then connecting clear plastic tube to the nipple. Hold the hose vertically and measure the height after the water has stopped rising in this plastic tube. Divide the height in feet by 2.3 to establish the pressure in pounds per square inch (psig) that will be added to all readings. (For example, if the height of water is 11.5 feet, then the added pressure will be 5 psig. This increases the 3.5 psig to 8.5 psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound per square inch and the timing remain the same.)
- f. The maximum starting test pressure should not exceed 9 psig, regardless of groundwater level above the pipe. If the groundwater level is such that the added pressure would be greater than 5.5 psig (12.7 feet), the pipe section may be tested using a starting pressure of 9 psig.
- g. Each pipe nipple installed to measure groundwater levels should be recapped subsequent to the air testing procedure to prevent future infiltration.
- h. As an alternative to installing a pipe nipple in a manhole to measure the height of groundwater, excavate a test pit over the pipe to determine the height of groundwater.



3. Exfiltration Test

- a. A water exfiltration test may be proposed by the Contractor, for approval by Engineer, in place of the low pressure air test where the sewer lines are installed in relatively dry areas.
- b. Exfiltration Test Procedures
  - 1) Isolate various sections of the sewer line using watertight plugs and fill the line with water to a predetermined level. Determine the loss of water in a predetermined time by measuring the quantity of water required to refill the line to the original level.
  - 2) The Engineer will determine the length of new sewer to be tested at one time, depending on the grade of the sewer.
  - 3) Include losses through manholes in determining the loss in a sewer line. For an exfiltration test, fill manholes to the bottom of the cone or flat top section and allow the level to stabilize before beginning the test. Refilling to the reference line may be required before commencing the test.
  - 4) The maximum acceptable loss, through exfiltration, shall not exceed 100 gallons per 24 hours per mile of pipe length per inch of pipe diameter tested.

D. Vacuum Test for Manholes - Gravity Sewer Lines

- 1. After a manhole has been constructed, conduct a manhole acceptance test using the following vacuum test procedure:
  - a. Plug all lift holes with an approved non-shrink grout.
  - b. Plug all pipes entering the manhole, taking care to securely brace the plug from being drawn into the manhole.
  - c. Place the test head at the inside of the top of the precast concrete cone section and inflate the seal in accordance with the manufacturers' recommendations.
  - d. Draw a vacuum of 10 inches of mercury and shut off the vacuum pump. With the valves closed, measure the time for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than:
    - 1 min. 0 sec. for 0-ft. to 10-ft. deep manholes
    - 1 min. 15 sec. for 10-ft. to 15-ft. deep manholes
    - 1 min. 30 sec. for 15-ft. to 25-ft. deep manholes
  - e. If the manhole fails the initial test, make repairs with a non-shrink grout. Re-test until a satisfactory test is obtained.

E. Allowable Deflection Test for flexible pipe types including polyvinyl chloride (PVC), high-density polyethylene (HDPE), or polypropylene (PP)

1. Pipe deflection measured not less than 45 days after the backfill has been completed shall not exceed 5 percent. Deflection shall be computed by multiplying the amount of deflection (average outside diameter less twice the average wall thickness diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
2. Deflection shall be measured with a rigid mandrel (Go-No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Submit drawings of the mandrel with complete dimensions for each diameter of pipe to be tested. Hand-pull the mandrel through all sewer and drain lines constructed with flexible piping as described above.
3. Uncover any section of pipe not passing the mandrel test and replace the bedding and backfill to prevent excessive deflection. Replace sections of the pipe as necessary. Retest repaired pipe immediately upon backfilling of trench until acceptable.
4. Retest the repaired section of pipeline again, from manhole to manhole, after the 45-day backfill period, until acceptable.

F. Test Failures

1. In case leakage or deflection exceeds the above specified amount, locate the failure and repair it in accordance with applicable Sections of this Contract.
2. Pipelines with shear-type breaks, “fishmouths” or damaged gaskets, cracked bells or couplings, hairline fractures, or structural damage shall be replaced. Mechanical sleeve couplings, poured concrete collars or similar repairs are not permitted. The use of pressure grouting repair techniques will not be allowed without the written consent of the Engineer.
3. After repairs have been made, re-test the line and repeat the process of repairing and re-testing until satisfactory test results, as specified in this Section, are obtained.

G. Alignment Review of New Gravity Sewers and Drains Through Television Inspection

1. At least 30 days after the pipe has been laid and backfilling has been completed, television inspect the interior of the pipe from manhole to manhole in accordance with Section 33 01 30.11. Introduce water into the sewer lines to be television inspected from the upstream manhole prior to the inspection but no more than 24 hours in advance of the inspection.
2. If the deviation from the design line and grade in either the horizontal or vertical alignment is observed to be excessive by the Engineer, the alignment will be considered unacceptable.
3. No standing water shall be allowed. The presence of standing water shall be cause for rejection of that pipe section.
4. If the alignment is unacceptable due to horizontal displacement, the Contractor will be allowed to construct intermediate manholes at its own expense. If the

alignment is unacceptable due to vertical displacement, including pipe sags, remove and replace/reset the pipe segment of concern, setting it to the proper grade. In addition, replace/reset manholes, if necessary to correct the vertical displacement/sag.

5. Pipe segments observed to have defects/damage during the television inspections shall also be removed and replaced at no additional cost to the Owner.

**TABLE 1**

**Low Pressure Air Test**

Specification Time Required for a 1.0 PSIG Pressure Drop

For Size and Length of Pipe Indicated for Q=0.0015 Cubic Feet per Minute per Square Foot of Internal Surface

1 Pipe Diameter (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)								
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.	
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	

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END OF SECTION

## SECTION 33 11 13

### DUCTILE IRON PIPE AND FITTINGS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. Ductile iron pipe and fittings, direct buried
2. Restrained joints and fittings
3. Polyethylene encasement
4. Cast-in-place concrete anchor blocks and thrust blocks

###### B. Related Sections

1. Section 33 05 29 – Pipeline and Underground Structure Abandonment
2. Section 31 23 00 – Excavation, Backfill, Compaction and Dewatering
3. Section 35 05 97 – Underground Warning Tape
4. Section 33 13 00 – Disinfection of Water Distribution Systems
5. Section 33 08 30 – Testing of Water Distribution Systems

##### 1.2 REFERENCES

###### A. Pipe and fittings shall conform to the latest edition of the following standards unless otherwise specified:

1. ANSI/AWWA C104/A21.4, Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.
2. ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.
3. ANSI/AWWA C110/A21.10, Ductile Iron and Grey Iron Fittings 3" through 48" for Water and Other Liquids.
4. ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C150/A21.50, Thickness Design of Ductile Iron Pipe.
6. ANSI/AWWA C151/A21.51, Ductile Iron Pipe, Centrifugally Cast, for Water.
7. ANSI/AWWA-C153/A21.53, Ductile Iron Compact Fittings Water Service.
8. ANSI/AWWA C600, Installation of Ductile Iron Water Mains and their Appurtenances.
9. ANSI/AWWA C800, Underground Service Line Valves and Fittings.
10. ANSI/AWWA C651, Disinfecting Water Mains.

11. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
12. ASTM A536, Standard Specification for Ductile Iron Castings
13. ASTM B88, Standard Specification for Seamless Copper Water Tube.
14. Ductile Iron Pipe Research Association, "Thrust Restraint Design for Ductile Iron Pipe" (Current Edition).

### 1.3 SUBMITTALS

#### A. Administrative Submittals

1. Detailed description of proposed pipe handling and installation methods along with the manufacturer's approval of those methods.
2. Construction details and schedule of Work for each connection to existing piping at least 7 days prior to beginning the Work. Approval must be received before commencement of Work on-site.

#### B. Shop Drawings

1. Manufacturer's drawings and catalog cuts, including descriptive literature indicating product characteristics and conformance with specifications and code requirements. Submit shop drawings for ductile iron pipe; fittings; couplings; filling rings; linings and coatings; and all accessories.
2. Detailed grade sheets (laying schedule) and connection details for pipe and appurtenances. Pipe grade sheets shall be for the entire pipeline with references to stationing and grades as shown on the Drawings. Grades sheets shall consist of, but not be limited to, pipe elevations, pipe lengths, bend sizes/angles and tie-in locations. Grade sheets shall be developed based upon information obtained from completed test pits where required/performed. Grade sheets shall include both horizontal state plane coordinates and vertical elevations to the nearest one tenth of a foot.
3. Utilize the horizontal and vertical alignment shown on the Drawings for the preparation and submission of the required grade sheets as much as is practical. Deviation from the horizontal alignment shown on the Drawings shall not exceed 2 feet unless otherwise approved. Deviation from the vertical alignment shall not exceed 0.1 foot unless otherwise approved. If a deviation from either the horizontal or vertical alignment is requested in excess of the amount specified, submit a request for the excess deviation using grade sheets developed by the manufacturer and a detailed explanation for the deviation for review and acceptance by the Engineer prior to submission of the entire Project grade sheets. The Engineer reserves the right to withhold approval and require the pipeline to be installed as shown on the Drawings and within the horizontal and vertical alignment specified.
4. Large scale details of special castings.
5. Layout and design details.

6. Location for each type of restrained joint or device to prevent joint separation along with installation, assembly and disassembly instructions.
- C. Quality Control Submittals
1. Certificates of compliance on pipe materials.
  2. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standards specified herein.
  3. Manufacturer of pipe and Manufacturer of fittings on the project shall have an established, annually audited and certified, quality control procedure for manufacturing of pipe and manufacturing of fittings respectively. Manufacturer shall be certified by an independent, third party auditor for compliance with all requirements of the AWWA standards. The manufacturer shall submit a current certificate of compliance for the plant facility where the pipe or fittings are to be made. Certificate of compliance shall be submitted for each additional year of manufacturing during the duration of the Project. The manufacturer shall not change the plant manufacturing the pipe or fittings during the duration of the Work.

#### 1.4 QUALITY ASSURANCE

- A. Pipe and fittings shall be inspected at the foundry as required by the standard specifications to which the material is manufactured. In addition, the Owner reserves the right to have any or all pipe, fittings, and special castings inspected and/or tested by an independent service, or by the Engineer, at either the manufacturer's plant or other testing laboratory at their own expense.
- B. Ductile iron pipe shall be from a single manufacturer. Fittings shall be from a single manufacturer, not necessarily the pipe manufacturer.
- C. The Engineer will inspect the pipe and fittings after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery, or at any point during the progress of the Work, shall be marked for identification and shall immediately be removed from the job site and replaced at no additional cost to the Owner.
- D. Test pipe under pressure for defects and leakage in accordance with Section 33 08 10.

#### 1.5 PROJECT CONDITIONS

- A. Secure permits and pay fees required to carry out the piping work. Comply with laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over the Work. Where provisions of the Contract Documents are in conflict with the codes, the more stringent shall govern.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. American Cast Iron Pipe Company
- B. U.S. Pipe

C. or equal

## 2.2 PIPE AND FITTINGS - GENERAL

- A. Ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151. Fittings and other materials referenced in this section shall conform to the latest edition of the references listed in Paragraph 1.2 of this section.
- B. Unless otherwise indicated or specified in the Contract Documents, buried ductile iron pipe and fittings shall be Class 52 with push on joints.
- C. Unless otherwise indicated or specified, buried pipe shall have an asphaltic exterior coating in accordance with AWWA C110, C151 or C153, as applicable.
- D. Unless otherwise indicated or specified in the Contract Documents, buried fittings shall be ductile iron or gray iron with mechanical joints.
- E. Unless otherwise indicated or specified in the Contract Documents, ductile iron pipe and fittings installed above ground and/or in buried vaults, shall be Class 53 with flanged joints.
- F. Exposed piping shall be shop primed and painted in the field in accordance with Section 09 91 00. Exposed piping to be painted shall not have an asphaltic exterior coating applied.
- G. Pipe and fittings shall be cement mortar lined and seal coated on the interior in accordance with AWWA C104. Cement mortar lining shall be twice the standard thickness; tolerance shall be minus 0 inches, plus 1/8 inch.

## 2.3 PIPE AND FITTING JOINTS

- A. Push-on-joints and mechanical joints shall conform to ANSI/AWWA C111/A21.11.
- B. Where indicated on the Drawings, provide restrained joints.. Gaskets shall meet the material requirements of ANSI/AWWA A21.11/C111 for mechanical joint gaskets.
- C. Restrained gasketed joints for rubber push-on joint pipe shall be Fast-Grip® by American Cast Iron Pipe Company, Field Lok 350® by US Pipe and Foundry Co., or equal. Contractor is to supply the Owner with four new gasket disassembly drive shims as a part of the project.

## 2.4 FITTINGS

- A. Fittings shall be ductile iron or gray iron.
- B. Fittings less than or equal to 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have a 350 psi pressure rating.
- C. Fittings greater than 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have the following pressure ratings:
  - 1. Fittings greater than 12 inches and less than or equal to 24 inches - 350 psi
  - 2. Fittings greater than 24 inches - 250 psi



- D. Mechanical joint retainer glands shall be installed on all mechanical joints. Retainer glands shall be specifically designed to fit standard mechanical joint bells with corrosion resistant, high strength, low-alloy T-head bolts conforming to ANSI/AWWA A21.11/C-111 and ANSI/AWWA A21.53/C-153. Retainer glands shall be manufactured of ductile iron conforming to ASTM A536-80, grade 60-42-10. Wedges shall be of hardened ductile iron and require the same torque in all sizes. These devices shall have a minimum 250 psi pressure rating with a minimum safety factor of 2:1 and shall be EBAA IRON, Inc., Megalug® series 1100 or equal. Glands shall be listed with Underwriters Laboratories and/or approved by Factory Mutual.
- E. Anchoring tees shall have main run ends as indicated on the Drawings or as required for the installation. The branch shall have a plain end with an integral gland and rotating mechanical joint gland to provide a restrained connection with the adjacent valve or fitting (typically used for hydrant branches).

## 2.5 COUPLINGS

- A. Solid sleeves shall have long body type (12 inches min.) and mechanical joints with retainer glands.
- B. Couplings and transitional couplings for pipe less than or equal to 12 inches in diameter shall consist of a long body cast iron sleeve and shall have gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Romac style 501, Dresser style 153, Rockwell type 441, or equal. Transition couplings for pipe less than or equal to 12 inches in diameter shall be Dresser Style 162, Rockwell Type 441, Smith Blair Omni Style 442, or equal.
- C. Couplings and transitional couplings for pipe greater than 12 inches in diameter shall consist of a steel sleeve with gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Dresser Style 38, Smith Blair Style 311, Romac Style 400, or equal. Transition couplings for pipe greater than 12 inches in diameter shall be Dresser Style 62, Smith Blair Style 413, Romac Style TC400, or equal.
- D. Provide couplings with an exterior epoxy coating.

## 2.6 GASKETS, GLANDS, NUTS, AND BOLTS

- A. Gaskets, glands, nuts, bolts and accessories shall conform to ANSI/AWWA C111/A21.11 or C153/A21.53, as appropriate.
- B. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.
- C. Lubricants must be suitable for the type of fluid to be carried by the pipeline, and shall be NSF approved for water service.
- D. Glands shall be ductile or cast iron.
- E. Bolts shall be high strength, low alloy.

## 2.7 THRUST BLOCKS AND ANCHOR BLOCKS

- A. Concrete shall have a 28-day compressive strength of 3,000 psi.

## 2.8 TEST CONNECTIONS

- A. Install air release, test connections, and blow offs in the piping for pressure testing and disinfection at locations to be determined by the Contractor and approved by the Engineer.
  - 1. Corporation cocks shall be in accordance with ANSI/AWWA C800 and shall be  $\frac{3}{4}$  inch diameter with CC thread on inlet by iron pipe thread flare on outlet as manufactured by Mueller, Ford, McDonald or equal.
  - 2. Copper tubing shall be annealed Type K soft tubing and shall conform to the requirements of ASTM B88.
  - 3. Upon completion of testing and disinfection, remove the corporation cock and replace with a brass plug and the copper tubing removed. Field swab the brass plug for disinfection in accordance with AWWA C651.

## 2.9 POLYETHYLENE ENCASUREMENT

- A. Provide polyethylene encasement around the ductile iron pipe in accordance with ANSI/AWWA C105/A21.5 and these specifications, where required on the Drawings or in these Specifications. Polyethylene shall be manufactured in accordance with the requirements of ASTM D-1248, and shall be in the form of a tube.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Deliver, handle, store and install ductile iron pipe in accordance with ANSI/AWWA C600.

### 3.2 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Pipe and Fittings
  - 1. Coordinate delivery of pipe and fittings with installation and unload along the line of work outside the trench near as practicable to the point of final placement, and properly wedged secure. Give minimum 24 hour notice to the Engineer prior to pipe deliveries. Notice shall include the method of unloading.
  - 2. Unload and handle pipe and fittings with a crane or backhoe of proper capacity outfitted with a steel cable sling, belt sling or other specially designed attachment to protect the pipe coating.
  - 3. At the end of each work week, no more than the amount of pipe to be installed the following work week shall remain along the construction route. All pipes remaining along the construction route are to be properly wedged to prevent movement and not interfere with traffic or pedestrian movement. All excess pipes are to be stockpiled at an approved staging yard in accordance with AWWA C600.
- B. Storage of Materials

1. Store pipe in a manner to keep pipe interior free from dirt and foreign matter. Store pipe on wood blocking, rails or other suitable materials. Pipe shall not be stored on stones.
2. Pipe may be stored on top of each other to the maximum stacking height specified by AWWA C600.
3. Protect materials subject to corrosion in accordance with manufacturer's recommendations.
4. If pipe or project materials are stored at the Contractor's approved staging yard, the Engineer shall be permitted reasonable access to the staging yard for inspection of the pipe and materials.
5. Pipe ends shall be sealed tight using polyethylene bags and tape immediately after unloading, regardless of the storage time length, in order to keep foreign matter and wind blown debris out.
6. All fittings are to be stored off of the ground on wooden pallets.

C. Handling Materials

1. Handle materials in such a manner so as to prevent damage to the concrete or mortar coating or lining.
2. Materials are to be handled using methods approved by the pipe manufacturer.
3. Materials damaged during handling will be rejected and shall be replaced at the Contractor's expense.
4. Ensure that no foreign materials enter the pipe and fittings during handling.

3.3 COORDINATION

- A. Existing mains may have to be shut down to complete the connections, as shown on the Drawings and as specified herein.
1. Existing valves will only be operated by the Owner.
  2. Submit requests for shutdown of existing piping to the Engineer at least 5 working days prior to the operations, and reschedule operations to prevent conflicts with the Owner's operations.
  3. The Owner reserves the right to cancel the shut-down at any time without penalty if system conditions exist in which it would be a matter of public health or safety to do so.
  4. The Owner does not guarantee complete shut down of valves. Make necessary provisions to do work under existing conditions.

3.4 DEFECTIVE PIPE

- A. Defective pipe or fittings will be rejected for use on this project. Defective pipe is classified as follows:
1. Damage to interior lining
  2. Insufficient lining thickness

3. Pipe out of round
  4. Damaged pipe barrel area
  5. Damaged pipe bells or spigots
  6. Missing, misplaced or illegible marking and identification
  7. Outside pipe diameter exceeding allowable tolerance
- B. If defective pipe is discovered after it has been installed, it shall be removed and replace with sound pipe, at no additional cost to the Owner.

### 3.5 JOB CONDITIONS

A. Environmental Requirements

1. Do not lay pipe when weather conditions are unsuitable, as determined by the Engineer, for pipe laying work.
2. Equipment for pipe laying shall be maintained in good operating order.
3. Job site shall be kept clean of debris and organized.

B. Protection

1. At all times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. This provision shall apply at all times when pipe laying operations are suspended.

C. Work Affecting Existing Pipelines

1. Work on Existing Pipelines:
  - a. Prior to any work on existing pipelines, remove soils, rust and other debris from the exterior wall of the pipe a minimum of 12 inches beyond the work area.
  - b. Cut pipes as shown or required with machines specifically designed for this work.
  - c. Install temporary plugs to keep out all mud, dirt, water and debris.
  - d. Provide necessary adapters, fittings, pipe and appurtenances required.
  - e. Cut or tap existing mains at the mid span of a pipe barrel. In no case shall a pipe be cut or tapped within 24 inches of a pipe joint.

### 3.6 CLEANING PIPE AND FITTINGS

- A. Clean and remove foreign matter from the interior of each pipe and fitting before placing in the trench. Remove pipe and fittings whose interior has been contaminated with oil, gasoline or kerosene and replace at no additional cost to the Owner. Remove pipe and fittings whose interior has been contaminated with any material which is a regulated drinking water contaminate or which damages the cement and replace at no additional cost to the Owner. Should foreign material or contaminants be observed in previously installed pipe, cease work until foreign material or contaminated pipe is decontaminated or removed.

- B. Remove all lumps, blisters, and excess asphaltic coating from the bell and spigot ends of each pipe or fitting. The outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and be dry and free from oil and grease before the pipe or fitting is laid.
- C. On all ductile iron pipe or fittings, the bell of the pipe and the spigot of the adjacent pipe or fitting shall be wire-brushed and cleaned of rust and dirt. The bell of the pipe or fitting and the spigot of the adjacent pipe shall then be lubricated with the joint lubricant furnished with the pipe, and used in accordance with the manufacturer's directions.

### 3.7 ALIGNMENT AND GRADE

- A. Lay and maintain the pipe at the required lines and grades as shown on the Drawings. Fittings shall be at the locations indicated on the Drawings with joints centered, and spigots properly fitted. No deviation shall be made from the line and grade indicated on the Drawings, except with the approval of the Engineer.
- B. Joint Openings and Deflection:
  - 1. The maximum allowable joint openings and deflection for push-on joint pipe and restrained joint pipe shall be one-half the manufacturer's maximum allowable opening and deflection.
  - 2. Radius curves indicated on the Drawings or approved during Shop Drawing review shall be made using full lengths of pipe. The use of short lengths of pipe and extra joints in order to make a smaller radius turn will not be allowed without the written approval of the Engineer.
- C. Line or Grade Conflicts with Other Structures
  - 1. Wherever obstructions not shown on the Drawings are encountered during the progress of the Work and interfere to such an extent that an alteration in the pipe layout is required, the Engineer will order a deviation from the line and grade at locations where obstructions such as culverts, ducts, wire and/or pipes are encountered. The pipe shall be laid over or under such obstacles with a minimum clearance of 6 inches. The Engineer reserves the right to make the decision to go over or under obstructions during construction.
- D. Where underground conditions indicate a change of alignment or grade, such change shall be made only with the written consent of the Engineer.
- E. Except at locations indicated on the Drawings by the profile, do not establish high points where air can accumulate.

### 3.8 PIPE INSTALLATION

- A. General Requirements
  - 1. Prepare the pipe trench in accordance with Section 31 23 00.
  - 2. Keep trenches dewatered while installing pipe until all required pipe joints have been made and the trench has been backfilled above the water table to a point where pipe uplift will not occur when the pipe is empty.

3. Carefully lower pipe and fittings into the trench piece by piece by means of a crane, ropes or other tools or equipment, in such a manner as to prevent damage to pipeline materials and protective coatings and linings. Under no circumstances shall pipeline materials be dropped or dumped into the trench.
4. Carefully inspect pipe and fittings for cleanliness and defects prior to placing them in the trench.
5. Install underground warning tape over the pipe in accordance with Section 33 05 97.23.

**B. Laying Pipe**

1. Install pipe with a minimum of 5 feet of cover, unless indicated otherwise on the Drawings or directed by the Engineer.
2. Prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.
3. When laying pipe, the spigot end shall be centered in the bell, the pipe forced home and the joint completely assembled. The pipe shall be adjusted to correct line and grade and secured in place with approved backfill material, properly tamped under and around the pipeline.

**C. Cutting Pipe**

1. Furnish pipe in full lengths. Cut ductile iron pipe without damage to the pipe or cement lining. The cutting shall be done to leave a smooth end at right angles to the axis of the pipe.
2. Cut ductile iron pipe either by the use of compression-type chain cutters which exert an even continuous force on the wall of the pipe or by power driven abrasive wheels.
3. On ductile iron pipe using rubber joints, the outside edge of the cut end must be tapered back approximately  $\frac{1}{4}$  inch at an angle of about 30 degrees so as to provide for the proper assembly of this joint.

**3.9 PUSH-ON JOINTS**

- A. Push-on joints shall be made in accordance with the manufacturer's instructions. Install gaskets in the pipe bell after lowering the pipe into the trench for installation. Thoroughly clean the bell and spigot of dirt and tar blisters in the trench utilizing a wire brush or bristle brush. Insert rubber gasket in the groove of the bell end of the pipe beginning at the bottom of the bell and working to the top of the bell. Apply lubricant per the manufacturer's recommendations utilizing a paint brush to the pipe gasket and the pipe spigot to be joined. Place a clean rag under the joint to protect the joint from dirt caused by unintentional grounding of the pipe during jointing. Upon completion, remove the rag. Align the plain end of the pipe to be laid and insert in the bell of the pipe to which it is to be joined and push home with a jack or by other means. After joining the pipe use a metal feeler to make certain that the rubber gasket is correctly located.

- B. On water pipe and fittings, make provisions for the electrical continuity of the pipeline. Insert two bronze wedges per joint to provide electrical continuity. Place wedges as close to the 3 o'clock and 9 o'clock positions as possible.

### 3.10 MECHANICAL JOINTS

- A. Mechanical joints shall be made in accordance with Appendix A of ANSI A21.11/AWWA C111 and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket before assembly. Tighten bolts to the specified torques. Under no conditions shall extension wrenches or an extended handle ratchet wrench be used to secure greater leverage.

### 3.11 RESTRAINED JOINTS

- A. Install restrained joint pipe where indicated on the Drawings. Make the joint assemblies in accordance with the manufacturer's recommendations.

### 3.12 CONCRETE THRUST BLOCKS

- A. Place cast-in-place concrete thrust blocks at all bends (regardless of the angle of deflection or direction), caps, offsets, hydrants, and tees, as well as in locations shown on the Drawings or directed by the Engineer. Cast-in-place thrust blocks shall be formed with wood forms; rough earth forms are not acceptable. Protect pipeline materials and fittings from direct adherence of the concrete thrust block by wrapping in plastic, roofing felt, reinforced manila paper or similar material. The thrust block shall not bear directly on the joint and shall not interfere with future adjustments, tightening, or removal of the joint. Thrust blocks shall bear against undisturbed soil at the side or end of the trench and this undisturbed surface shall be carefully cleaned off so as to be vertical. The thrust blocks shall have a minimum horizontal thickness of 2 feet and shall have the minimum bearing area listed on the Drawings, measured perpendicular to the direction of thrust.
- B. Cast-in-place concrete thrust blocks are required at all fittings and will be used in conjunction with retainer glands. Provide thrust blocks and anchor blocks at the locations shown on the Drawings or as Directed by the Engineer.

### 3.13 DISINFECTION

- A. Disinfect pipe, fittings and valves in accordance with Section 33 13 00, before placing into service.

### 3.14 TESTING

- A. Pipe, fittings and valves installed under this contract shall be tested in accordance with Section 33 08 10, before being placed into service.

### 3.15 POLYETHYLENE ENCASEMENT

- A. Install polyethylene encasement in accordance with AWWA C105.
- B. Slip the polyethylene tube over the exterior of the pipe and/or fittings prior to placement in the trench.
- C. Allow a minimum of 1 foot of overlap at each joint and secure to pipe with compatible polyethylene adhesive tape at several locations along the barrel of the pipe.

- D. At each pipe connection, overlap the wrap and secure with a non-corrosive strap behind the pipe bell, and overlap with the new section of wrap and secure in place with a strap on the spigot end.
- E. Install wrap in accordance with Method “A” or “C” of AWWA C105 and encase all pipe, fittings, valves, and all other appurtenances.
- F. Provide polyethylene encasement on all pipes

### 3.16 DEACTIVATION OF WATER MAINS

- A. Excavate and remove sections of the existing water main as shown on the Drawings. Repairs and capping of the main shall be in accordance with the Drawings.
- B. After the pipe has been capped, the top sections of all gate boxes shall be removed and stacked, the holes filled in with suitable backfill material and patched with bituminous concrete in the area of the gate box.
- C. The deactivation of the water mains shall be done upon completion of:
  - 1. Installation and successful testing of the new pipeline, including all hydrants and appurtenances, and
  - 2. Removal and reconnection of all building services from the existing pipelines to the new pipelines.
  - 3. Approval for the deactivation of the water mains by the Engineer or Owner.
- D. Surface repair methods shall meet the requirements of the applicable surface repair items.

END OF SECTION

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SECTION 33 12 19

VALVES AND HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section is for buried valves, including valves inside below-grade valve vaults.
- B. Section Includes
  - 1. Types of valves specified herein include:
    - a. Gate Valves
    - b. Valve Boxes
    - c. Fire Hydrants
    - d. Anchoring Tees
- C. Related Sections
  - 1. Section 31 23 00 - Excavation, Backfill, Compaction and Dewatering
  - 2. Section 33 08 10 - Testing of Water Distribution Systems
  - 3. Section 33 08 30 - Testing of Sanitary Sewer and Storm Drainage Systems
  - 4. Section 33 11 13 - Ductile Iron Pipe and Fittings

1.2 REFERENCES

- A. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
- B. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes
- C. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- D. ASTM A536 - Standard Specification for Ductile Iron Castings
- E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts
- F. ASTM A564 - Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
- G. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings
- H. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications
- I. ASTM D429 - Standard Test Methods for Rubber Property Adhesion to Rigid Substrates
- J. ASTM D1784 - Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds

- K. ASTM D4101 – Standard Specification for Polypropylene Injection and Extrusion Materials
- L. AWWA C111 - Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- M. AWWA C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
- N. AWWA C207 – Steel Pipe Flanges for Waterworks Service – Sizes 4 Inch Through 144 Inch (100 mm Through 3,600 mm)
- O. AWWA C500 – Metal-Seated Gate Valves for Water Supply Service
- P. AWWA C502 –Dry-Barrel Fire Hydrants
- Q. AWWA C504 - Rubber-Seated Butterfly Valves
- R. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in. (50 mm) through 24 in. (600 mm) NPS
- S. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service
- T. AWWA C550 - Protective Epoxy Interior Coatings for Valves and Hydrants
- U. MSS SP45 - Bypass and Drain Connections
- V. MSS SP80 - Bronze Gate, Globe, Angle and Check Valves
- W. NSF/ANSI Standard 61 and NSF/ANSI Standard 372 – Drinking Water System Components

### 1.3 SYSTEM DESCRIPTION

- A. Furnish all labor, materials, equipment, and incidentals required to install, complete and ready for operation, all valves, hydrant assemblies, and appurtenances as shown on the Contract Drawings and as specified herein.

### 1.4 SUBMITTALS

- A. Submit complete Shop Drawings of all valves, valve boxes, hydrants and other material specified in this Section including but not limited to the following:
  - 1. Product data including body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions.
- B. Operation and Maintenance Manuals
  - 1. Provide O&M manuals for all valves in accordance with Section 01 77 00.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
  - 1. Ensure valves are dry and internally protected against rust and corrosion.
  - 2. Protect valve ends against damage to threads, flange faces, and weld-end preps.
  - 3. Set valves in best position for handling:

- a. Set globe and gate valves closed to prevent rattling;
- B. Use the following precautions during storage:
  - 1. Do not remove valve end protectors unless necessary for inspection; then reinstall for storage.
  - 2. Protect valves from weather. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.
- C. Use a sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels and stems as lifting or rigging points.

## 1.6 SCHEDULING

- A. Refer to Section 01 32 13 for limitations on the sequence of work to be performed by the Contractor.

## 1.7 WARRANTY

- A. Buried gate valves shall be warranted by the manufacturer for a 10 year period covering failures. Warranty shall cover all replacement costs.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Valves, hydrants, and appurtenances shall conform to the standards of the City of Fall River Water Department.
- B. Pressure and temperature ratings shall be as scheduled.
- C. Valve sizes shall be the same size as the upstream pipe, unless otherwise indicated.
- D. Provide accessories including bolts, nuts, glands, and gaskets.
- E. Extended Stems - Where insulation is indicated or specified, provide extended stems arranged to receive insulation.
- F. Valves shall have the same end connections as the pipeline in which it is installed.
- G. Buried valves shall have mechanical joint ends compatible with the piping systems in which they are installed in accordance with ANSI/AWWA C111/A21.11-85 and Mega-Lug type retainer glands. Provide mechanical joint accessories, including glands, SBR rubber gaskets, tee head bolts, and nuts with the valves. Provide stainless steel bolts and nuts.
- H. Mechanical joint ends shall be compatible with ductile iron O.D. pipe.
- I. Valves and appurtenances shall be of the size shown on the Contract Drawings.
- J. Equipment of the same type shall be from one manufacturer, unless otherwise approved.

- K. Valves, hydrants, and appurtenances shall have the name of the manufacturer, flow directional arrows, and the working pressure for which they are designed cast in raised letter upon some appropriate part of the body.
- L. Valves for water distribution systems shall be certified to NSF 61 and NSF 372.
- M. Bolts shall be 304 stainless steel with hex heads and hex nuts in accordance with ASTM A-307 and A-563, respectively.
- N. Provide buried valves with standard valve box with tee-handle operator.
- O. Valves installed inside buried structures shall be hand-wheel or lever operated.

## 2.2 GATE VALVES (RESILIENT SEAT)

- A. Gate valves shall be resilient seat type suitable for underground service complying with the requirements of AWWA C515. C515 gate valves shall be ductile iron.
- B. Gate valves shall be designed to be bubble tight for 250 psig water working pressure with no leakage past the seat from either side of the disc, and shall be hydrostatically tested to 500 psig.
- C. Gate valves shall be of the non-rising stem (N.R.S.) design.
- D. Gate valves shall be set vertically (spur gearing).
- E. Gate valves shall open left (counter-clockwise).
- F. Buried gate valves shall be furnished with 2 inch square operating nuts.
- G. Open-left gate valves shall have a black-painted operating nut, and open-right valves shall have a red-painted operating nut.
- H. Cast iron shall meet the specifications of ASTM A126, Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Ductile iron shall meet the standards of ASTM A536.
- I. The resilient-seated disc wedge shall be of the resilient wedge fully supported type, either cast iron or ductile iron. Solid guide lugs shall travel within channels in the body of the valve. The disc and guide lugs shall be fully encapsulated in SBR (styrene butadiene rubber) or EPDM rubber. Disc wedges that are not 100% fully encapsulated shall not be acceptable. Provide guide caps of an acetal copolymer bearing material to protect the rubber-encapsulated solid guide lugs from abrasion for long life and ease of operation.
- J. The seat shall be SBR or EPDM rubber, matching the disc encasement. The seating surface (rubber) shall be specially designed so as to provide a smooth waterway, without depressions or cavities, which might trap debris and interfere with tight closures.
- K. The body, bonnet, and gate shall be cast/ductile iron, constructed in accordance with AWWA C515. The bonnet to body seal shall incorporate a flat neoprene gasket. Bonnet and body flanges shall be fully machined to assure proper sealing of the gasket.
- L. Gate valve stems shall be of bronze rolled bar stock in accordance with ASTM B584, and shall have a forged thrust collar. The thrust collar shall be factory lubricated, and the thrust collar and its lubrication shall be isolated by the O-Rings from the water

way and from outside contamination, providing permanent lubrication for long term ease of operation. An anti-friction thrust washer shall be provided both above and below the thrust collar for ease of operation.

- M. Gate valves shall have O-Ring sealed stems with one O-Ring located below the thrust collar and two O-Rings located above the thrust collar. The two O-Rings located above the thrust collar shall be replaceable with the valve still in service in the fully open position.
- N. Coat internal and external exposed ferrous surfaces of the valve with a fusion-bonded, thermosetting powder epoxy coating suitable for potable water service conforming to AWWA C550. Coating shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 10 mils. Gate valves for water distribution systems shall be certified to NSF 61.
- O. Seal internal and external exposed ferrous surfaces of the valve with two coats of asphaltic varnish (5 mils) suitable for potable water service conforming to AWWA C550. Coating shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 10 mils. Gate valves for water distribution systems shall be certified to NSF 61.
- P. Gate valves shall be as manufactured by U.S. Pipe Metroseal (Model 250), Mueller (Model 2360), American Flow Control (AFC-2500), Clow (2630 Series), equivalent by M&H Valve Company, or equal.

### 2.3 VALVE BOXES (FOR BURIED VALVES)

- A. Provide a valve box of the adjustable type of heavy pattern, constructed of cast iron and provided with a 6 inch cast iron cover for each buried valve.
- B. Valve boxes shall be manufactured in North America by Clow Corporation, Tyler/Union Corporation, United States Foundries, or equal.
- C. Valve boxes shall be round, 2-piece, sliding type, cast iron. The upper section of each box shall have a flange on top having sufficient bearing area to prevent settling. The bottom of the lower section shall be belled to enclose the operating nut of the valve. The barrel shall be 5-1/2 inch O.D. minimum.
- D. Boxes shall be of lengths consistent with pipe depths. Boxes shall be adjustable, with a lap of at least 6 inches when in the most extended position.
- E. Slot covers for easy removal.
- F. Covers for valve boxes on water mains shall have the word "WATER" cast in the top.
- G. Coat valve boxes with coal-tar pitch enamel or other approved coating.
- H. Valve boxes shall be suitable for the size valve on which they are used. The length of the lower section shall be adequate for trench adjustment, no top or mid-section adapters.
- I. Provide one tee-handled wrench for every four valves installed, unless additional wrenches are required due to variations in valve bury depth. Wrenches shall be field measured to accommodate the depth of bury and provide waist high operation.

## 2.4 FIRE HYDRANTS

### A. Fire Hydrants

1. The hydrant shall meet the requirements of AWWA Standard C-502, latest edition.
2. The hydrant operating nut shall open right.
3. Operating nut
  - a. Shall be D.I. or bronze.
  - b. Shall be 1-1/2 inch diameter, pentagon in shape.
4. Nozzles
  - a. 2 each – 2-1/2 inch National Standard Thread
  - b. 1 each – 4-1/2 inch National Standard Thread
5. Provide nozzle caps without chains and with the same size pentagon operator as specified above.
6. Provide traffic model hydrant with breakaway feature.
7. Hydrant shoe or base features
  - a. Ductile iron with 6 inch MJ inlet
  - b. 5-1/4 inch valve opening with draining bronze seat and drain ports to allow water within the hydrant barrel to drain to the exterior.
  - c. Valve seat and sub-seat arrangement shall be bronze to bronze.
8. Bolts and Nuts
  - a. Bolt and nuts shall be stainless steel.
9. Protective coatings
  - a. Provide a minimum of 3 mils total dry film thickness for all paintings and coatings.
  - b. The internal components of the hydrant shall be fusion-epoxy coated.
  - c. Coat internal and external cast iron or ductile iron components with an approved bituminous sealer or a fusion bonded epoxy coating, 3 mils minimum.
10. Approved hydrants
  - a. Clow Medallion
  - b. American Darling B62-B-5
  - c. Mueller Super Centurion 250
  - d. Or equal

- B. The hydrants shall comply with all requirements of AWWA Standard C502-80 and the following requirements:
1. The hydrant shall be a compression type shut-off with valve opening against the pressure. A negligible loss of water shall occur with breakage of the hydrant, whether breakage occurs in the open position or the closed position.
  2. The main valve seat shall be 5¼ inches in diameter.
  3. The inlet connection shall be 6-inch mechanical joint furnished with gasket, gland and bolts.
  4. The color of the hydrant above ground shall match the Owner's standard color.
  5. Connecting pipe and pipe nipples between the main line tee and hydrant shall be 6 inch ductile iron, Class 52, conforming to the requirements of Section 33 11 13.
  6. 6 inch hydrant valve and valve box shall conform to paragraphs 2.2 and 2.3.
  7. Anchoring tees shall have main run ends as indicated on the Drawings or as required for the installation. The 6 inch branch shall have a plain end with an integral gland and rotating mechanical joint gland to provide a restrained connection for the valve.
  8. Minimum working pressure shall be 250 psi.
  9. The hydrant tee shall be designed so that the hydrant valve can be securely attached to the main line.
  10. The length of the hydrant barrel shall be such that when installed with the proper depth of cover on the branch pipeline, the hydrant will be set with the normal ground line of the barrel between 3 inches minimum to 6 inches maximum above the finished surface elevation. The bury length shall be 5-1/2 foot minimum, or as required in each individual installation. Provide hydrant extensions as required.
  11. Fire hydrants shall be dry-barrel, non-freeze type with breakaway flanges.
  12. Furnish galvanized chains with caps.
  13. Extension kits shall be of the same manufacturer as the hydrant and shall be complete including all bolts, extension rods and gaskets.
  14. The hydrants shall be of the "Dry-top" design and with O-ring seals. The design shall be such as to prevent the entry of water into the operating portions of the hydrant from either the barrel or from rainwater.
  15. Hydrants in which the seat ring is in the base elbow shall be provided with a bronze shoe bushing screwed into the base elbow. In all hydrants there shall be a bronze shoe bushing to facilitate removal of the seat ring for repair, maintenance and renewal.
  16. The seal between the shoe bushing and the seat ring shall consist of "O" rings located to prevent the passage of water into the barrel of the hydrant or into the drain ports from the base elbow.

C. Hydrant Paint

1. Thoroughly clean hydrants and paint with two shop or field coats in accordance with AWWA C502 and the instructions of the paint manufacturer.
2. Provide a factory-applied fusion-bonded epoxy coating. Coating color shall be the Owner's standard.
3. Alkyd gloss enamel shall be 801 DTM by Sherwin-Williams, 2H-Tneme by Tnemec, or equal. Reflective paint shall be Scotchlite #7211 by 3M.
4. Hydrant color shall be Owner's standard color.

D. Additional Hydrant Components

1. Supply a minimum of 2 operating wrenches compatible with hydrants.
2. Supply a minimum of 2 repair kits compatible with the hydrants being supplied that includes all special tools required to maintain the hydrants (e.g., hose nozzle insertion tool, pumper nozzle insertion tool, hydrant disassembly wrench, etc.).

E. Anchoring Tees

1. Hydrant tees shall be the "anchoring" type and shall have mechanical joint bells conforming to the requirements of the main pipe. The anchoring tee outlet shall be 6 inch mechanical joint, equipped to anchor the hydrant valve to the tee.
2. Anchoring tees shall have mechanical joint main run ends. The branch shall have a plain end with an integral gland and rotating mechanical joint gland to provide a restrained connection.

F. Tie Rods

1. Tie rods utilized for joint restraints shall be manufactured by Star national Products, Columbus, OH, and shall consist of Star Figure SST7 tie bolts with Figure SST8 nuts, Figure SST17 tie washers, and Figure SST12 all thread tie rods. Tie bolts, tie washers, tie rods, and nuts shall be COR-TEN type steel.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Examine valve interior through the end ports for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks used to prevent disc movement during shipping and handling.
- B. Actuate valve through an open-close and close-open cycle. Examine functionally significant features, such as guides and seats made accessible by such actuation. Following examination, return the valve closure member to the shipping position.
- C. Examine threads on both the valve and the mating pipe for form (i.e., out-or-round or local identification) and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.



- E. Prior to valve installation, examine the piping for cleanliness, freedom from foreign materials, and proper alignment.
- F. Replace defective valves with new valves.

### 3.2 HYDRANT INSTALLATION

- A. Excavation, trenching and back filling procedures shall be in accordance with Section 31 23 00.
- B. Provide thrust blocks for all hydrants with bearing against the foot or bottom of the hydrant and against the vertical face of undisturbed soil behind the hydrant. The bearing areas of the thrust block on the soil shall be as shown on the Drawings.
- C. Provide one cubic yard of washed  $\frac{3}{4}$  inch stone around hydrant drains.
- D. Hydrants shall be located as shown on the plans.
- E. Hydrant breakaway flanges shall be located no higher than 3 inches above-grade or lower than at-grade.
- F. Support buried valves 6 inches and larger with a concrete pad.
- G. Install gate valves in the vertical position.
- H. Air test tapping sleeves prior to beginning tapping operations.
- I. Existing valves and hydrants will be operated only by Fall River Water Department personnel.
- J. All newly installed hydrant and branch connections shall be subject to line pressure in an open trench to determine tightness of joints before backfilling, unless they are part of the overall pipeline pressure and leakage testing.
- K. Install fire hydrants in accordance with the Drawings and the manufacturer's recommendation.

### 3.3 VALVE INSTALLATION

- A. Refer to the Drawings and piping system specification Sections for specific valve applications and arrangements.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install valves in horizontal piping with stem at or above the center of the pipe.
- E. Install valves in a position to allow full stem movement.
- F. Install valves and actuators to be plumb in the vertical direction.
- G. Threaded Connections
  - 1. Note the internal length of threads in valve ends and proximity of valve internal seat or wall to determine how far pipe should be threaded into valve.

2. Align threads at point of assembly.
3. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).
4. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

H. Mechanical Joint Connections

1. Refer to Section 33 11 13 for requirements for installing mechanical joint connections.

3.4 INSPECTION AND TESTING

- A. Valves and hydrants shall be inspected and tested in conjunction with the pipelines in which they are installed in accordance with Section 33 08 10 or Section 33 08 30.

3.5 FIELD QUALITY CONTROL

- A. After piping systems have been tested and put into service, but before final adjusting and balancing, inspect valves for leaks. Adjust or replace packing to stop leaks; replace valves if leak persists.

3.6 CLEANING

- A. Clean mill scale, grease, and protective coatings from exterior of valves and prepare valves to receive finish painting or insulation.

3.7 FINAL ACCEPTANCE AND WARRANTY

- A. Final acceptance of all equipment furnished under these Specifications will be withheld until after the installation and field testing by the Engineer. The manufacturer and the Contractor shall guarantee the equipment against defects of any kind for a period of one year after final testing and acceptance.

END OF SECTION

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## SECTION 33 13 00

### DISINFECTION OF WATER DISTRIBUTION SYSTEMS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Procedures for disinfecting new and repaired water distribution systems
- B. Related Sections
  - 1. Section 02 41 23 – Removal of Existing Hydrants and Gate Valves
  - 2. Section 33 08 10 – Testing of Water Distribution Systems
  - 3. Section 33 11 13 – Ductile Iron Pipe and Fittings
  - 4. Section 33 12 19 – Valves and Hydrants
  - 5. Section 33 12 13 – Water Services

##### 1.2 REFERENCES

- A. American Water Works Association, AWWA C651, *AWWA Standard for Disinfecting Water Mains*.
- B. American Public Health Association, American Water Works Association and Water Pollution Control Federation, *Standard Methods For the Examination of Water and Wastewater*.

##### 1.3 SUBMITTALS

- A. A formal statement in writing to the Engineer that all crews responsible for installation and repairs within the operating distribution system have been properly trained and are aware of prescribed construction practices and disinfection procedures to avoid contamination to the operating distribution system.
- B. The name of competent person(s) responsible for the disinfection processes and performing the required bacteriological sampling. The Engineer will approve the disinfection process to be used in advance of any disinfection efforts.
- C. Certificate of compliance that the independent commercial laboratory performing the bacteriological sampling analyses is certified with the State Department of Environmental Protection and U.S. Environmental Protection Agency for analyzing public drinking water supplies.
- D. Certified results for all bacteriological sampling prior to restoring or placing the distribution system into service.
- E. For each section of pipe to be chlorinated, the Contractor shall inform the Engineer in writing of the locations for taps to be installed and utilized for the procedure.

##### 1.4 QUALITY ASSURANCE

A. Qualifications & Certifications

1. The Contractor shall employ trained personnel aware of the need to carefully observe prescribed construction practices and disinfection procedures in order to prevent contamination to the distribution system.
2. The competent person(s) responsible for the disinfection processes and bacteriological sampling shall be familiar with AWWA C651- Standards for Disinfecting Water Mains and experienced with the Continuous Feed Method of disinfection. The Engineer shall approve disinfection procedures in advance.
3. Bacteriological sampling shall be made in full accordance with AWWA C651 and under the supervision of the Engineer.
4. An independent commercial laboratory certified for analyzing public drinking water supplies by the State Department of Environmental Protection and U.S. Environmental Protection Agency shall analyze all bacteriological samples and provide certified results to the Engineer and/or Owner for review prior to restoring or placing the system into service.

1.5 PROJECT/SITE CONDITIONS

- A. The general procedure for disinfection and analyses is described in Part 3, Execution, of this section. If project conditions warrant the need for special disinfection procedures, obtain prior written approval from the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

- A. The forms of chlorine used in the disinfection operations shall conform to ANSI/AWWA B300. Materials Safety Data Sheets (MSDS) for the disinfectant shall be readily available for reference. The competent person responsible for the disinfection operation shall be fully trained and equipped to handle any emergency that may arise.

PART 3 EXECUTION

3.1 DISINFECTION

- A. Before being placed into service, all new water pipelines shall be chlorinated using the Continuous Feed Method specified in AWWA C651 – Section 4.4.3. The Engineer shall approve the procedure in advance.
1. The Contractor will determine the location of the chlorination and sampling points in the field. The Contractor shall install taps for chlorinating, sampling and expulsion of air and shall uncover, backfill and plug the taps as required.
  2. Prior to disinfecting the water main, the main shall be completely filled to remove all air pockets and then flushed to remove particulate. The flushing velocity in the main shall not be less than 2.5 ft/s unless the Engineer and/or Owner determine that the conditions do not permit the required flow to be discharged to waste.

**TABLE 3.1-1**

Required Flow to Flush Pipelines (40 psi residual pressure in water main)\*

Pipe Diameter (in)	Flow Required to Produce 3.0 ft/s (Approximate) Velocity in Main	Number of 2 ½ inch Hydrant Outlets
4	120 gpm	1
6	260 gpm	1
8	470 gpm	1

\*AWWA C651, AWWA Standard for Disinfecting Water Mains

3. At a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will not have less than 25 mg/L (PPM) free chlorine throughout the entire section of pipe to be chlorinated.

**TABLE 3.1-2**

Chlorine Required to Produce 25-mg/L Concentration in 100 Feet of Pipe – By Diameter\*

Pipe Diameter (in)	100 % Chlorine (Pounds)	1% Chlorine Solution (Gals.)
4	0.013	0.16
6	0.030	0.36
8	0.054	0.65

\*AWWA C651, AWWA Standard for Disinfecting Water Mains

4. The chlorinated water is to remain in the new pipeline for at least 24-hours. After a contact time of 24-hours there should be a free chlorine concentration of not less than 10 mg/L (PPM). During this period, proper precautions are to be taken to prevent this chlorinated water from flowing back into the existing system.
  5. All valves and hydrants within the treated section shall be operated to ensure disinfection of the appurtenances.
- B. The Tablet Method consisting of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water and allowing it to set for a contact period is not acceptable.
  - C. The interior of all pipe, fittings and valves used in making a repair or tie-in shall be swabbed or sprayed with a one percent (1%) hypochlorite solution before they are installed.

3.2 FINAL FLUSHING

- A. Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system.
1. Flushing the main is to be accomplished at as high a velocity as possible consistent with the ability of the Contractor to collect the discharge water for proper disposal.
  2. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means provided in AWWA C651.
  3. Flushing shall be done in strict conformance with all applicable local, state and federal regulations. No discharge of chlorinated water to any storm sewer or natural watercourse will be allowed.

### 3.3 BACTERIOLOGICAL ANALYSES

- A. After the 24-hour disinfection period and all chlorine solution has been thoroughly flushed, the bacteriological sampling and analysis of the replacement water may then be performed.
1. Bacteriological sampling shall be made by the Contractor's competent person(s) in full accordance with AWWA C651- Section 5, *Bacteriological Tests* and under the supervision of the Engineer.
  2. Analysis shall be performed by an independent commercial laboratory certified by the State Department of Environmental Protection and U.S. Environmental Protection Agency for analyzing public drinking water supplies. All results shall be provided to the Engineer for review.
  3. Two consecutive sets of acceptable samples, taken at least 16-Hours apart are required prior to placing the main into service. Samples shall be collected every 1,200 ft of the new water main, plus one set from the end of the line and at least one from each branch greater than one pipe length. Failure of any one of the bacteriological test samples shall require rechlorination and retesting by the Contractor.
  4. The line shall not be placed in service until the bacteriological requirements of AWWA C651 are met.

END OF SECTION

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SECTION 33 31 23

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
  - 1. PVC Gravity Pipe and Fittings
  - 2. Perforated PVC Drain Pipe
- B. Related Sections
  - 1. Section 31 23 00 - Excavation, Backfill, Compaction, and Dewatering
  - 2. Section 31 05 13 - Borrow Material
  - 3. Section 33 08 30 - Testing of Sanitary Sewer and Storm Drainage Systems

1.2 REFERENCES

- A. ASTM D2241 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)
- B. ASTM D2412 - Standard Test Method for External Loading Properties of Plastic Pipe by Parallel-Plate Loading
- C. ASTM D2444 - Standard Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- D. ASTM D3034 - Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
- E. ASTM D3139 - Standard Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
- F. ASTM D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- G. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- H. ASTM F679 - Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- I. ANSI/AWWA C110/A21.10, Ductile Iron and Grey Iron Fittings 3" through 48" for Water and Other Liquids
- J. ANSI/AWWA-C153/A21.53, Ductile Iron Compact Fittings Water Service
- K. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., For Water Distribution

1.3 SUBMITTALS

- A. Submit specifications and shop drawings for materials and equipment furnished under this Section.

- B. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified herein.

#### 1.4 QUALITY ASSURANCE

- A. Each type of PVC pipe and fittings shall be from a single manufacturer. Alternatively, the pipe manufacturer shall provide certification that the fittings are suitable for installation with the pipe.
- B. Inspection of the pipe will also be made by the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job site.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

##### A. Gravity Pipe

1. Polyvinyl chloride (PVC) pipe shall be of the size indicated on the Drawings or as specified and shall conform to the latest revision of ASTM D3034, Type SDR 35 for diameters less than or equal to 15 inch diameter and ASTM F679 for pipe greater than 15 inch diameter. Standard laying lengths shall not exceed 14.0 feet.
2. Joints shall be elastomeric gasket joints and shall provide a watertight seal. Gaskets shall be in accordance with ASTM F477. Assembly of joints shall be in accordance with ASTM D3212.
3. The minimum "pipe stiffness" (load divided by change in inside diameter in direction of load application) at 5% deflection shall be at least 46 psi for pipe tested in accordance with ASTM D2412.
4. No shattering or splitting shall be evident when 150 ft.-lbs. and 210 ft.-lbs. is impacted on 4 inch and 6 inch diameter pipe, respectively, in accordance with ASTM Method of Test D2444.
5. Pipe lengths and fittings to be used on the project shall be clearly marked on the outside in bold type with the name of the manufacturer, pipe size, pipe material, pipe class, and ASTM designation.

##### B. Perforated Pipe

1. Perforated polyvinyl chloride pipe shall be Type PS-46 PVC and conform to ASTM F758. Perforated pipe shall be furnished in lengths of not more than 20 feet.
2. Alternately, perforated polyvinyl chloride pipe shall conform to ASTM D3034 in sizes 4 through 15 inch. Perforations shall be two rows of ½ inch diameter holes spread longitudinally, 6 inch (maximum) apart and shall be oriented 120 degrees apart (60 degrees either side of the pipe bottom). A maximum tolerance of ¼-inch on hole spacing and size will be allowed. The top of pipe shall be marked for ease of installation.



## PART 3 EXECUTION

### 3.1 HANDLING PIPE AND FITTINGS

- A. Take care in loading, transporting, and unloading to prevent injury to the pipe. Do not drop pipe or fittings. Examine pipe and fittings before installing, and no piece shall be installed that is found to be defective.
- B. If any defective pipe is discovered after it has been installed, remove and replace it with a sound pipe in a satisfactory manner. Thoroughly clean pipe and fittings before installing, keep clean until they are used in the work, and conform to the lines, grades and dimensions required when installed.
- C. Pipe ends requiring cutting shall be cut square without damage to the remaining pipe. Bevel cut pipe ends 1/8 inch at approximately 30 degrees to provide proper assembly of the joint. Beveling can be done with a coarse file or portable grinder.
- D. Support stored pipe from below at not more than 3 foot intervals to prevent deformation. Do not stack pipe higher than 6 feet. Store pipe and fittings in a manner which will keep them at ambient outdoor temperatures. Provide temporary shading as required to meet this requirement. Simply covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted.

### 3.2 INSTALLATION

- A. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this required check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.
- B. Install piping and fittings true to alignment and grade. If necessary, each length of pipe shall be cleaned out before installation.
- C. Excavation, trenching and back filling procedures shall be in accordance with Section 31 23 00.
- D. All PVC gravity pipe shall be installed on a bed of 3/4-inch crushed stone borrow meeting the requirements of Section 31 05 13 and have a minimum depth of 6 inches. The 3/4-inch crushed stone borrow shall also completely encase the pipe and cover the pipe to a grade 6 inches over the top of the pipe for the entire width of the trench. Bell holes shall be made in the 3/4-inch crushed stone borrow bedding such that the pipe shall be uniformly supported throughout the entire length of the barrel section.
- E. All pipe shall be tested in accordance with Section 33 08 30.
- F. Deflections in Pipe Alignment
  - 1. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint, and shall be approved by the Engineer.

2. Prior to deflecting the pipeline, the spigot of the pipeline should be marked flush with the bell end to assure that the spigot is not withdrawn excessively as the result of the deflection. After the pipe is deflected, an adequate depth of jointing material must remain on the side where the spigot is away from home and an adequate width of caulking space must remain on the opposite side of the pipe at the face of the bell.
3. The maximum deflection recommended by the manufacturer when using any pipe system must be observed when deflecting a pipeline.
4. In general, all radius curves called for on the Drawings or permitted at the time of construction are to be made using full lengths of pipe. The use of short lengths of pipe and extra joints in order to make a smaller radius turn will not be allowed without the written approval of Engineer.

G. Unsuitable Laying Conditions

1. No pipe shall be laid in water, in an unsuitable trench or during unsuitable weather conditions.

END OF SECTION

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SECTION 33 31 13.33

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. High density polyethylene (HDPE) pipe for:
  - a. Storm drainage lines
2. Types of HDPE piping specified in this Section include:
  - a. Corrugated exterior, smooth interior, solid wall HDPE pipe

B. Related Sections

1. Section 31 23 00 – Excavation, Backfill, Compaction and Dewatering
2. Section 31 05 13 – Borrow Materials
3. Section 033 08 10 – Testing of Sanitary Sewer and Storm Drainage Systems

1.2 REFERENCES

- A. AASHTO M252 –Corrugated Polyethylene Drainage Pipe
- B. AASHTO M294 – Corrugated Polyethylene Pipe, 300- to 1200-mm Diameter
- C. AASHTO MP7 – Corrugated Polyethylene Pipe, 1300- to 1500-mm Diameter
- D. AWWA C901 – Standard for Polyethylene Pressure Pipe and Tubing, ½-Inch through 3-Inch for Water Service
- E. AWWA C906 – Standard for Polyethylene Pressure Pipe and Fittings, 4-inch through 64-inch for Water Distribution.
- F. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable
- G. ASTM D2239 – Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
- H. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- I. ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- J. ASTM D2683 – Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- K. ASTM D2737 – Standard Specification for Polyethylene (PE) Plastic Tubing

- L. ASTM D2774 – Standard Practice for Underground Installation of Thermoplastic Pressure Piping
  - M. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
  - N. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
  - O. ASTM D3261 – Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
  - P. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
  - Q. ASTM F405 – Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
  - R. ASTM F585 – Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers
  - S. ASTM F667 – Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings
  - T. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
  - U. ASTM F894 – Standard Specification for Polyethylene (PE) Large-Diameter Profile Wall Sewer and Drain Pipe
  - V. ASTM F905 – Standard Practice for Qualification of Saddle Fusion Joints
  - W. ASTM F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
  - X. ASTM F1962 – Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings
  - Y. ASTM F2620 - Standard Practice of Heat Fusion Joining of Polyethylene Pipe and Fittings
  - Z. AWWA C153 / ANSI A21.53 – Standard for Ductile-Iron Compact Fittings for Water Service
  - AA. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, ½-Inch (13 mm) Through 3-Inch (76 mm), for Water Service
  - BB. AWWA C906 – Polyethylene (PE) Pressure Pipe and Fittings, 4-Inch (100 mm) Through 63-Inch (1,575 mm), for Water Distribution and Transmission
  - CC. NSF/ANSI Standard 61 – Drinking Water System Components
- 1.3 SUBMITTALS
- A. Submit product data on the pipe, fittings, and accessories.

- B. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the appropriate ASTM standards specified herein.
- C. Submit resumes for all personnel performing heat fusion joining.

#### 1.4 QUALITY ASSURANCE

- A. Personnel performing heat fusion joining shall have adequate training and experience in the procedure, demonstrated by at least twelve months applicable experience.
- B. Use an adequate number of skilled laborers, equipment of adequate size, capacity, and quantity to perform the work of this Section, and its related Sections, in a timely manner.
- C. Materials to be used in conjunction with potable water systems shall conform to NSF/ANSI 61 (Drinking Water System Components).

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. When lifting with slings, only wide fabric choker slings capable of safely carrying the load shall be used. Wire rope or chain shall not be used to handle pipe.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER – GENERAL

- A. The manufacturer shall have manufacturing and quality assurance facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications.
- B. Pipe and fittings from different manufacturers shall not be interchanged for the same type of pipe and application.

#### 2.2 PIPE IDENTIFICATION

- A. The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding five feet:
  - 1. Name and/or trademark of the pipe manufacturer.
  - 2. Nominal pipe size.
  - 3. Dimension ratio.
  - 4. The letters “PE” followed by the polyethylene grade in accordance with the ASTM designation, followed by the hydrostatic design basis in PSI.
  - 5. A production code from which the date and place of manufacture can be determined.

#### 2.3 CORRUGATED EXTERIOR/SMOOTH INTERIOR HDPE PIPE AND FITTINGS

- A. General
  - 1. The polyethylene pipe and fittings shall comply with AASHTO M294, Type S (smooth wall interior).

2. Piping shall be manufactured by Advanced Drainage Systems, Inc., or equal.
3. Pipe material and fittings shall be high density polyethylene meeting ASTM D3350 minimum cell classification 324420C (4"-10") or 325420C (12"-60").
4. Installation shall be in accordance with ASTM D2321.
5. Pipe shall be joined with the bell-and-spigot joint. Gaskets and joint lubricant shall be utilized.
6. Minimum parallel plate pipe stiffness shall be as recommended for each specified diameter pipe per ASTM Test Method D2412.
7. The pipe and fittings shall be free of foreign inclusions and visible defects. The ends of the pipe shall be cut squarely and cleanly so as not to adversely effect joining.
8. The nominal size of the pipe and fittings is based on the nominal inside diameter of the pipe. Corrugated fittings may be either molded or fabricated by the manufacturer. Fittings and gaskets supplied by manufacturers other than the supplier of the pipe shall not be permitted without the approval of the Engineer.

#### 2.4 JOINTS FOR CORRUGATED PIPING

##### A. General

1. Joints of corrugated pipe sections and fittings other than smooth interior, shall be made with split couplings, corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of the pipe joint. Where required by the Engineer, a neoprene gasket shall be utilized with the coupling to provide a soil tight joint.
2. Joints of smooth interior, corrugated pipe sections shall be as per manufacturer's instructions utilizing gasketed PVC or HDPE joints meeting ASTM D-3212.
3. Installation shall be in accordance with ASTM Recommended Practice D-2321 or as specified by the Engineer or local approving agency.

##### B. Leak Resistant/Silt-Tight Pipe

1. Pipe shall provide soil-tight joints with built-in gaskets. Bee joints shall be same as the outside diameter of the pipe.
2. Shall be ADS, N-12 IB ST (soil-tight joint type) piping, or equal.
3. Meets silt-tight & leak resistant (not defined as watertight) joint requirements.
4. For non-watertight connections, exterior HDPE culvert coupling may be used with dedicated ties.
5. Polyethylene flared end sections shall be manufactured to the same criteria as mainline pipe sections.
6. Non-Watertight Manhole Connections - To be made with non-shrink grout.

##### C. Watertight Pipe

1. Provides superior watertight performance.
  2. Meets ASTM D3212 requirements of 10.8 PSI for 10 minutes with no leakage.
  3. Shall be ADS, N-12 IB WT (watertight joint type) piping, or equal.
- D. Manhole Boot Connection
1. Watertight seal made with rubber manhole boot as manufactured by Press Seal, or equal.
  2. Alternatively, watertight seal made by Alok, or equal, in which case maximum insertion angle is 7 degrees.
- E. Watertight Seals for Corrugated HDPE Pipe - Shall be NPC Corrugated Pipe Adapter compatible with Kor-N-Seal manhole connector.

## 2.5 CORRUGATED INTERIOR/EXTERIOR SLOTTED HDPE PIPE

- A. Corrugated, slotted, HDPE tubing shall meet AASHTO M-252. Slotted tubing shall be supplied factory wrapped in a polyester geotextile filter sock. The filter sock shall have a minimum weight of 3.0 oz/square yard, a minimum burst strength of 100 psi, and an apparent opening size of 35.
- B. A manufacturers' certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Engineer upon request.
- C. There shall be a minimum soil cover of 12 inches, as measured from the top of the pipe, for H-20 loading conditions.
- D. Filter Fabric Wraps
  1. Extra strong synthetic materials are to be used with perforated drainage pipe to prevent infiltration of fine soil particles while allowing water to flow freely.
  2. Material shall be ADS Sock, as manufactured by Advanced Drainage Systems.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. The Contractor shall verify that the surface has been prepared to the proper line and grade by shooting invert elevation grades.

### 3.2 INSTALLATION

- A. Open-Cut Installations
  1. Polyethylene pipe and fittings shall be installed in accordance with ASTM Standards, and the manufacturer's recommendations.
  2. Pipe is to be lifted or rolled into position, not dragged over the prepared bedding.
  3. The pipe is to be set at the slope and grades indicated on the plans. Ensure pipe remains at proper grades by shoring it.
  4. All HDPE piping shall be bedded in 6" of crushed stone unless noted otherwise.

5. Crushed stone shall be used as backfill to a point of 6" above the top of the pipe unless noted otherwise.
6. Clay dams shall be installed in the stone backfill as directed by the Engineer to prevent groundwater migration. Spacing shall be 50 ft. maximum. Clay borrow shall be in accordance with Section 31 05 13 requirements for low permeability borrow.
7. Open-Trench Installations - Prepare the area in accordance with Section 31 23 00 - Excavation, Backfill and Compaction.
8. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.
9. Install piping and fittings true to alignment and grade. If necessary, each length of pipe shall be cleaned out before installation.

**B. Joint Couplings**

1. Joint couplings shall be installed in accordance with manufacturer's recommendations.
2. Remove the protective paper and wrap the collar around the pipe with the mastic side to the pipe. The overlap shall be at the top of the pipe.
3. Secure the steel straps.
4. The closing flap shall cover the exposed straps.
5. Encase the entire joint with a minimum of 8 inches of concrete on all sides. The concrete encasement shall extend along the pipe 12 inches on each side of the joint.

**C. Mechanical Joint and Flange Installation**

1. Mechanical joint (MJ) and flange connections shall be installed in accordance with the manufacturer's recommended procedure.
2. MJ adapters and flanges shall be centered and aligned to each other before assembling and tightening bolts.
3. In no case shall the MJ gland or flange bolts be used to draw the connection into alignment.
4. Bolt threads shall be lubricated, and flat washers should be used under the nuts.
5. Bolts shall be evenly tightened according to the tightening and torque pattern of the manufacturer.

**3.3 TESTING**

**A. Pressure Testing**



1. All sections of polyethylene drain and sewer pipe shall be tested in accordance with Section 33 08 30.

END OF SECTION

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SECTION 33 39 13

MANHOLES AND CATCH BASINS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Precast concrete manholes
2. Precast concrete catch basins
3. Cast iron manhole frames and covers
4. Cast iron catch basin frames and grates

B. Related Sections

1. Section 33 08 30 - Testing of Sanitary Sewer and Storm Drainage Systems

1.2 REFERENCES

- A. AASHTO – American Association of State Highway and Transportation Officials, Standard Specifications for Highways and Bridges, most recent edition
- B. ASTM C32 - Standard Specification for Sewer and Manhole Brick (made from clay or shale)
- C. ASTM A48 – Standard Specification for Gray Iron Castings
- D. ASTM C150 – Standard Specification for Portland Cement
- E. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes
- F. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
- G. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets
- H. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals
- I. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- J. ASTM C1157 - Standard Performance Specification for Hydraulic Cement

1.3 SUBMITTALS

- A. Submit Shop Drawings, showing all details of construction, including, but not limited to, structure dimensions, reinforcing, joints, and pipe connections to structures.
- B. Submit on all materials and products included in this specification, including, but not limited to, precast concrete structures, manhole rungs, manhole frames and covers, dampproofing coating, brick masonry, mortar, non-shrink water-proof grout, and catch basin frames and grates.

- C. Submit weights of manhole frames and covers and catch basin frames and grates.
- D. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the manhole structure has been designed to withstand the burial depth, submergence due to flooding, flotation, and dead and live loads.

#### 1.4 QUALITY ASSURANCE

- A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the Owner. Such inspection may be made at the place of manufacture, or at the Site after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. Materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, at no additional cost to the Owner.
- B. At the time of inspection, the materials will be carefully examined for compliance with the latest ASTM designation specified and these Specifications, and with the approved manufacturer's drawings. Manhole sections will be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, and soundness. The surface shall be dense and close-textured.
- C. Imperfections in manhole sections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs will be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at 7 days and 5,000 psi at 28 days, when tested in 3 inch by 6 inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.
- D. Personnel shall have confined space entry training as appropriate for the work to be performed.
- E. Manholes and catch basins shall be designed for lateral earth pressures and to resist flotation.

### PART 2 PRODUCTS

#### 2.1 PRECAST CONCRETE MANHOLE AND CATCH BASIN SECTIONS

- A. Precast concrete barrel sections and transition top sections, shall conform to ASTM C478 and the following requirements:
  - 1. The wall thickness shall not be less than 5 inches for 48 inch diameter reinforced barrel sections, 6 inches for 60 inch diameter reinforced barrel sections and 7 inches for 72 inch diameter reinforced barrel sections.
  - 2. Top sections shall be eccentric except that flat top sections shall be used where shallow cover requires a top section less than 4 feet as shown on the Drawings.
  - 3. Barrel sections shall have tongue and groove joints.

4. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after fabrication and/or repair, whichever is longer.
5. Precast concrete barrel sections with precast top slabs and precast concrete transition sections shall be designed for a minimum of AASHTO HS20-44 loading plus the weight of the soil above at 120 pcf.
6. The date of manufacture and the name and trademark of the manufacturer shall be clearly marked on each precast section.
7. Precast concrete bases shall be monolithically constructed. The thickness of the bottom slab of the precast bases shall not be less than the barrel sections or top slab whichever is greater. Precast concrete bases shall be constructed with a 6 inch extended base, unless otherwise shown on the Drawings.
8. Knock out panels for piping shall be provided in precast sections at the locations shown on the Drawings. They shall be integrally cast with the section, 2½ inches thick and shall be sized as shown on the Drawings. There shall be no steel reinforcing in knock out panels.
9. The side wall height of the base section shall be a minimum of 12 inches above the top of the pipe coming into the manholes and catch basins.
10. A 4'-0" deep sump shall be provided below catch basin outlet pipes.

## 2.2 BRICK MASONRY

- A. Bricks shall be good, sound, hard and uniformly burned, regular and uniform in shape and size, of compact texture. Underburned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted. In case bricks are rejected by the Engineer, they shall be immediately removed from the site of the work and satisfactory bricks substituted, at no additional cost to the Owner.
  1. Bricks for the channels and shelves shall comply with the latest specifications of ASTM C32 for Sewer Brick, Grade SM.
  2. Bricks for building up and leveling manhole frames shall conform to ASTM C32 Grade MS.
  3. Poured concrete inverts will not be allowed.
- B. Mortar used in the brickwork shall be composed of one part Type II portland cement conforming to ASTM C150 to two parts sand to which a small amount of hydrated lime not to exceed 10 lbs. to each bag of cement shall be added.
- C. Sand used shall be washed, cleaned, screened, sharp and well graded as to different sizes and with no grain larger than will pass a No. 4 sieve. Sand shall be free from vegetable matter, loam, organic or other materials of such nature or of such quantity as to render it unsatisfactory.
- D. Hydrated lime shall conform to ASTM C207, Type S.

## 2.3 MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind.

Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.

- B. Manhole covers shall have a diamond pattern, pickholes and the word "SEWER" or "DRAIN", as appropriate, cast in 3 inch letters. Manhole frame and covers shall be manufactured by East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal.
- C. Manhole frames and covers shall be approved for use by the Massachusetts Department of Transportation – Highway Division.
- D. Manhole frames and covers shall comply with the detail shown on the Drawings.
- E. Manhole frames and covers shall be designed for a minimum of AASHTO HS20-44 loading.

#### 2.4 CATCH BASIN FRAMES AND GRATES

- A. Catch basin frames and grates shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Grate and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.
- B. The catch basin frames and grates shall comply with the details shown on the Drawings.
- C. Catch basin frames and grates shall be designed for a minimum of AASHTO HS20-44 loading.

#### 2.5 JOINTING PRECAST MANHOLE SECTIONS

- A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

#### 2.6 MANHOLE RUNGS

- A. Manhole rungs shall be drop front design, 14 inches wide with an abrasive step surface, steel reinforced, copolymer, polypropylene, plastic. Manhole rungs shall conform to OSHA requirements.

#### 2.7 FLEXIBLE PIPE TO-STRUCTURE CONNECTORS

- A. The flexible pipe-to-structure connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
- B. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
- C. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
- D. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.

- E. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
  - 1. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
  - 2. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
  - 3. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

## 2.8 DAMPPROOFING

- A. Dampproofing is required for all sanitary sewer structures.
- B. Provide two coats of bituminous dampproofing on outer surfaces of precast manholes at the rate of 20-25 square feet per gallon in accordance with manufacturer's instructions.
- C. Dampproofing coating shall be a factory-applied asphalt compound specially made to adhere to below grade concrete structures.
- D. The dampproofing shall be Sonoshield semi-mastic, as manufactured by BASF; Dehydratine 4 by Euclid Chemical; RIW Marine Liquid by Toch Brothers; or equal.

## 2.9 NON-SHRINK, HYDRAULIC CEMENT

- A. Hydraulic cement shall be non-shrink, fast-setting, complying with ASTM C1157.
- B. Hydraulic cement shall have a minimum 7-day compressive strength of 3,000 psi and a minimum 28-day compressive strength of 5,000 psi.
- C. Hydraulic cement shall be as manufactured by UGL (Drylock Fastplug), Quikrete, Kryton, or approved equal.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Installation
  - 1. Construct manholes and catch basins to the dimensions shown on the Drawings and as specified. Protect all work against flooding and flotation.
  - 2. Set precast concrete barrel sections so as to be plumb and with sections in true alignment with a ¼ inch maximum tolerance to be allowed.
  - 3. Install the precast sections in a manner that will result in a watertight joint. Seal the joints of precast concrete barrel sections with the preformed flexible joint sealant used in sufficient quantity to fill 75% of the joint cavity. Fill the outside and inside precast section joints with hydraulic cement and finish flush with the adjoining surfaces. Plug holes in the concrete barrel sections required for handling or other purposes with a hydraulic cement or concrete and rubber plugs, and finish flush on the inside.
  - 4. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides.

**B. Pipe Connections**

**1. Stubs**

- a. Connect pipe stubs for future extensions to the structures as shown on the Drawings and close the stub end by a suitable watertight plug.
2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE pressure pipe, steel, etc), use flexible pipe-to-structure connectors.
3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal, HDPE drainage pipe, etc):
  - a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, hydraulic cement.
  - b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

**C. Manhole Rung Installation**

1. Steel reinforced copolymer polypropylene plastic steps shall be press fitted by hand driven hammer into preformed holes in cured precast sections, on 12 inch centers, by the precast concrete manufacturer.

**D. Brickwork**

1. Mix mortar only in such quantity as may be required for immediate use and use before the initial set has taken place. Do not retain mortar for more than one and one-half hours and constantly work over with a hoe or shovel until used. Anti-freeze mixtures will not be allowed in the mortar. No masonry shall be laid when the outside temperature is below 40°F unless provisions are made to protect the mortar, bricks, and finished work from frost by heating and enclosing the work with tarpaulins or other suitable material. The Engineer's decision as to the adequacy of protection against freezing shall be final.
2. Construct channels and shelves of brick as shown on the Drawings. The brick channels shall correspond in shape with the lower half of the pipe. The top of the shelf shall be set at the elevation of the crown of the highest pipe and shall be sloped 1 inch per foot to drain toward the flow through channel. Construct brick surfaces exposed to sewage flow with the nominal 2 inch by 8 inch face exposed (i.e., bricks on edge).
3. Set manhole covers and frames and catch basin frames and grates in a full mortar bed and bricks, a maximum of 12 inches thick for conical tops and 6 inches thick for flat top sections, utilized to assure frame and cover are set to the existing grade. Reset the manhole frames and covers and catch basin frames and grates to final grade prior to placement of final paving.

**3.2 LEAKAGE TEST**

- A. Leak test sewer manholes in conjunction with the pipeline in accordance with Section 33 08 30.



### 3.3 CLEANING

- A. Clean new manholes and catch basins of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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## SECTION 33 46 00

### SUBSURFACE STORMWATER DETENTION SYSTEM

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes

1. The work covered by this section consists of the construction of a subsurface stormwater detention system. The Contractor shall furnish all equipment, tools, labor, and materials necessary to complete the work in accordance with the plans and specifications.

###### B. Related Sections

1. Section 33 08 30 – Testing Storm Drainage Systems
2. Section 33 39 13 – Manholes and Catch basins
3. Section 31 05 13 – Borrow Materials

##### 1.2 SUBMITTALS

- ###### A. Submit Shop Drawings, showing details of construction, reinforcing, joints, pipe connections to structures and manhole frames and cover.

- ###### B. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the subsurface detention structure has been designed to withstand the burial depth, submergence due to flooding, flotation with ground water at the surface elevation, and dead and live loads. These calculations must be stamped by a MA Registered Professional Engineer.

- ###### C. Contractor shall supply shop drawings for review and approval prior to installation. Drawings shall include dimensions, elevations and configuration of the system, including any internal flow controls; attenuation channels, weirs, baffles, orifices and overflow devices. They shall also include inlet splash pads, sumps and outlet control structures. The drawings shall identify and detail all roof access openings and inlet/outlet pipe openings.

##### 1.3 REFERENCE STANDARDS

- ###### A. ASTM C478 - Standard Specification for Pre-cast Reinforced Concrete Manhole Sections.
- ###### B. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, using Rubber Gaskets.
- ###### C. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Reinforcement.

##### 1.4 QUALITY ASSURANCE

- ###### A. All precast concrete structures and components shall be manufactured in accordance with the approved design shop drawings.

- B. The subsurface stormwater detention system shall be a Retain-it Stormwater Management System or approved equal.

#### 1.5 HANDLING AND STORAGE

- A. Care shall be taken in loading, transporting, and unloading to prevent damage to materials during storage and handling.
- B. Precast vendor shall supply sufficient lifting devices cast into the structures capable of supporting structure.

### PART 2 PRODUCTS

#### 2.1 PRECAST CONCRETE SECTIONS

- A. Precast concrete components shall conform to the requirements of Section 33 39 13.
- B. Precast concrete shall be manufactured by a NPCA certified plant.
- C. Precast vendor shall submit structural calculations prepared by a licensed Professional Engineer licensed in the state of installation.
- D. Precast concrete shall be a minimum of 5000psi @ 28 days.

#### 2.2 BRICK MASONRY

- A. Bricks for building up and leveling manhole frames shall conform to ASTM C32 Grade MS, meeting the requirements of Section 33 39 13.

#### 2.3 MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.
- B. Manhole covers shall have a diamond pattern, pickholes and the unit's name cast into the cover. Manhole frame and covers shall be manufactured by East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal.
- C. Manhole frames and covers shall be designed for a minimum of AASHTO HS20-44 loading.

#### 2.4 JOINTING PRECAST MANHOLE SECTIONS

- A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

#### 2.5 FLEXIBLE PIPE-TO-STRUCTURE CONNECTORS

- A. The flexible pipe-to-structure connectors shall conform to the requirements of Section 33 39 13.

#### 2.6 NON-SHRINK, WATER-PROOF GROUT

- A. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Subsurface stormwater detention system installation shall be in accordance with the approved engineering drawings, specifications and calculations. Location, dimensions, elevations, pipe sizes and access manholes shall be per plan.
- B. Contractor shall obtain and be familiar with product installation guide.
- C. Contractor shall excavate the installation area to the specified subgrade elevation. Subgrade soils shall be graded to a consistent level bed, free from deleterious materials such as organics, trash and debris. Subgrades shall be compacted to a 95% density.
- D. A minimum of 6" of  $\frac{3}{4}$ " + crushed stone base placed in a 95% compacted level grade shall be installed on top of the filter fabric in the bottom of the excavation.
- E. Precast concrete (or cast in place) inlet splash pads shall be installed to the specified grade and locations per plan.
- F. Subsurface stormwater detention structures shall be installed in a level and plumb fashion so as to minimize the gap between structures to no more than an average of  $\frac{1}{4}$ " and no greater than  $\frac{1}{2}$ " gap. Unless noted, all structure bottom and top elevations shall be equal to within  $\frac{1}{2}$ ".
- G. Exterior top joints shall be sealed with ConSeal CS-212 (.065 thick x 6" wide) "ribbon tape", or approved equal. "Ribbon tape" shall be applied to a clean dry surface that may require surface preparation to apply per the manufactures recommendations. "Ribbon tape" shall be applied in a continuous length; although when required, a minimum of a 12" overlay can be utilized.
- H. All pipe inverts shall be installed per specified elevation. Installation of the inlet/outlet pipes with a membrane system shall incorporate a watertight rubber boot and flange gasket kit supplied by the vender. The rubber boot shall be installed inside the pipe hole cut into the structure wall. Hole shall be clean and smooth and free of loose or foreign material. The rubber boot should fit tightly and snug against the receiving concrete wall section. The internal metal expansion ring should be tightened to the manufactures recommended torque. The pipe should be slipped into the rubber boot and the external metal pipe clamp should be tightened down to the manufactures recommended torque. When using corrugated pipe, a pipe adapter may be supplied by the pipe vendor to fill the cavity and produce a flat surface to connect the pipe boot to. Those materials may be a Conseal CS-102 "rope tar" or ConSeal CS- 212 "ribbon tape" material or a watertight caulking such as Sikaflex 1a construction sealant.
- I. For detention systems a masonry grout filled pipe hole is sufficient.
- J. For internal piping configurations, a rubber boot system or masonry grout filled pipe hole is sufficient.
- K. Internal flow control structure shall be installed per plan specifications.
- L. Contractor shall install manhole access structures per plan specifications.

- M. Backfill around and on top of structures shall consist of select native material, structural fill or structural stone per plan specifications. Fills shall be placed in 9” lifts at 95% compaction. All fill should not contain any deleterious materials or stones larger than 3” diameter within 6” of system top.

### 3.2 CLEANING

- A. Clean new subsurface detention system of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 33 46 01

STORMWATER TREATMENT UNIT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. The work covered by this section consists of the four storm water treatment units, shown as WQU 1, WQU 2, WQU 3, and WQU 4 on the plans. The Contractor shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications

B. Related Sections

1. Section 33 08 30 - Testing Storm Drainage Systems
2. Section 33 39 13 - Manholes

1.2 SUBMITTALS

- A. Submit Shop Drawings, showing details of construction, reinforcing, joints, pipe connections to structures and frames and grates.

- B. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the structure has been designed to withstand the burial depth, submergence due to flooding, flotation with ground water at the surface elevation, and dead and live loads. Calculations must be stamped by a Professional Engineer. Calculations should verify the following pollutant removal rates:

1. WQU 1: 86% net annual load removal efficiency of total suspended solids.
2. WQU 2: 80% mass loading removal of total phosphorous and 30% mass loading removal of nitrogen.
3. WQU 3: 90% net annual load removal efficiency of total suspended solids.
4. WQU 4: 80% mass loading removal of total phosphorous and 30% mass loading removal of nitrogen.

1.3 REFERENCE STANDARDS

- A. ASTM D4097 - Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.
- B. ASTM C478 - Standard Specification for Pre-cast Reinforced Concrete Manhole Sections.
- C. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, using Rubber Gaskets.

1.4 QUALITY ASSURANCE

- A. The stormwater treatment unit shall remove oil and sediment from stormwater during wet weather events. Refer to Section 2.10 for performance requirements.

## 1.5 HANDLING AND STORAGE

- A. Care shall be taken in loading, transporting, and unloading to prevent damage to materials during storage and handling

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. The stormwater treatment unit shall be constructed from pre-cast concrete riser and slab components. The internal fiberglass insert shall be bolted and sealed watertight inside the reinforced concrete component. The stormwater treatment unit shall be capable of being used as a bend or junction structure within the stormwater drainage system.

### 2.2 PRODUCTS

- A. Water Quality Unit 1 shall be a CS-4 Cascade Separator or approved equal.
- B. Water Quality Unit 2 shall be a Jellyfish JFPD0806 or approved equal.
- C. Water Quality Unit 3 shall be a CDS2015-4-C unit with grated inlet and inline CDS or approved equal.
- D. Water Quality Unit 4 shall be a Jellyfish JFSI0406 or approved equal.

### 2.3 PRECAST CONCRETE SECTIONS

- A. Precast concrete sections and transition top sections, shall conform to the requirements of Section 33 39 13.

### 2.4 BRICK MASONRY

- A. Bricks for building up and leveling frames and grates shall conform to ASTM C32 Grade MS, meeting the requirements of Section 33 39 13.

### 2.5 FRAMES, GRATES, AND COVERS

- A. Catch basin frames, grates, and covers shall meet the requirements of Section 33 39 13.

### 2.6 JOINTING PRECAST MANHOLE SECTIONS

- A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

### 2.7 FLEXIBLE PIPE-TO-STRUCTURE CONNECTORS

- A. The flexible pipe-to-structure connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
- B. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
- C. The external bands shall be made entirely of 304 series non-magnetic stainless steel.



- D. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
- E. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
  - 1. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
  - 2. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
  - 3. Shall not leak when subject to a load of 150 lbs/in. pipe diameter and the head pressure conditions described above.

## 2.8 FIBERGLASS

- A. The fiberglass portion of the stormwater treatment unit shall be constructed in accordance with ASTM D-4097 Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

## 2.9 NON-SHRINK, WATER-PROOF GROUT

- A. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

## 2.10 PERFORMANCE

### A. WQU-1

- 1. The stormwater treatment unit shall be designed for a Water Quality Flow Rate of 2.808 cfs.
- 2. The stormwater treatment unit shall be designed to remove at least 86% net annual load removal efficiency of total suspended solids.
- 3. The stormwater treatment unit shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet so the scour and/or re-suspension of material previously collected in the separator does not occur.
- 4. The stormwater treatment unit shall contain a fiberglass insert, bolted and sealed watertight to the inside of the bypass chamber to divert low to normal stormwater flows into the treatment chamber.
- 5. The inlet and outlet elevations shall be equal. The unit shall trap pollutants so they are not scoured away from the separator during backwater conditions.
- 6. The separator must be capable of trapping fine sand, silt, clay and organic particles in addition to larger sand, gravel particles and small floatables.

### B. WQU-2

- 1. The stormwater treatment unit shall be designed for a Water Quality Flow Rate of 2.808 cfs.
- 2. The stormwater treatment unit shall be designed to remove at least 80% mass loading removal of total phosphorous and 30% mass loading removal of nitrogen

3. The stormwater treatment unit shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet so the scour and/or re-suspension of material previously collected in the separator does not occur.
4. The stormwater treatment unit shall be equipped with a draindown cartridge.
5. The stormwater treatment unit shall contain a bypass weir and floatables baffle.
6. The stormwater treatment unit shall contain twelve (12) 54" filter cartridges.
7. The difference between the inlet and outlet elevations shall be a minimum of 3-inches.

C. WQU-3

1. The stormwater treatment unit shall be designed for a Water Quality Flow Rate of 0.721 cfs.
2. The stormwater treatment unit shall be designed to remove at least 90% net annual load removal efficiency of total suspended solids.
3. The stormwater treatment unit shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet so the scour and/or re-suspension of material previously collected in the separator does not occur.
4. The stormwater treatment units shall contain a fiberglass insert, bolted and sealed watertight to the inside of the bypass chamber to divert low to normal stormwater flows into the treatment chamber.
5. The inlet and outlet elevations shall be equal. The unit shall trap pollutants so they are not scoured away from the separator during backwater conditions.
6. The separator must be capable of trapping fine sand, silt, clay and organic particles in addition to larger sand, gravel particles and small floatables.

D. WQU-4

1. The stormwater treatment unit shall be designed for a Water Quality Flow Rate of 0.721 cfs.
2. The stormwater treatment unit shall be designed to remove at least 80% mass loading removal of total phosphorous and 30% mass loading removal of nitrogen.
3. The stormwater treatment unit shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet so the scour and/or re-suspension of material previously collected in the separator does not occur.
4. The stormwater treatment unit shall be equipped with a draindown cartridge.
5. The stormwater treatment unit shall contain a bypass weir and floatables baffle.

6. The stormwater treatment unit shall contain six (6) 54” filter cartridges.
7. The difference between the inlet and outlet elevations shall be a minimum of 3-inches.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. The stormwater treatment unit shall be installed at elevations and locations shown on the Drawings unless or as otherwise directed by the Engineer. Install per manufacturer specifications.
- B. Place precast base units in accordance with Section 33 39 13. The floor of the installed precast base section shall be checked for level at four prominent locations. Floor shall be within 0.50” of level.
- C. All structural system components and system piping shall be made watertight.
- D. Holes made for handling precast sections shall be filled with a nonshrink grout.

#### 3.2 CLEANING

- A. Clean new stormwater treatment unit of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 33 51 13

NATURAL GAS SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Underground piping and fittings
2. Above ground piping and fittings
3. Underground warning tape
4. Tracer wire
5. Gas sleeves, unions, and valves
6. Gas pressure regulators
7. Risers
8. Installation, testing and other normal parts that make the natural gas service and distribution system complete, operable, code compliant and acceptable to the authorities having jurisdiction.

B. The Contractor's responsibilities include:

1. Arrangement with Utility Company for upgrading the existing natural gas service, including meter set and service regulators, and payment of Utility Company charges for upgrading the service connection.
2. Installation of above ground and underground gas line between the new Utility Company service regulator and the intended service connections, ready for operation, including cathodic protection where required, and all appurtenant structures.

C. Related Sections

1. Section 31 23 00 – Excavation, Backfill and Compaction

1.2 REFERENCES

A. American Society of Mechanical Engineers (ASME)/American National Standards Institute (ANSI):

1. B16 – Standards of Pipes and Fittings
2. B31.8 – Gas Transmission and Distribution Piping Systems

B. American Society for Civil Engineers (ASCE)

1. 25 Earthquake-Actuated Automatic Gas Shutoff Devices

C. American Society for Testing and Materials (ASTM):

1. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  2. A105 – Standard Specification for Carbon Steel Forgings for Piping Applications
  3. A106 – Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
  4. A234 – Standard Specification for Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
  5. D2513 – Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
  6. D2683 – Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
  7. D3350 – Polyethylene Plastics Pipe and Fittings Materials
- D. National Fire Protection Association (NFPA)
1. NFPA 54 – National Fuel Gas Code
- E. Underwriters Laboratories
- F. Massachusetts Rules and Regulations Governing Plumbers and Gas Fitters 248 CMR 1.00 - 11.00
- G. Massachusetts Board of Fire Prevention Regulations 527 CMR

### 1.3 DEFINITIONS

- A. Gas Main or Distribution Main: a distribution line that serves as a common source of supply for more than one service line.
- B. Gas Service Line: a distribution line that transports gas from a common source of supply to the meter set assembly.

### 1.4 SERVICE DESCRIPTION

- A. Natural gas service shall be provided by the Utility Company at the DCM (Department of Community Maintenance) Facility located at 10 Lewiston Street in Fall River, MA, 02721.
- B. The Utility Company shall provide new meter and service regulators, designed by the Utility Company to accommodate the required loads.
- C. The Utility Company shall provide all gas piping modifications at the service regulators.
- D. The general contractor (GC) shall provide necessary excavation, trenching, backfill, and compaction, as required to make modifications to the meter set and regulators.
- E. The GC shall provide the line pressure gas regulator and all piping shown after the utility provider's meter/regulator set.
- F. Refer to drawings for routing and arrangements.

## 1.5 UTILITY COMPANY

- A. Utility Company: Liberty Gas, 800-936-7000

## 1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 – Submittal Procedures
- B. Provide details of system components and pipe connections. Provide product data or catalog cuts for piping, fittings, flanges, gas pressure regulators, and manual valves. Submit catalog sheets with information on the system components, including, but not limited to grade, class or type, schedule number, pressure and temperature ratings, and pressure and flow capacities of gas pressure regulators. Include rated capacities of selected models, furnished specialties, and accessories.
- C. For products on the customer side of the utility meter, provide product listing reference in the Accepted Plumbing and Gas Products Online System of the Massachusetts Board of Registration of Plumbers and Gas Fitters of the Division of Professional Licensure.
- D. Shop Drawings detailing dimensions, required clearances and layout of complete system, showing all piping above and below grade and limit of system.
- E. Provide installation instructions.
- F. Maintenance data for gas specialties and regulators for inclusion in Operation and Maintenance Manual.
- G. Provide Manufacturer's Certification of Compliance with specified standards for all piping, fittings, flanges, pipe coatings, gas pressure regulators, and valves.
- H. Welders Qualifications.
- I. Extra Materials:
  - 1. Valve Wrenches - Furnish to Owner, with receipt, 2 valve wrenches for each type of gas valve installed.

## 1.7 QUALITY ASSURANCE

- A. All materials, equipment and Work shall meet or exceed all applicable federal, state and local requirements and conform to codes and ordinances of authorities having jurisdiction. All accessories and appurtenances required to meet applicable codes shall be provided by the Contractor whether or not shown on the drawings.
- B. NFPA 54 - National Fuel Gas Code, for gas piping materials and components, gas piping installations, and inspection, testing, and purging of gas piping systems.
- C. Comply with Massachusetts Fuel and Gas Code.
- D. Valves: Manufacturer's name, size, standards compliance and pressure rating clearly marked on outside of valve body.
- E. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.

- F. **Manufacturer Qualifications:** Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
- G. **Installer Qualifications:** Company specializing in performing the Work of this Section with minimum three (3) years documented experience. Installation of natural gas piping systems shall be performed by individuals licensed in the state where the work is performed. Welders shall be certified in accordance with ASME Section 9.
- H. **Approval by Engineer** is required of products or services of proposed manufacturers, suppliers and installers, and will be based upon submission by Contractor for certification that:
  - 1. Manufacturers regularly and currently manufacture shutoff valves, and regulators.
  - 2. The design and size of each item of equipment provided for this project is of current production and has been in satisfactory and efficient operation on at least three installations for approximately 3 years. If elements of equipment lack a substantial experience record, such lack shall be brought to the attention of the Engineer at the time of submission of Shop Drawings, with full information included to permit proper evaluation.
- I. Apply and install materials, equipment, and specialties in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the Contract Drawings and Specifications shall be referred to the Engineer for resolution. Provide copies of installation instructions to the Engineer prior to commencing installation of any item.
- J. **Assembly of Plastic Piping:** Installation personnel shall have been trained, tested and certified under a procedure approved by the manufacturer of the piping. Proof of certification, in writing, shall be provided to the Engineer.
- K. Comply with rules and regulations of the local utility having jurisdiction in all cases where gas lines are connected to public utility services.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

### 2.2 UNDERGROUND PIPING AND FITTINGS

- A. **Polyethylene (PE) Pipe, Tubing, and Fittings:** Products shall conform to ASTM D3350 and ASTM D2513, pipe designations PE 2708 or PE 3408. Minimum wall thickness shall conform to ANSI/ASME B31.8. PE pipe is for underground use only. Polyethylene pipe shall not be used where gas pressures are above 690 kPa (100 psi) or with operating temperatures below 7 degrees C (20 degrees F) or above 60 degrees C (140 degrees F).
- B. Polyethylene pipe joints shall be heat fusion, either butt fusion conforming to ASTM D2513 or socket fusion conforming to ASTM D2683.



- C. Valves shall be suitable for shutoff or isolation service. All valves on polyethylene pipe for underground installation shall be a full port and shall conform to ASME B16.40.

### 2.3 ABOVE GROUND PIPING AND FITTINGS

- A. Pipe and Tubing Materials: Steel Pipe – ASTM A53, Grade B, seamless.
  - 1. ½ inch to ¾ inch - Sch. 160
  - 2. 1 inch to 2 inch - Sch. 80
  - 3. 2½ inch and larger - Sch. 40
  - 4. ½ inch to 1½ inch - Screwed Fittings
  - 5. ½ inch to 1½ inch - Socketweld Fittings
  - 6. 2 inch and larger - Buttweld Fittings
- B. Fittings:
  - 1. Threaded Fittings in accordance with ANSI B16.11 black malleable iron.
  - 2. Socketweld Fittings in accordance with ANSI B16.11 forged steel.
  - 3. Buttweld Fittings - ASTM A-234 WPB, seamless, dimensional standards in accordance with ANSI B16.9.
  - 4. Unions ANSI 16.39, black Malleable iron
  - 5. Flanges - 150# RF, ASTM A-105, screwed or weldneck, dimensional standards in accordance with ANSI B16.5.
  - 6. Unions - ½ inch to ¾ inch 6000#, 1 inch to 1½ inch 3000#, ASTM A-105, socketweld or screwed.
  - 7. Bolting - Stud bolts with two heavy hex nuts, ASTM A-193, Grade B7 continuously threaded stud bolt, ASTM A-194 Grade 2H nuts, dimensional standards in accordance with ANSI B16.5.
  - 8. Gaskets – {Fluorinated elastomer, compatible with flange faces}. {1/8 inch thick, 150# spiral wound 304SS with {non-}asbestos filler}.
- C. Joining Materials
  - 1. Joint Compound - suitable for the gas being handled.
  - 2. Gasket Material - thickness, material, and type suitable for gas to be handled, and for design temperatures and pressures.
- D. Valves
  - 1. Gas Cocks less than 2 inch - 150 psi WOG, bronze body, straightaway pattern, square head, threaded ends.
  - 2. Gas Cocks – 2 inch and Larger - MSS SP-78; 175 psi, lubricated plug type, semi-steel body, single gland, wrench operated, flanged ends.

- E. Piping Specialties: Dielectric Unions - ANSI B16.39, Class 250; malleable iron and cast bronze; with threaded or soldered end connections suitable for pipe to be joined; designed to isolate galvanic and stray current corrosion.
- F. Protective Coatings - When piping will be in contact with material or atmosphere exerting a corrosive action and for buried pipe, pipe and fittings shall be factory-coated with polyethylene tape, having the following properties:
  - 1. overall thickness; 20 mils;
  - 2. synthetic adhesive;
  - 3. water vapor transmission rate, gallons per 100 square inch - 0.10 or less.
  - 4. water absorption, percent - 0.02 or less.
  - 5. Prime pipe and fittings with a compatible primer prior to application of tape.

#### 2.4 RISERS

- A. Provide Manufacturer's standard prefabricated transition anodeless riser from plastic to steel piping.

#### 2.5 UNDERGROUND WARNING TAPE

- A. Minimum 3 inch wide polyethylene detectable type marking tape. The tape shall be resistant to alkalis, acids and other destructive agents found in soil and impregnated with metal so that it can be readily recognized after burial by standard locating equipment. The width shall be 6 inch if installed more than 18 inch deep.
- B. Lamination bond of one (1) layer of Minimum 0.35 mils thick aluminum foil between two (2) layers of minimum 4.3 mils thick inert plastic film.
- C. Minimum tensile strength: 63 LBS per 3 IN width.
- D. Minimum elongation: 500 percent.
- E. Provide continuous yellow with black letter printed message repeated every 16 to 36 inches warning of pipe buried below (e.g.: "CAUTION GAS LINE BURIED BELOW").
- F. Manufactured by Reef Industries "Terra Tape" or equal.

#### 2.6 TRACER WIRE

- A. All tracer wire shall be 12 AWG solid copper wire coated with .45 mils Type HMW - PE yellow insulation. The wire shall meet all requirements of the latest version of ASTM D1351 and ASTM B8. Tracer wire shall be UL listed as direct burial wire at temperatures between -40o C and 75o C for circuits not exceeding 600 volts. The surface of the insulation shall be durably marked, at intervals not exceeding 24 inches, with only the following information: maximum working voltage "600 VOLTS", wire type, manufacturer's name or trademark, AWG size or circular mil area, UL required markings.

#### 2.7 GAS PRESSURE REGULATORS

- A. All pressure regulators shall be designed, manufactured and approved for natural gas service.
- B. Pressure regulators for individual service lines shall be capable of reducing distribution line pressure to pressures required for users. Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected user. Regulator shall have a single port with orifice diameter no greater than that recommended by manufacturer for the maximum gas pressure at the regulator inlet. Regulator vent valve shall be of resilient materials designed to withstand flow conditions when pressed against valve port. Regulator shall be capable of limiting build-up of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions.
- C. Regulator vent shall be at least 10 feet from a mechanical air intake and source of ignition and at least 3 feet from any opening into the building and any electrical source not intrinsically safe. Extend the regulator vent if required.
- D. Commercial grade diaphragm type with internal relief valve, vent valve, cast iron body, Buna-N diaphragm.
- E. Manufactured by Rockwell or Fisher, or equal.

## 2.8 METERS

- A. Gas meters shall be furnished and installed by the Utility Company listed previously, as specified herein.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Conform to the requirements of NFPA 54 - National Fuel Gas Code and State and Local Codes.

### 3.2 UNDERGROUND GAS LINE INSTALLATION

- A. All dimensions below are minimum requirements. Compare with local utility provider requirements and follow the tighter requirement.
- B. Pipe for underground gas lines shall be polyethylene. Polyethylene shall not be installed above ground.
- C. Gas distribution system and equipment shall be installed in accordance with the manufacturer's recommendations and applicable sections of B31.8 and NFPA 54.
- D. Excavation and backfilling shall be as specified in Section 31 23 00.
- E. Other utilities shall have right of way.
- F. Warning tape shall be continuously placed 12 inches above buried gas lines.
- G. Make service connections at the top of the main, whenever the depth of the main is sufficient to allow top connections. When service connections cannot be made at the top of the main, they shall be made on the side of the main as close to the top as possible. Service connections shall not be made lower than the horizontal midpoint of the gas main.

- H. Before entering building, underground service line shall rise above grade close to building to permit possible gas leaks to vent themselves.
- I. Mains shall have a 42 inch minimum cover or as recommended by local utility.
- J. Service lines shall have a 18 inch minimum cover or as recommended by local utility.
- K. Where indicated, the main shall be concrete-encased, sleeved. Non-metallic pipe to be concrete encased shall be sleeved as indicated. The sleeve shall be sloped and vented to atmosphere at the highest point or where shown.
- L. Connections between metallic and plastic piping shall be made only outside, underground, and with approved transition fittings.

### 3.3 APPLICATION OF PLASTIC TAPE

- A. Where connection to an existing steel line is made underground, tape wrap new steel transition fitting and exposed existing pipe having damaged coating.
- B. Clean pipe to bare metal free of burrs and rust before taping. Damaged coating shall be smoothed down or cut away if not firmly bonded to the pipe.
- C. Wrap spirally with a two-layer wrapping system, overlapping the coating surface at least 3 inches. Initially stretch tape sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 2 inches or less in width, or one layer lapped at least 1 inch for tape more than 2 inches wide.
- D. A second layer lapped as above, with a tension as it comes off the roll shall then be applied and pressed to conform to the shape of the component.

### 3.4 PIPING

- A. Install gas piping at a uniform grade of  $\frac{1}{4}$  inch in 15 feet, upward to risers, and from the risers to the meter, or service regulator when meter is not provided, or the equipment.
- B. Make reductions in pipe sizes using eccentric reducer fittings installed with the level side down.
- C. Connect branch outlet pipes from the top or sides of horizontal lines, not from the bottom.
- D. Install unions in pipes 2 inch and smaller, adjacent to each valve, at final connections for each piece of equipment. Unions are not required on flanged devices.
- E. Install dielectric unions where piping of dissimilar metals is joined.
- F. Install flanges on valves, apparatus, and equipment having  $2\frac{1}{2}$  inch and larger connections.

### 3.5 BUILDING SERVICE LINES

- A. Install gas service lines to point of connection within approximately 5 feet outside of buildings or as shown on drawings to which such service is to be connected and

make connections thereto. The point of delivery is the meter set assembly; service regulator; shutoff valve.

- B. Where building services have not been installed, provide isolation shut-off valves and temporary caps.
- C. Connect service lines to top of mains by two-strap service clamp or coupling (socket) welded to main and into which is screwed a street tee and street elbow swing, joint assembly.
- D. The service lines shall be as short and as straight as practicable between the point of delivery and the gas main and shall not be bent or curved laterally unless necessary to avoid obstructions or otherwise permitted. Service lines shall be laid with as few as joints as practicable using standard lengths of pipe. Polyethylene service lines shall not be installed aboveground except as permitted in ANSI B31.8.

### 3.6 SETTING VALVES

- A. Do not install valves under pavement unless shown on Drawings.
- B. Clean valve interior before installation.

### 3.7 VALVE INSTALLATIONS

- A. Install valves in accessible locations, protected from physical damage. Tag valves with a metal tag attached with a metal chain indicating the piping systems supplied.
- B. Install a gas cock after each gas pressure regulator.
- C. Install pressure relief or pressure limiting devices that: 1) can be readily operated to determine if the valve is free; 2) can be tested to determine the pressure at which they will operate; and, 3) can be examined for leaking when in the closed position.

### 3.8 PIPE CLEANING

- A. All pipe sections shall be blown down with 100 psi air to remove all sand, soil and debris.
- B. Blow down procedure shall be down after system is complete, but before valves are installed.

### 3.9 LABELING

- A. Label elevated pressure piping as follows:
  - 1. Yellow color with black label
  - 2. Gas type and pressure
  - 3. Locations and letter sizing acceptable to authority having jurisdiction.

### 3.10 PAINTING

- A. Follow requirements in specification section 09 91 00 for all exposed gas piping.

### 3.11 ELECTRICAL BONDING AND GROUND

- A. Install above ground portions of gas piping systems, upstream from equipment shutoff valves electrically continuous and bonded to a grounding electrode in accordance with NFPA 70 - "National Electrical Code."
- B. Do not use gas piping as a grounding electrode.
- C. Conform to NFPA 70 - "National Electrical Code," for electrical connections between wiring and electrically operated control devices.

### 3.12 FILTER AND PRESSURE REGULATOR INSTALLATION

- A. Shall be installed per manufacturer's recommendations, NFPA 54 and applicable State Code listed previously.

### 3.13 TESTS

- A. Piping System: Inspection, testing and purging shall be in accordance with NFPA 54, B31.8, applicable State Code, and local utility requirements.

END OF SECTION

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