TOWN OF HUDSON, MA

Brigham Street Culvert Replacement and Park Street Culvert Maintenance

Bidding Documents For Construction

Woodard & Curran

Project No. 0234865.01
Town of Hudson, MA

woodardcurran.com

April 2024

SECTION 00 01 07

SEALS PAGE

The engineering material and data contained in these Bidding and Contract Documents were prepared under the supervision and direction of the undersigned, whose seal as registered professional engineer is affixed below.

Date of Issue: April 25, 2024

_____

Kevin McCaffery, P.E.
Woodard & Curran, Inc. (Engineer)

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SECTION 00 11 16

INVITATION TO BID

Town of Hudson, MA (Owner) invites Bidders to submit sealed Bids for Brigham Street Culvert Replacement and Park Street Culvert Maintenance, which includes: installation of concrete culvert and headwalls at Brigham Street, open channel restoration between Brigham and Park Streets, installation of Park Street headwall, with an Alternate for CIPP relining of Park Street Culvert; and all materials and equipment, construction, and services inherent to the Work.

The Work shall be substantially complete within 155 calendar days from the commencement of Contract Time and completed and ready for final payment within 176 calendar days from the commencement of Contract Time.

The Project being bid is subject to Massachusetts General Laws, Chapter 30, Section 39M.

Bidding Documents **may be obtained electronically at no cost on or after April 24, 2024 at 10:00 am** by registering with the Engineer's bidding team (Issuing Office) via email at MunicipalBids@woodardcurran.com and subject line "**Hudson MA – Brigham Street Culvert Replacement and Park Street Culvert Maintenance**" to obtain the Bidding Documents and other related public information. Instructions for downloading the Bidding Documents and accessing other related public information will then be provided by email. Documents from third parties are not considered official Bidding Documents.

A mandatory pre-Bid conference will be held at **11:00 a.m. local time on May 1, 2024 at Department of Public Works, 1 Municipal Drive Hudson, MA 01749**. Bidders are required to attend and participate in the conference. Bids may not be accepted from Bidders who fail to attend the mandatory pre-Bid conference.

Questions must be received by **3:00 p.m. local time on May 9, 2024** to be answered.

Sealed Bids will be received until **11:00 a.m. local time on May 16, 2024** by Owner at **Department of Public Works, 1 Municipal Drive Hudson, MA 01749, Attention: Eric Ryder, DPW Director**. Bids will then be publicly opened and read aloud. Bids received after the time of announced opening will not be accepted.

Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents, Bidding Documents or any portion thereof provided by third parties, or for modifications to the Bidding Documents not made by official Addenda, including electronic conversion.

Bid security in the amount of 5 percent of the Bid must accompany the Bid in accordance with the Instructions to Bidders.

Prevailing wage rates as issued by the Director of the Executive Office of Labor and Workforce Development, Department of Labor Standards under the provisions of Massachusetts General Laws, Chapter 149, Sections 26 to 27D inclusive, as amended, apply to this Project. It is the responsibility of the Bidders, before Bid opening, to request if necessary, any additional information on prevailing wage rates for those trades people who may be employed for the proposed Work under the resulting Contract.

Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, not to be responsible or eligible. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder. Award is subject to available funding.

END OF SECTION

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions, if any. Additional terms used in these Instructions to Bidders have the meanings indicated below and as may be included in the Supplementary Instructions to Bidders.

A. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered identified in the Invitation to Bid.

B. *Supplements* – Those portions of the Bidding Requirements to be submitted with and made a condition of a Bid including required submittals.

C. *Notice of Intent to Award* – The written notice to the Successful Bidder indicating, conditions precedent to receiving a Notice of Award and Agreement for execution.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Sets of Bidding Documents may be examined and obtained as stated in the Invitation to Bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents, Bidding Documents or any portion thereof provided by third parties, or for modifications to the Bidding Documents not made by official Addenda, including electronic conversion.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidders' qualifications to perform the Work, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data requested in the Bidding Documents, and within the time frames stipulated upon Owner's request.

3.02 Bidders shall meet minimum criteria regarding experience and qualifications set forth in the General Requirements and the Specifications.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

A. Section 00 73 10 of the Supplementary Conditions identifies:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. Copies of reports and drawings referenced in Section 00 73 10, if any, are included in the Bidding Documents as indicated in Section 00 31 00. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions, has been identified and established in Section 00 73 10 of the Supplementary Conditions.

C. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

A. Section 00 73 10 of the Supplementary Conditions identifies any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.

B. Copies of reports and drawings referenced in Section 00 73 10, if any, are included in the Bidding Documents as indicated in Section 00 31 00. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Section 00 73 10 of the Supplementary Conditions.

C. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions and Section 00 73 10 of the Supplementary Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 4.06 of the General Conditions and Section 00 73 10 of the Supplementary Conditions.

4.05 Upon request, Owner may provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall be responsible for obtaining permission and necessary permits and insurance for access to the Site. Bidder shall clean up and restore the Site to its former condition upon completion of any such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to Article 7 of the General Conditions and Section 00 73 10 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Section 00 73 10 of the Supplementary Conditions, as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Section 00 73 10 of the Supplementary Conditions, as containing reliable "technical data";

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

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 A mandatory pre-Bid conference will be held as indicated in the Invitation to Bid. Bidders are required to attend and participate in the conference.

A. Bids may not be accepted from Bidders who fail to attend the mandatory pre-Bid conference.

5.02 Addenda will be issued to all prospective Bidders of record considered necessary in response to questions arising at the conference as indicated in Article 7. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing by email as follows.

Woodard & Curran, Inc.
Garrett Bergey
Email: gbergey@woodardcurran.com
(and a copy to kmccaffery@woodardcurran.com)

7.02 Interpretations or clarifications considered necessary in response to such questions will be issued by Addenda to all parties recorded as having received the Bidding Documents. **Questions must be received by 3:00 p.m. local time on May 9, 2024 to be answered. Questions received thereafter may not be answered.** Only answers in the Addenda will be binding. Oral statements, interpretations, and clarifications may not be relied upon and will not be binding or legally effective.

7.03 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer and will be posted on the website indicated in the Invitation to Bid. All parties recorded as having received the Bidding Documents will be notified by email that Addenda has been posted along with instructions for accessing the Addenda .

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price and in the form of a certified check, treasurer's or cashier's check, or money order, or a Bid bond on or consistent with the form included in the Bidding Documents in Section 00 43 13 issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General and Supplementary Conditions, if any.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the Contract to such Bidder, and such Bidder has furnished the required Contract security, insurance documentation and met the other conditions of the Notice of Intent to Award or Notice of Award, and executed the Contract Documents, whereupon the Bid security will be released. If the Successful Bidder fails to furnish the required Contract security, insurance documentation, and meet the other conditions as stated in the Notice of Intent to Award or Notice of Award, and execute and deliver the Contract Documents, Owner may consider Bidder to be in default, annul the Notice of Intent to Award or Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. See Supplementary Instructions to Bidders (if any) for additional information.

8.04 Bid security of other Bidders that Owner believes do not have a chance of receiving the award will be returned within 5 days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

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

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment and construction methods or procedures specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment and construction methods or procedures may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 The Bidding Documents may require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner with the Bid.

12.02 As required in the Bidding Documents, or within 5 days after Bid opening if requested by Owner, Bidder shall submit a listing and experience statement with pertinent information regarding similar projects and other evidence of qualification for each Subcontractor, Supplier, individual, or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute without an increase in the Bid.

12.03 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General and Supplementary Conditions, if any.

12.04 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form and Supplements are included with the Bidding Documents.

13.02 Bids are to be completed as indicated in the Bid Form. All blanks on the Bid Form shall be completed in ink or typewritten and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

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

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member or manager and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

13.08 All names shall be printed in ink below the signatures**.**

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

13.10 Postal and e-mail addresses and telephone numbers for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form. See Supplementary Instructions to Bidders for additional requirements, if any.

13.12 Bidders are advised to carefully review those portions of the Bid Form and Supplements requiring Bidder's representations and certifications that are to be submitted with a Bid or subsequent to the Bid opening, and made a condition of the Bid.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 *Bid Pricing*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed on the Unit Prices Form in Section 00 43 22. Bid prices shall be stated in both words and figures.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price included on the Unit Prices Form in Section 00 43 22. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General and Supplementary Conditions, if any.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between prices written in words and prices written in figures will be resolved in favor of prices written in words.

14.02 *Alternates (if any)*

A. Bidders shall include a separate price for each alternate described in the Bidding Documents as provided for in the Bid Form and Supplements, if any. The price for each alternate will be considered in accordance with Article 19.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished a copy of the Bid Form, the Bid Security Form and Supplements. An original signed hard copy of the Bid Form, the original of the Bid security, and Supplements as listed in the Bid Form, are to be completed and submitted.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Invitation to Bid and shall be enclosed in a plainly marked package with the Project title, the name and address of Bidder, and IFB number (if any), and shall be accompanied by the Bid security and other required documents.

15.03 If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "**BID ENCLOSED**." **Bids shall be addressed as indicated in the Invitation to Bid.**

15.04 Bidders shall be responsible to confirm the ability of overnight mailing or courier services to deliver to the Owner's offices.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered in hard copy to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Such modifications and withdrawals may not be transmitted by email.

16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is re-Bid, that Bidder may be disqualified from submitting a Bid on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Invitation to Bid and, unless obviously non-responsive, read aloud publicly.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, not to be responsible or eligible or does not to meet the specified qualification or quality requirements, based on poor references or otherwise. Owner may also reject the Bid if any Bidder if Owner reasonably believes that it would not be in the best interest og the Project or public to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data as may be requested in the Bid Form or prior to the Notice of Intent to Award or Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities are submitted.

A. Owner may also consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

A. Owner may conduct reference checks for the Bidder. Poor references may be a basis for deeming Bidder as not responsible. Reference questions will include, but are not limited to, product quality and durability, overall work quality, performance, timely delivery/completion, customer service, and general customer satisfaction.

19.06 If the Contract is to be awarded, Owner may award the Contract to the responsible and eligible Bidder, offering the lowest price for the base Bid, OR base Bid plus Alternate A, OR base Bid plus Alternates A plus Alternate B, subject to available funding. Unit pricing for Alternates must be the same as used in the base Bid for the same items of Work.

19.07 The Owner will issue a Notice of Intent to Award to the Successful Bidder in the form included in Bidding Documents. Within 15 days of receipt of the Notice of Intent to Award, the Successful Bidder shall comply with the conditions set forth therein and provide requested information. After required reviews and approvals by Owner of bonds and insurance documentation and other conditions set forth in the Notice of Intent to Award, the Owner may issue a Notice of Award in accordance with Article 21.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

A. In case the bonds or insurance documentation submitted by the Successful Bidder do not meet the requirements of the Contract Documents, and changes are to be made before these documents can be accepted by the Owner, the Successful Bidder is obligated to accept an extension of the date of award of the Contract, or the date of issuance of Notice to Proceed, as the case may be, for that period of additional time required to furnish acceptable documents.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 After required reviews and approvals by Owner of bonds and insurance documentation and other conditions set forth in the Notice of Intent to Award, Owner will issue a Notice of Award to the Successful Bidder. When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement and attached thereto. Within 10 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. After required reviews and approvals, Owner shall deliver one fully signed set of Contract Documents to Successful Bidder with a complete set of the Drawings.

ARTICLE 22 – RETAINAGE

22.01 Provisions regarding retainage are set forth in the Agreement.

ARTICLE 23 – CONTRACTOR'S WARRANTY AND GUARANTEES; CORRECTION PERIOD

23.01 Provisions regarding Contractor's general warranty and guarantees and correction period are set forth in Articles 6.19, 13.06, 13.07, 13.09 and 14.03 of the General and Supplementary Conditions, if any.

ARTICLE 24 – SAFETY AND HEALTH REGULATIONS

24.01 The Project is subject to the Safety and Health Regulations of the U.S. Department of Labor set forth in Title 29 CFR, Part 1926 and to all subsequent amendments, as a minimum, and other specific requirements identified in the Supplementary Conditions.

ARTICLE 25 – EQUAL EMPLOYMENT OPPORTUNITY, ANTI-DISCRIMINATION, AND AFFIRMATIVE ACTION

25.01 Provisions regarding the requirements for equal employment opportunity, anti-discrimination, and affirmative action programs, if any, are set forth in the Supplementary Conditions.

ARTICLE 26 – WAGE RATE REQUIREMENTS

26.01 Wage rate requirements, if any, are set forth in the Supplementary Conditions.

ARTICLE 27 – SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

27.01 Supplementary Instructions to Bidders, if any, are included in Section 00 22 13 and may include certain provisions required by Laws and Regulations and funding agencies. Bidders are solely responsible to determine, obtain, review and interpret the full text of applicable Laws and Regulations.

END OF SECTION

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SECTION 00 22 13

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

The following supplement or modify the Instructions to Bidders. This section includes certain provisions required by Laws and Regulations, but does not represent or reflect all applicable provisions and policies or Laws and Regulations, and may only include excerpts and portions thereof. Other required provisions and policies, and Laws and Regulations, shall be deemed to be so included and incorporated herein. Bidders are solely responsible to determine, obtain, review and interpret the full text of applicable Laws and Regulations. Representations, certifications, compliance statements and forms relating to the subject matter in this Section are included in Section 00 45 05 and must be submitted by each Bidder as part of its Bid. Failure to do so may render a Bid non-responsive.

1.01 APPLICABLE LAWS FOR BID AND AWARD; GENERAL

A. This Contract is being bid under the provisions of Massachusetts General Law (MGL) Chapter 30, Section 39M*, Contracts for construction and materials; manner of awarding.*

B. The Bid and Contract are subject to MGL Chapter 43, Section 27 *Interest In Public Contracts By Public Employees Prohibited; Penalty* and provisions of MGL Chapter 268A, Section 20 *Municipal Employees; Financial Interest In Contracts; Holding One Or More Elected Positions*.

C. Pursuant to Paragraphs 19.01 and 19.06 of the Instructions to Bidder, Bidders must be "eligible" as defined by MGL Chapter 30, Section 39M.

1.02 ADDITIONAL DEFINED TERMS

A. *Bid security* – per the Instructions to Bidders. Also "bid deposit" as used in MGL Chapter 30, Section 39M.

B. *Lowest Responsible and Eligible Bidder* – Also the Successful Bidder. As defined in MGL Chapter 30, Section 39M,

> "The term "lowest responsible and eligible bidder" shall mean the bidder: (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall certify, that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who shall certify 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; (4) who, where the provisions of section 8B of chapter 29 apply, shall have been determined to be qualified thereunder; and (5) who obtains within 10 days of the notification of contract award the security by bond required under section 29 of chapter 149; provided that for the purposes of this section the term "security by bond" shall mean the bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority; provided further, that if there is more than 1 surety company, the surety companies shall be jointly and severally liable."

1.03 APPLICABLE REQUIREMENTS OF THE MGL

A. **Foreign Corporations**: The provisions of MGL Chapter 30, Section 39L, *Public construction work by foreign corporations; restrictions and reports,* requires that if a Bidder is a foreign corporation, it shall provide with its Bid, a certificate from the Commonwealth of Massachusetts Secretary of State stating that the corporation has complied with requirements of Section 15.03 of subdivision A of Part 15 of MGL Chapter 156D and the date of compliance, and further has filed all annual reports required by Section 16.22 of subdivision B of Part 16 of said Chapter 156D, and further, will provide such certificate for each Subcontractor that is a foreign corporation if it receives a Notice of Award. Also see Section 00 45 05 of the Bidding Requirements.

B. **Taxes**: Bidder shall submit with its Bid, a "Certificate of Good Standing" with respect to all returns due and taxes (NOT corporate) from the Commonwealth of Massachusetts Department of Revenue (NOT Secretary of State) certifying Bidder has complied with all laws relating to taxes, reporting of employees and contractors, and withholding and remitting of child support. Bidder will provide such certificate for each Subcontractor if it receives a Notice of Intent to Award. Bidders are encouraged to obtain such Certificate of Good Standing online at

https://www.mass.gov/how-to/request-a-certificate-of-good-standing-tax-compliance-or-a-corporate-tax-lien-waiver

See explanation, instructions, and sample at the end of this Section and see Section 00 45 05 of the Bidding Requirements.

C. **Debarment:** A Bidder is ineligible to bid or enter into a public contract in the Commonwealth of Massachusetts if it has been debarred from bidding on or entering into a public contract under the provisions of MGL Chapter 29, Section 29F, *Debarment from bidding; definitions; lists; notice; affiliates; mitigating circumstances*, or any other applicable debarment provisions of any other chapter of the MGL or any rule or regulations promulgated thereunder.

D. **Financial Statements**: The following shall be submitted prior to execution of the Agreement in accordance with MGL Chapter 30, Section 39R *Definitions; contract provisions; management and financial statements; enforcement.*

- To Owner - A statement by management on internal accounting control and a statement prepared by an independent certified public accountant regarding management's statement (samples at the end of this section); and
- To DCAMM - An audited financial statement for the most recent completed fiscal year.

E. **Labor Preferences and Work Hours**

1. The provisions of MGL Chapter 149, Section 26, *Public works; preference to veterans and citizens; wages,* requires that employment in the construction of public works be subject to preference being given to citizens of the Commonwealth of Massachusetts, citizens of the town or city where the Project is located, veterans and service-disabled veterans, and citizens of the United States. The provisions of MGL Chapter 149, Section 179A*, Preference to citizens in awarding public work contracts, violations,* requires that award of contracts for public work be subject to preference being given to persons who are citizens of the United States.

2. The provisions of MGL Chapter 149, Sections 26, 27, and 27A through 27D, as amended, set forth requirements for prevailing wage rates as issued by the Executive Office of Labor and Workforce Development, Department of Labor Standards. It is the responsibility of the Bidders, before Bid opening, to request if necessary, any additional information on prevailing wage rates for those trades people who may be employed for the proposed Work under the resulting Contract. See Section 00 73 43.

3. The provisions of MGL Chapter 149, Section 30*, Eight hour day and six day week; emergencies; work on highways,* and Section 34*, Public contracts; stipulation as to hours and days of work; void contracts,* apply to this Project.

F. **Sales Tax Exemption:** MGL Chapter 64H, Section 6*, Exemptions*, subsection (f)*,* exempts building materials and supplies to be used in the Project from Commonwealth of Massachusetts sales tax and Bidder shall not include any amount therefor. The words "building materials and supplies" shall include all materials and supplies consumed, employed or expended in the construction, reconstruction, alteration, remodeling or repair of any building, structure, public highway, bridge, or other such public work, as well as such materials and supplies physically incorporated therein. Said words shall also include rental charges for construction

vehicles, equipment and machinery rented specifically for use on the Project Site, or while being used exclusively for the transportation of materials for the Project.

G. **Safety and Health:** This Project is subject to Safety and Health Regulations of the U.S. Department of Labor set forth in Title 29 CFR, Part 1926 and to all subsequent amendments, and to Massachusetts Department of Labor and Industries, Division of Occupational Safety 454 CMR 10.00 et seq. "*Construction Industry Rules and Regulations*"; Massachusetts Department of Public Safety 520 CMR 14.00 et seq. "*Excavation and Trench Safety*"; MGL Chapter 82*, The Laying Out, Alteration, Relocation and Discontinuance Of Public Ways and Specific Repairs Thereon;* MGL Chapter 82A, *Excavation and Trench Safety,* and MGL Chapter 149 Section 129A*, Shoring Trenches for local governments*.

1. In addition, MGL Chapter 30, Section 39S, requires that all employees to be employed at the Work Site 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 documentation of successful completion of said course shall be submitted with the first certified payroll report for each employee. Any employee found on a Work Site subject to this section without documentation of successful completion of 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 shall be subject to immediate removal.

H. **Special Licensing**

1. Work involving the removal, containment, or encapsulation of asbestos or material containing asbestos must be performed by a contractor licensed in accordance with MGL Chapter 149, Section 6B.

2. Sheet metal work must be performed by a contractor licensed in accordance with 271 CMR 1.00, et seq. governing licensing, permitting, and sheet metal work in Massachusetts.

I. **Public Records**: The Bid and Contract are subject to MGL Chapter 66 et seq, *Public Records*, and as such, related submittals, purchase orders, related pricing documents, and invoices will be public documents, and may be available for public and private distribution, except as specifically excluded. The Bidder agrees to provide the Owner copies of any documents requested under this law at no charge to the Owner or the requestor.

J. **Price Adjustments for Certain Materials**: As required by Chapter 150 of the Acts of 2013, the provisions of MGL Chapter 30, Section 38A, *Price adjustment clause in contracts for road, bridge, water and sewer projects awarded under Sec. 39M,* adjustments for fuel (both diesel and gasoline), liquid asphalt and Portland cement shall be made as set forth in Section 00 73 73, SC-12.01.

ATTACHMENTS

A. MA Department of Revenue – Instructions for Requesting a Certificate of Good Standing-Tax Compliance or Corporate Tax Lien Waiver

B. Sample Certificate of Good Standing and/or Tax Compliance

C. Accounting Controls Letters MGLc30s39R

END OF SECTION

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DOR Certificate of Good Standing and/or Corporate Tax Lien Waiver FAQs

Businesses and individuals: Learn how to request proof you're in good tax standing by requesting a Massachusetts DOR Certificate of Good Standing and/or Corporate Tax Lien Waiver with MassTaxConnect.

Updated: May 13, 2022

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Related (#related-)

What is a Certificate of Good Standing and do I need one?

A DOR Certificate of Good Standing is the answer when individuals, businesses and other organizations need proof they've filed and paid their Massachusetts taxes in order to:

- Sell a business
  - Some corporations are required to also obtain a Corporate Tax Lien Waiver.
- Obtain financing
- Renew or transfer a liquor license
- Verify a marijuana license
- Gain employment with the Gaming Commission and other agencies

- Participate in the HireNow Program (/news/baker-polito-administration-launches-hirenow-hiring-and-training-employer-grant-program)
- Enter into other business transactions.

DOR does not charge a fee to obtain a Certificate of Good Standing.

How do I apply for a Certificate of Good Standing?

DOR recommends that individuals, businesses and other organizations obtain a Certificate of Good Standing with MassTaxConnect (https://mtc.dor.state.ma.us/mtc/_/). It's fast, easy and secure.

For individuals and businesses registered with MassTaxConnect

- Log in to MassTaxConnect (https://mtc.dor.state.ma.us/mtc/_/).
- Click on **More**
- Under **Other Actions**, select **Request a Certificate of Good Standing**
- Under **Enter - Application Type,**
  - Go to the right-hand side, under **Required,**
  - Select from the following dropdown list:
    - Certificate of Good Standing (standard)
    - Gaming Commission
    - Liquor License
    - Liquor License Transfer
    - Marijuana License Verification
    - Professional License Renewal
    - Waiver of Corporate Tax Lien.
- Complete application and **submit**.

Visit the video tutorial How to File for a Certificate of Good Standing When You are Logged In (https://www.youtube.com/watch?v=apSWETA8r4Q&list=PLfBnwDVE7DgGsk_WprAIk_BVQvxUgUtvk&index=3).

For individuals and businesses NOT registered with MassTaxConnect

- Go to the MassTaxConnect (https://mtc.dor.state.ma.us/mtc/_/) homepage.
- Under **Individuals**, select **Request a Certificate of Good Standing**.
  - **Note**: Non registered businesses must also choose **Individuals**.
- Under **Enter - Application Type,**
  - Go to the right-hand side, under **Required,**

    - Select from the following dropdown list:
        - Certificate of Good Standing (standard)
        - Gaming Commission
        - Liquor License
        - Liquor License Transfer
        - Marijuana License Verification
        - Professional License Renewal.
- Complete application and **submit**.

Please note

- If you must apply by paper, select **Request for a Certificate of Good Standing and/or Tax Compliance or Waiver of Corporate Tax Lien** (/doc/request-for-a-certificate-of-good-standing-andor-tax-compliance-or-waiver-of-corporate-tax-lien/download).
    - Processing of a paper application can take 4 to 6 weeks. DOR **strongly recommends** filing your request online.
- If approved, the Certificate of Good Standing will be mailed within 24-48 hours.
    - Approved certificates can also printed through MassTaxConnect.
- DOR does not charge a fee to obtain Certificate of Good Standing.

What is a Corporate Tax Lien Waiver and do I need one?

A Corporate Tax Lien Waiver (along with a Certificate of Good Standing) is the answer for corporations that are being sold.

DOR does not charge a fee to obtain a Corporate Tax Lien Waiver.

Keep in mind:

- Limit Liability Companies can only obtain a Corporate Tax Lien Waiver if they file and pay corporate returns.
- Non-Profit corporations can not obtain a Corporate Tax Lien Waiver.
- Sole Proprietors can not obtain a Corporate Tax Lien Waiver.

How do I apply for a Corporate Tax Lien Waiver?

DOR recommends that businesses and other organizations obtain a Corporate Tax Lien Waiver with **MassTaxConnect** (https://mtc.dor.state.ma.us/mtc/_/). It's fast, easy and secure.

- Log in to **MassTaxConnect** (https://mtc.dor.state.ma.us/mtc/_/).

- Select the **More** tab
- Under the **Other Actions**, choose **Request a Certificate of Good Standing**
- Under **Enter Application Information**
  - On the right-hand side, under **Required,**
  - Select **Waiver of Corporate Tax Lien** from the dropdown list.
- Complete application and **submit**.

Please note

- If you must apply by paper, select **Request for a Certificate of Good Standing and/or Tax Compliance or Waiver of Corporate Tax Lien** (/doc/request-for-a-certificate-of-good-standing-andor-tax-compliance-or-waiver-of-corporate-tax-lien/download).
  - Processing of a paper application can take 4 to 6 weeks. DOR **strongly recommends** filing your request online.
- DOR does not charge a fee to obtain a Corporate Tax Lien Waiver.

Keep in mind:

- Limit Liability Companies can only obtain a Corporate Tax Lien Waiver if they file and pay corporate returns.
- Non-Profit corporations can not obtain a Corporate Tax Lien Waiver.
- Sole Proprietors can not obtain a Corporate Tax Lien Waiver.

Why can't I submit my application?

You can't submit an application if you have:

- Outstanding liability
- Unfiled returns or
- Other issues with your accounts.

You must file and pay Massachusetts taxes and remedy any other situations before filing for a Certificate of Good Standing or Corporate Tax Lien Waiver.

Can I print the Certificate of Good Standing or Corporate Tax Lien Waiver?

An approved Certificate of Good Standing or Corporate Tax Lien Waiver will be mailed.

However, if you need your certificate or waiver sooner, both users and non-users of MassTaxConnect can print within 24-48 hours after approval.

For individuals and businesses registered with MassTaxConnect

- Log in to **MassTaxConnect** (https://mtc.dor.state.ma.us/mtc/_/)
- Go to the **Action Center** tab and select the **View Letters** link.

You can filter the list of letters by entering **Certificate of Good Standing** or **Corporate Tax Lien Waiver** in the filter bar.

For individuals and businesses NOT registered with MassTaxConnect

When you apply for a Certificate of Good Standing or Corporate Tax Lien Waiver, you will receive an automated email with a confirmation code and number.

It is important to save this email as you will need this information if you choose to print out your certificate or waiver.

To print:

- Go to MassTaxConnect
- On the homepage under **Quick Links**, select **Find a Submission**
- Enter the email address used on your application
- Enter the 6 digit **confirmation code** which you received by email when you applied.
- **Submit**.

Notice of Non-Renewal of Professional License

Professional licenses are issued by the **Division of Occupational Licensure (DOL)** (/division-of-occupational-licensure-dol-disciplinary-actions).

If you owe Massachusetts tax or have not filed state returns, you may not be able to renew your Professional License.

If you received a Notice of Non-Renewal of Professional License, visit **DOR's Professional License Renewal page** (/info-details/massachusetts-professional-license-renewal-faqs).

Contact

Certificate of Good of Standing

Phone

(617) 887-6400 **(tel:+16178876400)**
9 a.m.– 4 p.m., Monday through Friday

Online

Translate a website, webpage or document

(/info-details/how-to-translate-a-website-webpage-or-document-into-the-language-you-want)

RELATED

MassTaxConnect (https://mtc.dor.state.ma.us/mtc/_/)

Video: How to File for a Certificate of Good Standing When You are Logged In (https://www.youtube.com/watch?v=apSWETA8r4Q&list=PLfBnwDVE7DgGsk_WprAIk_BVQvxUgUtvk&index=3)

AP 613: Requesting a Certificate of Good Standing and/or Tax Compliance or Waiver of Corporate Tax Lien (/administrative-procedure/ap-613-requesting-a-certificate-of-good-standing-andor-tax-compliance-or-waiver-of-corporate-tax-lien)

Set up a payment agreement (/info-details/dor-payment-agreement-frequently-asked-questions)

Massachusetts Professional License Renewal FAQs (/info-details/massachusetts-professional-license-renewal-faqs)

Commonwealth of Massachusetts
Department of Revenue
Christopher C. Harding, Commissioner

mass.gov/dor

Letter ID: L0 #######
Notice Date:
Case ID: 0-000- ##-##

SAMPLE

CERTIFICATE OF GOOD STANDING AND/OR TAX COMPLIANCE

Why did I receive this notice?

The Commissioner of Revenue certifies that, as of the date of this certificate, **COMPANY NAME** is in compliance with its tax obligations under Chapter 62C of the Massachusetts General Laws.

This certificate doesn't certify that the taxpayer is compliant in taxes such as unemployment insurance administered by agencies other than the Department of Revenue, or taxes under any other provisions of law.

This is not a waiver of lien issued under Chapter 62C, section 52 of the Massachusetts General Laws.

What if I have questions?

If you have questions, call us at (617) 887-6367 or toll-free in Massachusetts at (800) 392-6089, Monday through Friday, 8:30 a.m. to 4:30 p.m..

Visit us online!

Visit mass.gov/dor to learn more about Massachusetts tax laws and DOR policies and procedures, including your Taxpayer Bill of Rights, and MassTaxConnect for easy access to your account:

- Review or update your account
- Contact us using e-message
- Sign up for e-billing to save paper
- Make payments or set up autopay

Edward W. Coyle, Jr., Chief
Collections Bureau

SAMPLE

Massachusetts Department of Revenue

PO BOX 7073 BOSTON, MA 02204

CHRISTOPHER C. HARDING, COMMISSIONER
CHARLENE HANNAFORD, DEPUTY COMMISSIONER

Collections Bureau, Certificate Unit
Telephone: (617) 887-6400
Date:

Company
Name

T/P ID XXX XX **XXXX**

The Massachusetts Department of Revenue has received a request for a Certificate of Good Standing for the above listed taxpayer. The Massachusetts Department of Revenue currently considers this taxpayer to be in compliance with the tax laws of the Commonwealth of Massachusetts.

Charlene Hannaford
Deputy Commissioner

12/2018

SAMPLE LETTER 1
FROM CONTRACTOR REGARDING ACCOUNTING CONTROLS
Pursuant to MGL Chapter 30, Section 39R

TO BE SUBMITTED ON CONTRACTOR'S LETTERHEAD

DATE

INSERT Owner name and address

RE: [INSERT CONTRACT #/PROJECT # AND NAME]

Dear [_____]:

This letter is being submitted pursuant to MGL Chapter 30 §39R(c). Please be advised that our firm has a system of internal accounting controls which assure that:

(1) transactions are executed in accordance with management's general and specific authorization;

(2) transactions are recorded as necessary, to permit preparation of financial statements in conformity with generally accepted accounting principles, and to maintain accountability for assets;

(3) access to assets is permitted only in accordance with management's general or specific authorization; and

(4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Sincerely,

_____
[Name and title of authorized representative of Contractor]

SAMPLE LETTER 2
FROM CPA REGARDING CONTRACTOR ACCOUNTING CONTROLS
Pursuant to MGL Chapter 30, Section 39R

TO BE SUBMITTED ON CPA'S LETTERHEAD

DATE

INSERT Owner name and address

RE: [INSERT CONTRACT #/PROJECT # AND NAME]

Dear [_____]:

Please be advised that we have reviewed the Statement of Internal Accounting Controls prepared by [NAME OF CONTRACTOR], in connection with the above-captioned Project as required under MGL Chapter 30, § 39R. In our opinion, representations of management are consistent with our evaluations of the system of internal accounting controls and such representations are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to [NAME OF CONTRACTOR]'s financial statements.

Sincerely,

_____, CPA
[Name]

SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

INFORMATION	LOCATION OF INFORMATION
Easements, Rights-of-Way	Available from Owner
Survey	Shown on Drawings
Geotechnical Data Geotechnical Report Soil Boring Data, Results of Laboratory Testing	Following this page
Wetlands Report	Following this page
Brigham Street Culvert Feasibility Study (including Hydrologic & Hydraulic Analysis)	Appendix A
Order of Conditions	To be provided when available
U.S. Army Corps of Engineers Permit	To be provided when available

END OF SECTION

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5 Commerce Park North
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Bedford, NH 03110
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F: 603.624.9463
www.gza.com

MEMORANDUM

To: Ms. Caitlin Glass
Woodard & Curran, Inc. (W&C)
41 Hutchins Drive,
Portland, Maine 04102

From: Andrew Fournier,
Jay L. Hodkinson, P.E.,
Bruce W. Fairless, P.E.
GZA GeoEnvironmental, Inc. (GZA)

Date: April 21, 2023

File No: 04.0191546.00

Re: Geotechnical Engineering Memorandum
Brigham Street Culvert and Park Street Culvert Headwall Replacement
Hudson, Massachusetts

This memorandum presents the results of the subsurface exploration program performed at the above-referenced site by GZA. The subsurface exploration program was completed in accordance with GZA's Proposal for Geotechnical Services dated February 17, 2023. GZA's objectives were to evaluate subsurface conditions and provide geotechnical recommendations for the proposed culvert replacement on Brigham Street and the proposed headwall replacement for a culvert on Park Street in Hudson, Massachusetts. The contents of this report are subject to the **Limitations** contained in **Appendix A** and the Terms and Conditions of our agreement. Note that elevations in this memorandum are in feet referenced to the North American Vertical Datum of 1988 (NAVD 88).

BACKGROUND/SITE DESCRIPTION

The Brigham Street culvert and the Park Street culvert are located relatively near each other and convey the same unnamed brook as shown in **Figure 1** below. The culvert on Brigham Street and the headwall on Park Street need to be replaced due to deterioration.

According to Woodard & Curran (W&C), the Brigham Street culvert is a three-sided reinforced concrete culvert with an approximate span of 36 inches and a height of 22 inches. The headwalls consist of stone abutments which support the embankment slope and roadway. A temporary repair was installed consisting of 12-inch and 15-inch-high density polyethylene (HDPE) corrugated pipes to provide conveyance after a section of the existing culvert failed. The culvert is approximately 70 feet long. Overhead utilities are located along the westbound travel lane of Brigham Street and the northbound travel lane of Park Street. Underground utilities at Brigham Street and Park Street consist of gas, sewer and water.

The proposed culvert replacement may consist of an aluminum multi-plate arch span or a 3- or 4-sided precast concrete box culvert. W&C indicated the proposed span of the replacement culvert at Brigham Street will likely be less than 10 feet and is

therefore not subject to Massachusetts Department of Transportation (MassDOT) Chapter 85 Permitting.

The Park Street culvert is an approximately 36-inch-wide corrugated metal pipe (CMP) that extends approximately 350 feet underground to the west of Park Street and drains into an unnamed brook. We understand the existing CMP will be relined, and the upstream headwall will be replaced with a precast concrete system.

SUBSURFACE EXPLORATIONS

GZA performed a subsurface exploration program to evaluate subsurface conditions in the vicinity of the proposed culvert and headwall replacements. Drilex Environmental of Auburn, Massachusetts coordinated utility clearance and drilled test borings GZ-1 through GZ-3 on March 13, 2023. Borings GZ-1 and GZ-2 were drilled in the roadway to the northeast and southwest, respectively, of the existing Brigham Street culvert in the east bound lane and extended to a depth of approximately 27 feet below ground surface (bgs). Boring GZ-3 was drilled in the roadway to the southwest of the existing Park Street culvert headwall in the southbound lane and extended to a depth of approximately 27 feet bgs. Boring B-3 was drilled approximately 34 feet away from the existing headwall due to conflicts with overhead and underground utilities. W&C surveyed the boring locations after the completion of the drilling program. The approximate locations of the test borings are shown on **Figure 2 – Exploration Location Plan.**

Borings were drilled using a truck-mounted drill rig with 4.25-inch-inside-diameter (ID) hollow stem augers (HSA). Standard Penetration Testing and split spoon sampling were performed semi-continuously through fill and generally at 5-foot intervals thereafter.

Samples were classified in accordance with the Modified Burmister System. The test borings were backfilled with drill cuttings upon the completion of the drilling and repaired at the surface with concrete-patch. GZA field personnel monitored the drilling and prepared the test boring logs which are included in **Appendix B**.

GEOTECHNICAL LABORATORY TESTING

Four soil samples obtained from the test borings were submitted to GZA's geotechnical laboratory subcontractor, Thielsch Engineering, for grain size distribution analyses. Laboratory test results for these samples are attached as **Appendix C** and are summarized in the table below.

Test Boring No.	Sample ID	Depth Below Grade (ft)	Stratum	Soil Description	Test Performed
GZ-1	S-3	5-7	Fill	Olive, GRAVEL, some Sand, trace Silt	Gradation
GZ-1	S-6	15-17	Sand and Gravel	Brown, fine to coarse SAND, some Gravel, little Silt	Gradation
GZ-2	S-5	15-17	Sand and Gravel	Brown, GRAVEL and fine to coarse Sand, little Silt	Gradation
GZ-3	S-5	10-12	Sand and Gravel	Brown, GRAVEL and fine to coarse Sand, little Silt	Gradation

GENERALIZED SUBSURFACE CONDITIONS

Based on the completed test borings, subsurface conditions at each culvert location were similar and consisted of loose to dense sand fill over loose to very dense natural sand and gravel. Descriptions of the geologic units encountered at each culvert location are as follows, in general order of occurrence below ground surface.

GENERALIZED SUBSURFACE CONDITIONS NEAR BRIGHAM STREET CULVERT (Boring GZ-1 and GZ-2)		
Soil Unit	**Approx. Depth Range (feet)**	**Generalized Description**
Asphalt	0.3	4 inches of bituminous asphalt pavement was encountered at the ground surface at both locations.
Fill	0.3 to 12	Approximately 11.7 and 9.5 feet of fill was encountered directly below the asphalt in borings GZ-1 and GZ-2, respectively. The material generally consisted of loose to dense, brown, fine to coarse SAND, with up to 50 percent Gravel and up to about 35 percent Silt.
Buried Topsoil	9.8 to 12.5	Buried topsoil was encountered directly below the Fill at a depth of 9.8 feet bgs in boring GZ-2. The buried topsoil consisted of fine to medium SAND, 20 to 35 percent Silt, and less than 10 percent each of Gravel and Organics. The bottom of the buried topsoil was not confirmed however, we estimate it could be approximately 1 to 3 feet thick.
Sand and Gravel	12 to 27	A natural deposit of Sand and Gravel was encountered at a depth of 12.5 feet bgs in boring GZ-2 and 12 feet bgs in boring GZ-1. The borings were terminated in the Sand and Gravel stratum. The Sand and Gravel generally consisted of loose to dense, gray to brown, fine to coarse SAND, with up to 50 percent Gravel and up to 35 percent Silt.

GENERALIZED SUBSURFACE CONDITIONS NEAR PARK STREET CULVERT HEADWALL (Borings GZ-3)		
Soil Unit	**Approx. Depth Range (feet)**	**Generalized Description**
Asphalt	0.3	4 inches of bituminous asphalt pavement was encountered at the ground surface in boring.
Fill	0.3 to 5.0	Fill was encountered directly below the asphalt in boring GZ-3. The Fill generally consisted of medium dense to dense, brown, fine to coarse SAND, with up to about 20 percent Silt and up to 20 percent Gravel.
Sand and Gravel	5.0 to 27	Natural Sand and Gravel was encountered below the Fill at a depth of 5 feet bgs in boring GZ-3. The Sand and Gravel generally consisted of medium dense to very dense, brown and gray, fine to medium SAND, with up to 50 percent Gravel and up to 20 percent of Silt.

Detailed descriptions of the materials encountered are presented on the boring logs in **Appendix B**.

GROUNDWATER

GZA measured groundwater depths during drilling in test borings GZ-1 and GZ-2 for the Brigham Street culvert. Groundwater was measured at approximately 21.4 (GZ-1) and 21.3 (GZ-2) feet bgs (corresponding to Elevations 210.7 and 211.4), respectively, as shown on the boring logs included in **Appendix B**. Based on GZA's visual observations during drilling, the stream was approximately 2-3 feet deep at the time the borings were completed which corresponds to approximately Elevation ±222 to 223 at the upstream side of the Brigham Street culvert.

At the Park Street culvert location, groundwater was measured in test boring GZ-3 at approximately 9.6 feet bgs (corresponding to Elevation 212.1) as shown on the boring logs included in **Appendix B**. There was approximately 2-3 feet of water in the stream at the time the borings were completed which corresponds to approximately Elevation ±215 to 216 at the upstream opening of the Park Street culvert.

Water level readings were made in the borings at the time and under conditions stated on the logs. Groundwater depths and elevations are approximate representations of the hydrostatic groundwater level. Therefore, the groundwater level observed in the test borings may not represent stabilized groundwater levels. Note that

fluctuations in the level of the groundwater will occur due to variations in season, rainfall, temperature, construction, and other factors occurring since the time measurements were made.

BEDROCK

Bedrock was not encountered in test borings GZ-1 through GZ-3. Bedrock underlying each site area is mapped as sillimanite schist and gneiss, amphibolite, and biotite gneiss which are part of the Nashoba Formation.

IMPLICATIONS OF SUBSURFACE CONDITIONS

BRIGHAM STREET CULVERT

The subsurface conditions at the Brigham Street Culvert site, generally consist of loose to dense sand fill overlying a loose to dense natural sand and gravel stratum. Based on survey plans provided by W&C, and assuming that footings will bear approximately four feet below an invert of approximately Elevation ±219 feet down stream side and Elevation ±220 upstream side, the estimated elevation for the bottom of the proposed culvert footing at this site will be about Elevation ±215 to ±216 feet. Based on the test boring, soils at this elevation are likely to be loose to medium dense natural sand and gravel. Note, a layer of buried topsoil was encountered below the fill in test boring GZ-2 at about Elevation 222 feet. However, based on the anticipated footing depth, the topsoil will likely be removed during excavation for the proposed culvert footing and is therefore not considered a geotechnical issue. Should buried topsoil be encountered at the proposed footing elevation, it should be removed and replaced with compacted structural fill.

PARK STREET CULVERT HEADWALL

The subsurface conditions at the Park Street culvert headwall site generally consist of medium dense to dense sand fill overlying a medium dense to very dense natural sand and gravel stratum. Based on survey plans provided by W&C, and assuming that the precast headwall foundation will bear up to four feet below the existing invert of approximate Elevation ±213 feet, the estimated elevation for the bottom of the proposed precast headwall will be about Elevation ±209 feet. Based on the borings, soils at this elevation are likely to be dense natural sand and gravel.

RECOMMENDATIONS AND CONSTRUCTION CONSIDERATIONS

The following recommendations assume the buried topsoil stratum will be removed incidental to footing excavation. In addition, the footings for the proposed culvert replacement on Brigham Street and proposed headwall replacement on Park Street will be installed at approximately Elevation 215 feet and 209 feet, respectively.

FOUNDATION SUBGRADE PREPARATION

In order to densify the soils near the footing bearing elevation, the contractor should proof compact the subgrade soils. Following existing fill and buried topsoil removal, the excavated subgrade should be proof-compacted with at least 10 passes of a large, self-propelled vibratory double-drum trench roller capable of generating a minimum of 16,000 pounds of dynamic force. Areas exhibiting excessive weaving, or soft or unstable soils should be excavated and replaced with Structural Fill meeting the usage and compaction requirements discussed below. In confined areas, the final subgrade should be proof-compacted with a minimum of 10 passes of a heavy vibratory plate compactor.

When near the water table or behind retaining wall structures, the contractor should proof-compact using static (non-vibratory) equipment. To limit the impact of vibrations on the existing or newly constructed structures, the contractor should compact the subgrade using large plate compactors within 10 feet of a structure. For wet subgrades below groundwater level, crushed stone wrapped in geotextile fabric (Mirafi 140N or equivalent) may be used to stabilize the subgrade and allow for fill placement in-the-dry. A qualified geotechnical engineer should observe the foundation subgrade preparation.

BEARING CAPACITY

The proposed aluminum multi-plate arch span or 3- or 4-sided precast concrete box culvert on Brigham Street and the proposed precast headwall on Park Street can be supported on the undisturbed natural Sand and Gravel. Assuming the subgrade is prepared as discussed above, GZA recommends a maximum net allowable bearing pressure for the proposed culvert footings, headwall, abutments, and wingwalls of 2,000 pounds per square foot. The bearing pressures should assume total settlement to be less than 1 inch and differential settlement less than ½ inch over 20 feet.

DEWATERING

Based on the survey plans provided to GZA on April 11, 2023, the typical bottom of stream elevation at the upstream opening of the Brigham Street culvert is Elevation ±220 and the bottom of stream elevation at the upstream opening of the Park Street culvert is Elevation ±213 feet. Groundwater was encountered at Elevation ±210 feet for the Brigham Street culvert which is approximately 5 feet below the proposed bottom of footing elevation. However, groundwater was encountered at Elevation ±212 feet for the Park Street culvert which is approximately 3 feet above footing elevation and will require dewatering during construction. Please note that groundwater elevations measured during time of drilling were lower than stream elevations, however, groundwater elevations may be higher and closer to stream elevations during construction.

Temporary construction dewatering will be required to control groundwater seepage, precipitation, and surface inflow in excavations, to maintain the integrity of soil bearing surfaces, and allow construction in-the-dry. Temporary damming of the streams and open sump pumping may be sufficient to dewater the excavations; however, additional dewatering using well points and or steel sheeting to limit water infiltration may be required. Exposed sand and gravel subgrade can become unstable if exposed to high dewatering gradients.

FROST PROTECTION

Typical frost depth in the Commonwealth of Massachusetts is 4 feet bgs. We recommend that spread footings for abutments and wingwalls be supported a minimum of 4 feet below the lowest adjacent ground surface to provide frost protection.

CONCLUSION

We appreciate the opportunity to work with Woodard & Curran, Inc. on this project. If you have any questions regarding this memorandum, please contact Andrew Fournier at 603-316-8711 or Jay Hodkinson at 603-232-8742.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Andrew D. Fournier
Project Manager

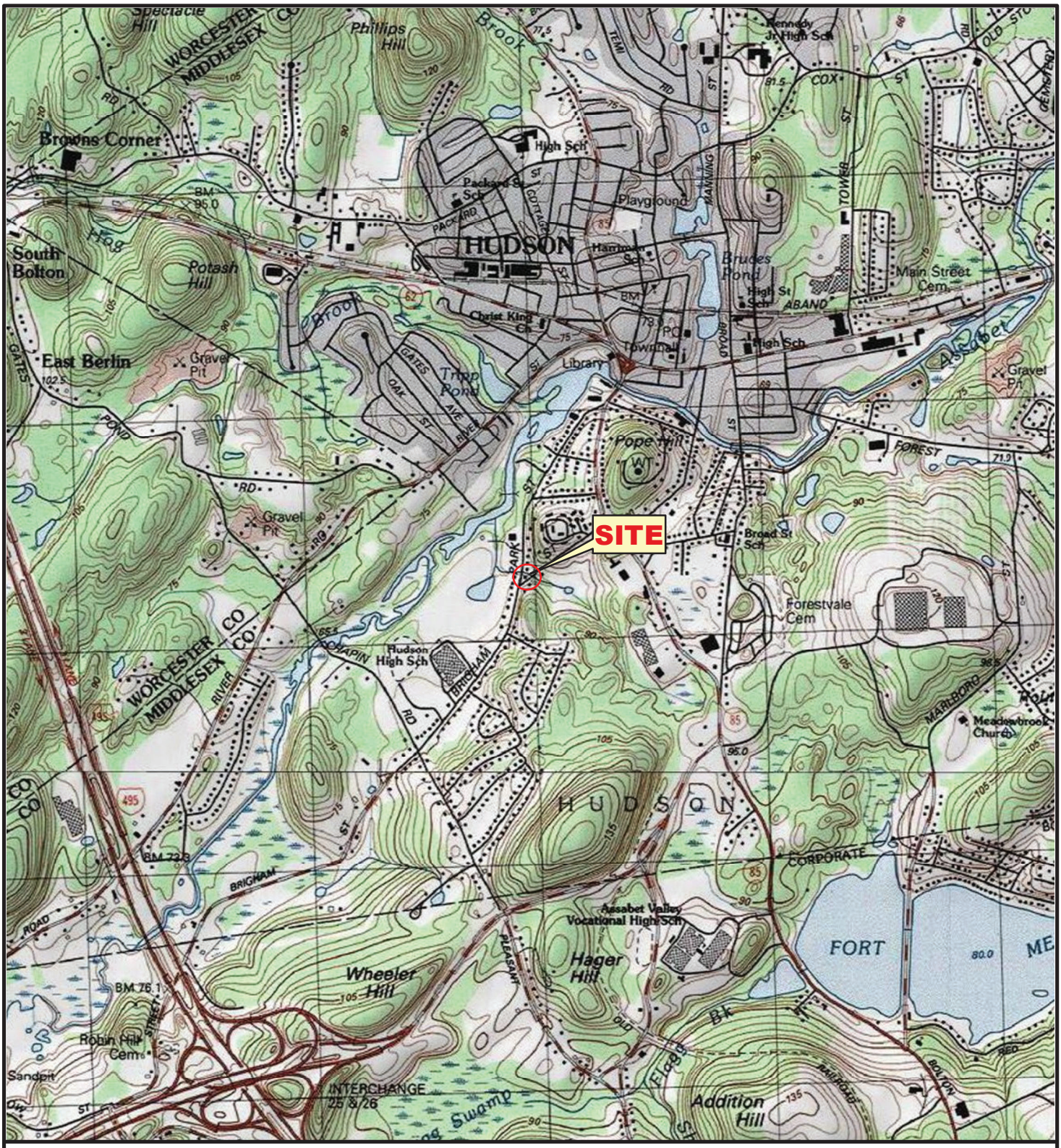
Bruce W. Fairless, P.E.
Consultant/Reviewer

Jay L. Hodkinson, P.E.
Associate Principal

ADF/DGL/BWF:
p:\04jobs\0191500s\04.0191546.00 - hudson ma culvert\report\draft 04.0191546.00 hudson ma geotech report 04.21.2023.docx

Attachments: Figure 1 – Locus Plan
Figure 2 – Exploration Location Plan
Appendix A – Limitations
Appendix B – Boring Logs
Appendix C – Laboratory Test Results

Figure 1 – Locus Plan

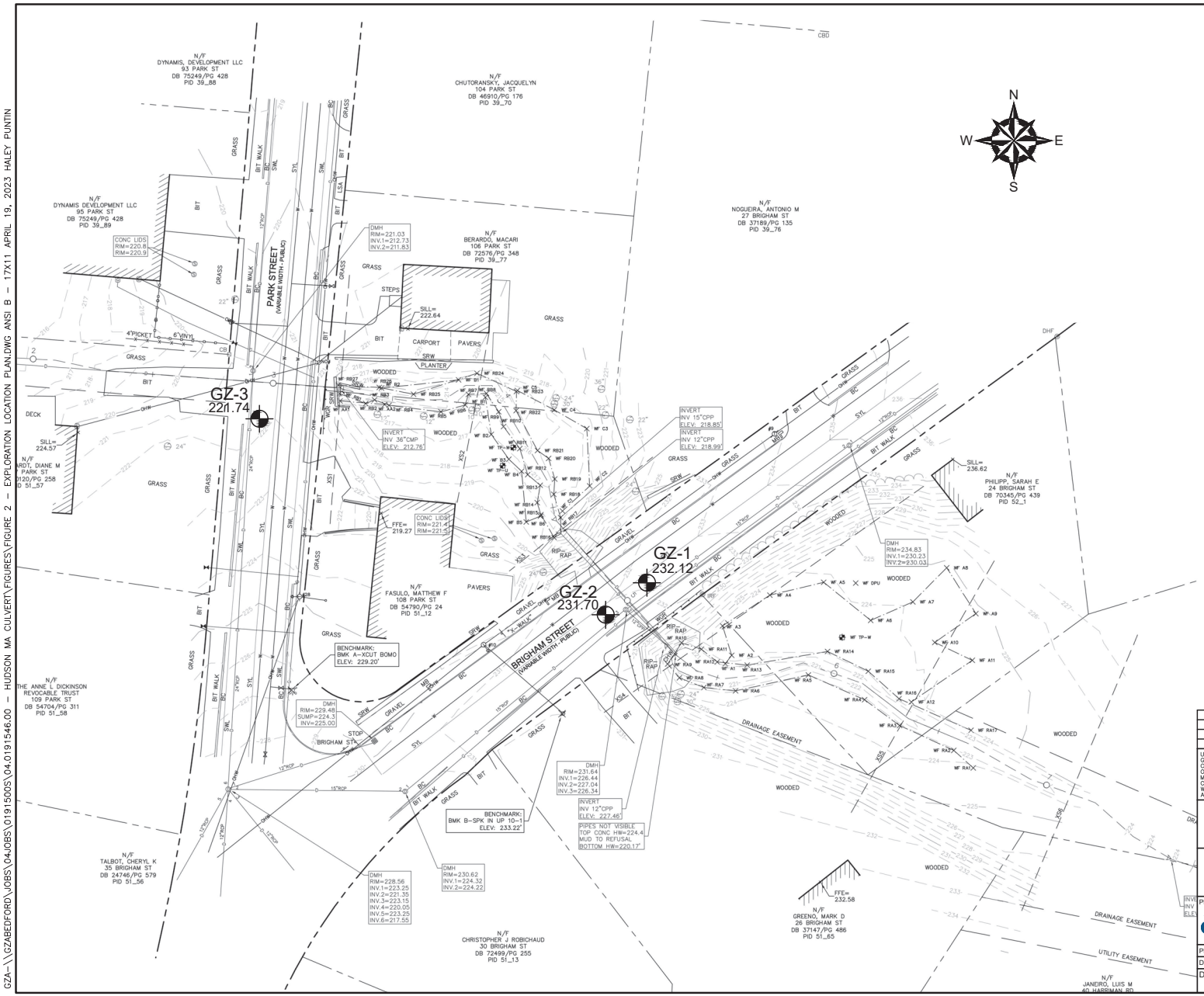


SOURCE : USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE NATIONAL GEOGRAPHIC SOCIETY & I-CUBED, COPYRIGHT 2011

Data Supplied by : esri

GZA	PROJ. MGR.: ADF DESIGNED BY: IJC REVIEWED BY: JLH OPERATOR: IJC DATE: 01-20-2023	LOCUS MAP	JOB NO. 04.0191546.00
		BRIGHAM STREET AND PARK STREET CULVERTS HUDSON, MASSACHUSETTS	FIGURE NO. 1

Figure 2 – Sample Location Plan



GENERAL NOTES

1. BASE MAP DEVELOPED FROM ELECTRONIC DRAWING FILE "30902402-1-HUDSON-041123" PREPARED BY WSP USA INC. TRANSMITTED TO GZA ON APRIL 11, 2023.
2. GZA TEST BORINGS WERE PERFORMED BY DRILEX ENVIRONMENTAL INC. OF AUBURN, MASSACHUSETTS ON MARCH 13, 2023 AND WERE OBSERVED BY GZA PERSONNEL
3. THE LOCATIONS OF THE TEST BORINGS WERE DETERMINED IN THE FIELD USING RTK GPS SURVEY TECHNIQUES BY WSP USA INC.

LEGEND

GZ-1
232.12
TEST BORING LOCATION, DESIGNATION, AND ELEVATION MEASURED IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

CULVERT REPLACEMENT
BRIGHAM AND PARK STREET
HUDSON, MASSACHUSETTS

EXPLORATION LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: WOODARD & CURRAN	
PROJ MGR: ADF	REVIEWED BY: ADF	CHECKED BY: DGL	FIGURE 2
DESIGNED BY: DS	DRAWN BY: DS	SCALE: 1"=40'	
DATE: APRIL, 2023	PROJECT NO. 04.0191546.00	REVISION NO. -	

Appendix A – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report,as appropriate, to reflect the unanticipated changed conditions .

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Water level readings have been made in test holes (as described in this Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

8. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

9. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

COMPLIANCE WITH CODES AND REGULATIONS

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

COST ESTIMATES

11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

12. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

13. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

ADDITIONAL SERVICES

14. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

Appendix B – Boring Logs

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woodard & Curran
Brigham and Park St Culverts
Hudson, MA

EXPLORATION NO.: GZ-1
SHEET: 1 of 1
PROJECT NO: 04.0191546.00
REVIEWED BY: A. Fournier

Logged By: K. Ashe
Drilling Co.: Drilex Environmental
Foreman: E.Gravante

Type of Rig: Truck
Rig Model: Mobile B57
Drilling Method: HSA

Boring Location: See Plan
Ground Surface Elev. (ft.): 232.12
Final Boring Depth (ft.): 27
Date Start - Finish: 3/13/2023 - 3/13/2023

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
3/13/23	10:25	5 min	21.4	25

Depth (ft)	Casing Blows/ (Core Rate)	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (RQD)	Sample SPT Value	Sample Description (Modified Burmister Classification)	Remark	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.3-2.3	24	16	16 13 8 6	21	S-1: Medium dense, brown and black, fine to coarse SAND, little Silt, dry.		0.3	ASPHALT	231.8
		S-2	3.0-5.0	24	9	6 6 13 23	19	S-2: Medium dense, brown, fine to coarse SAND, and Gravel, little Silt, dry.				
5		S-3	5.0-7.0	24	12	15 14 14 14	28	S-3: Medium dense, olive, GRAVEL, some medium Sand, trace Silt, dry.			FILL	
		S-4	8.0-10.0	24	8	16 10 7 5	17	S-4: Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, dry.				
10		S-5	10.0-12.0	24	3	3 3 4 2	7	S-5: Loose, brown, fine to medium SAND, some Silt, some Gravel, dry.		12		220.1
									1. 2.			
15		S-6	15.0-17.0	24	10	20 4 4 6	8	S-6: Loose, brown, fine to coarse SAND, some Gravel, little Silt, moist.				
20		S-7	20.0-22.0	24	16	13 20 22 20	42	S-7: Dense, gray, fine to medium SAND, and Gravel, little Silt, wet.			SAND AND GRAVEL	
25		S-8	25.0-27.0	24	20	9 11 20 20	31	S-8: Dense, gray, fine SAND, some Silt, little Gravel, wet.				
										27		205.1
30								End of exploration at 27 feet	3.			

REMARKS

1. - Stratum change based on drill action.
2. - Gravel and cobbles observed in the drill cuttings from 12 to 15 ft. below ground surface.
3. - Hole backfilled with drill cuttings and 2 bags of sand and patched with quick-set concrete.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-1

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woodard & Curran
Brigham and Park St Culverts
Hudson, MA

EXPLORATION NO.: GZ-2
SHEET: 1 of 1
PROJECT NO: 04.0191546.00
REVIEWED BY: A. Fournier

Logged By: K. Ashe
Drilling Co.: Drilex Environmental
Foreman: E.Gravante

Type of Rig: Truck
Rig Model: Mobile B57
Drilling Method: HSA

Boring Location: See Plan
Ground Surface Elev. (ft.): 231.7
Final Boring Depth (ft.): 27
Date Start - Finish: 3/13/2023 - 3/13/2023

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
3/13/23	8:48	5 min	21.3	25

Depth (ft)	Casing Blows/ (Core Rate)	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (RQD)	SPT Value	Sample Description (Modified Burmister Classification)	Remark	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.3-2.3	24	14	18 20 13 8	33	S-1: Dense, brown and black, fine to coarse SAND, little Silt, little Gravel, dry.		0.3	ASPHALT	231.4
		S-2	3.0-5.0	24	6	8 7 14 10	21	S-2: Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, dry.				
5		S-3	5.0-7.0	24	1	7 8 5 3	13	S-3: Medium dense, brown and black, fine to medium SAND, some Gravel, little Silt, dry.			FILL	
		S-4A	8.0-9.8	22	6	3 6 9 6/4"	15	S-4A: Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, dry.				
10		S-4B	9.8-10.0	2	2			S-4B: Dark brown, fine to medium SAND, some Silt, trace Gravel, trace Organics, dry.		9.8	BURIED TOPSOIL	221.9
										12.5		219.2
15		S-5	15.0-17.0	24	11	7 9 13 25	22	S-5: Medium dense, brown, GRAVEL and fine to coarse Sand, little Silt, moist.				
20		S-6	20.0-22.0	24	14	16 21 23 25	44	S-6: Dense, gray, fine to coarse SAND, some Silt, trace Gravel, wet.			SAND AND GRAVEL	
25		S-7	25.0-27.0	24	14	17 18 12 12	30	S-7: Dense, gray, fine to medium SAND, some Silt, trace Gravel, wet.		27		204.7
30								End of exploration at 27 feet	1.			

REMARKS

1. - Hole backfilled with drill cuttings and 2 bags of sand and patched with quick-set concrete.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-2

GZA TEMPLATE TEST BORING - GZA GINT DATA TEMPLATE 10-27-20.GDT - 4/21/23 09:01 - P:\04JOBS\GINT PROJECT DATABASES\04.0191546.00- HUDSON, MA BRIGHAM AND PARK ST CULVERTS.GPJ

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woodard & Curran
Brigham and Park St Culverts
Hudson, MA

EXPLORATION NO.: GZ-3
SHEET: 1 of 1
PROJECT NO: 04.0191546.00
REVIEWED BY: A. Fournier

Logged By: K. Ashe
Drilling Co.: Drilex Environmental
Foreman: E.Gravante

Type of Rig: Truck
Rig Model: Mobile B57
Drilling Method: HSA

Boring Location: See Plan
Ground Surface Elev. (ft.): 221.74
Final Boring Depth (ft.): 27
Date Start - Finish: 3/13/2023 - 3/13/2023

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
3/13/23	12:35	5 min	9.6	25

Depth (ft)	Casing Blows/ (Core Rate)	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (RQD)	SPT Value	Sample Description (Modified Burmister Classification)	Remark	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.3-2.3	24	11	26 20 16 12	36	S-1: Dense, brown, fine to coarse SAND, little Gravel, little Silt, dry.		0.3	ASPHALT	221.4
		S-2	3.0-5.0	24	8	15 14 10 13	29	S-2: Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, dry.			FILL	
5		S-3	5.0-7.0	24	10	11 9 10 15	19	S-3: Medium dense, brown, fine to medium SAND, little Silt, little Gravel, dry.		5		216.7
		S-4	8.0-10.0	24	3	15 10 8 5	18	S-4: Medium dense, brown, fine to medium SAND, some Gravel, little Silt, moist.				
10		S-5	10.0-12.0	24	9	12 36 17 12	53	S-5: Very dense, brown, GRAVEL and fine to medium Sand, little Silt, wet.				
15		S-6	15.0-16.8	22	14	17 20 27 30/4"	47	S-6: Dense, brown and gray, GRAVEL, some fine to medium Sand, little Silt, wet.			SAND AND GRAVEL	
20		S-7	20.0-22.0	24	18	12 26 17 10	43	S-7: Dense, gray, fine to medium SAND, little Silt, trace Gravel, wet.				
25		S-8	25.0-27.0	24	24	10 10 13 14	23	S-8: Medium dense, gray, fine to coarse SAND, little Silt, little Gravel, wet.		27		194.7
30								End of exploration at 27 feet	1.			

REMARKS

1. - Hole backfilled with drill cuttings and 1 bag of sand and patched with quick-set concrete.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-3

GZA TEMPLATE TEST BORING - GZA GINT DATA TEMPLATE 10-27-20.GDT - 4/21/23 09:01 - P:\04JOBS\GINT PROJECT DATABASES\04.0191546.00- HUDSON, MA BRIGHAM AND PARK ST CULVERTS.GPJ

LOG KEY

GZA
Geo Environmental, Inc.
Engineers and Scientists

BURMISTER SOIL CLASSIFICATION (INORGANIC)

COMPONENT	NAME	PROPORTIONAL TERM	PERCENT BY WEIGHT
MAJOR	GRAVEL, SAND, FINES*		>50
Minor	Gravel, Sand, Fines*	and	35 - 50
		some	20-35
		little	10-20
		trace	0-10

*See identification of fines table.

IDENTIFICATION OF FINES

Material	PI	Atterberg Thread Dia.
SILT	0	Cannot Roll
Clayey SILT	1-5	1/4"
SILT & CLAY	5-10	1/8"
CLAY & SILT	10-20	1/16"
Silty CLAY	20-40	1/32"
CLAY	>40	1/64"

GRADATION DESIGNATION	PROPORTION OF COMPONENT
Fine to coarse	All fractions > 10%
Medium to coarse	<10% fine
Fine to medium	<10% coarse
Coarse	<10% fine and medium
Medium	<10% coarse and fine
Fine	<10% coarse and medium

PLASTIC SOILS

Consistency	Blows/Ft. SPT N-Value
Very Soft	< 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

GRAVEL & SAND

Density	Blows/Ft. SPT N-Value
Very Loose	< 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

BURMISTER SOIL CLASSIFICATION (ORGANIC)

Fibrous PEAT (Pt) - Lightweight, spongy, mostly visible organic matter, water squeezes readily from sample. Typically near top of deposit.
Fine Grained PEAT (Pt) - Lightweight, spongy, little visible organic matter, water squeezes reqdily from sample. Typically below fibrous peat.
Organic Silt (OL) - Typically gray to dark gray, often has strong H2S odor. Typically contains shells or shell fragments. Lightweight. Usually found near coastal regions. May contain wide range of sand fractions.
Organic Clay (OH) - Typically gray to dark gray, high plasticity. Usually found near coastal regions. May contain wide range of sand fractions. Need organic content test for final identification.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (ASTM D 2487)

MAJOR DIVISIONS			Group Symbols
Coarse Grained Soils More than 50% of material larger than No. 200 sieve	Gravel More than 50% larger than No. 4 sieve	Clean Gravels (Little or no fines)	GW GP
		Gravels with Fines (Appreciable amount of fines)	GM GC
	Sand More than 50% smaller than No. 4 sieve	Clean Sands (Little or no fines)	SW SP
		Sands with Fines (Appreciable amount of fines)	SM SC
Fine Grained Soils More than 50% of material smaller than No. 200 sieve		Silts and Clays Liquid Limit <50	ML CL
		Silts and Clays Liquid Limit >50	OL MH CH OH
		Highly Organic Soils	Pt

ABBREVIATIONS

MR = Mud Rotary
HSA = Hollow Stem Auger
SSA = Solid Stem Auger
SS = Split Spoon Sampler
U = Undisturbed Sample (Shelby Tube)
MC = Modified California Sampler
V = Vibracore
M = Macrocore
R = Refusal
USCS = Unified Soil Classification System (ASTM D2487)
NYCBC = New York City Building Code
WOR = Weight of Rods
WOH= Weight of Hammer
SPT = Standard Penetration Test (ASTM D1586)
N-Value = Cumulative number of uncorrected blows for the middle two 6-inch intervals (blows/foot).

Tv = Field Vane Shear Test (Torvane)
PP = Pocket Penetrometer
PI = Plasticity Index
MC = Moisture Content
CO = Consolidation
UC = Unconfined Compression Test
SI = Sieve Analysis
DS = Direct Shear
PID = Photoionization Detector
ppm = Parts Per Million
REC = Recovery
RQD = Rock Quality Designation
▼ = Measured Water Level

Appendix C – Laboratory Test Results

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental, Inc.	
Bedford, NH 03110	
Project Manager:	Andrew Fournier
Assigned By:	Andrew Fournier
Collected By:	Kyle Ashe

Project Information:	
Hudson, MA Culvert Relacement	
Bringham Street and Park Street	
Project Number:	04.0191546.00
Summary Page:	1 of 1
Report Date:	03.23.23

LABORATORY TESTING DATA SHEET, Report No.: 7423-C-138

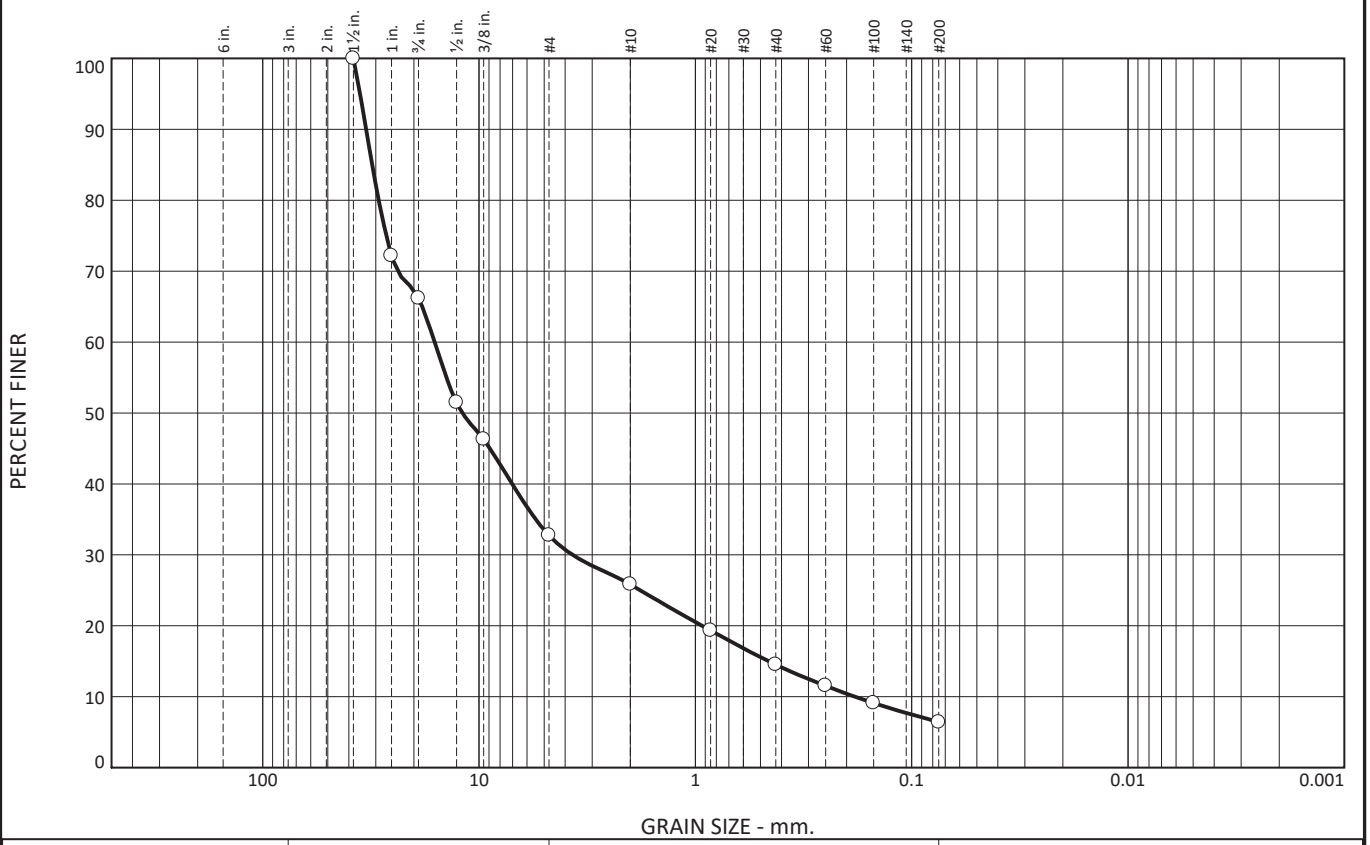
Boring No.	Sample No.	Depth (ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	pH	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D4792	D1557								
GZ-1	S-3	5-7	23-S-1237				67.2	26.4	6.4											Olive, GRAVEL, some medium Sand, trace Silt.
GZ-1	S-6	15-17	23-S-1238				23.8	61.6	14.6											Brown, f-c SAND, some Gravel, little Silt.
GZ-2	S-5	15-17	12-S-1239				44.3	43.7	12.0											Brown, GRAVEL and f-c SAND, little Silt.
GZ-3	S-5	10-12	12-S-1240				53.0	36.2	10.8											Brown, GRAVEL and f-c SAND, little Silt.

Date Received: *03.16.23*

Reviewed By:

Date Reviewed: *03.23.23*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	33.8	33.4	7.0	11.3	8.1	6.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	72.2		
3/4"	66.2		
1/2"	51.5		
3/8"	46.3		
#4	32.8		
#10	25.8		
#20	19.3		
#40	14.5		
#60	11.5		
#100	9.1		
#200	6.4		

* (no specification provided)

Soil Description

Olive, GRAVEL, some medium Sand, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 33.2792 D_{85}= 31.1585 D_{60}= 16.0359
D_{50}= 11.9297 D_{30}= 3.6929 D_{15}= 0.4592
D_{10}= 0.1834 C_u= 87.43 C_c= 4.64

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Source of Sample: Boring **Depth:** 5-7'
Sample Number: GZ-1 / S-3

Date: 03.21.23

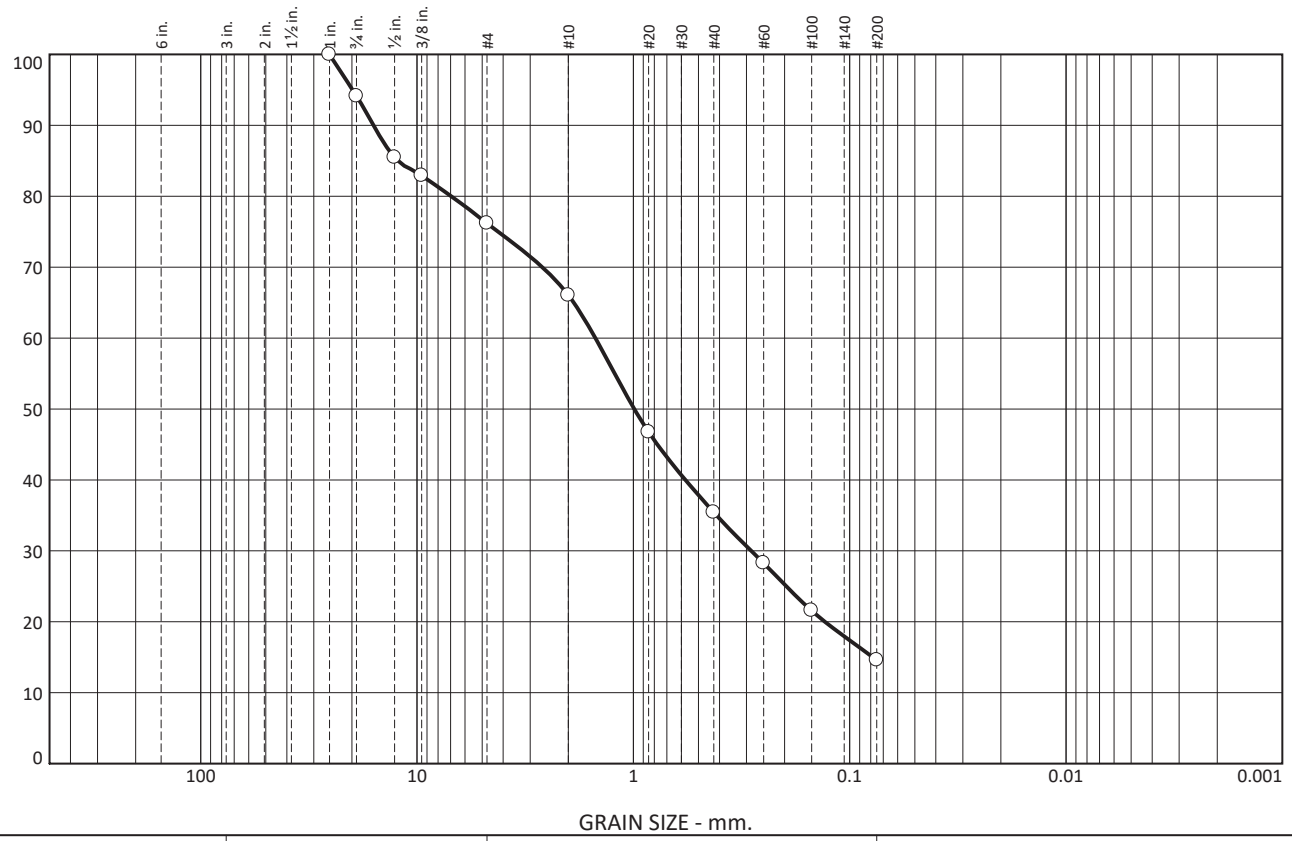
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Hudson, MA Culvert Replacements
Brigham Street and Park Street
Project No: 04.0191546.00 **Fig.** 23-S-1237

Tested By: RB / AF / JGW **Checked By:**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.9	17.9	10.2	30.6	20.8	14.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	94.1		
1/2"	85.5		
3/8"	82.9		
#4	76.2		
#10	66.0		
#20	46.8		
#40	35.4		
#60	28.3		
#100	21.6		
#200	14.6		

* (no specification provided)

Soil Description

Brown, f-c SAND, some Gravel, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 15.8904 D_{85}= 12.2784 D_{60}= 1.4982
D_{50}= 0.9905 D_{30}= 0.2853 D_{15}= 0.0783
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: Boring **Depth:** 15-17'
Sample Number: GZ-1 / S-6

Date: 03.21.23

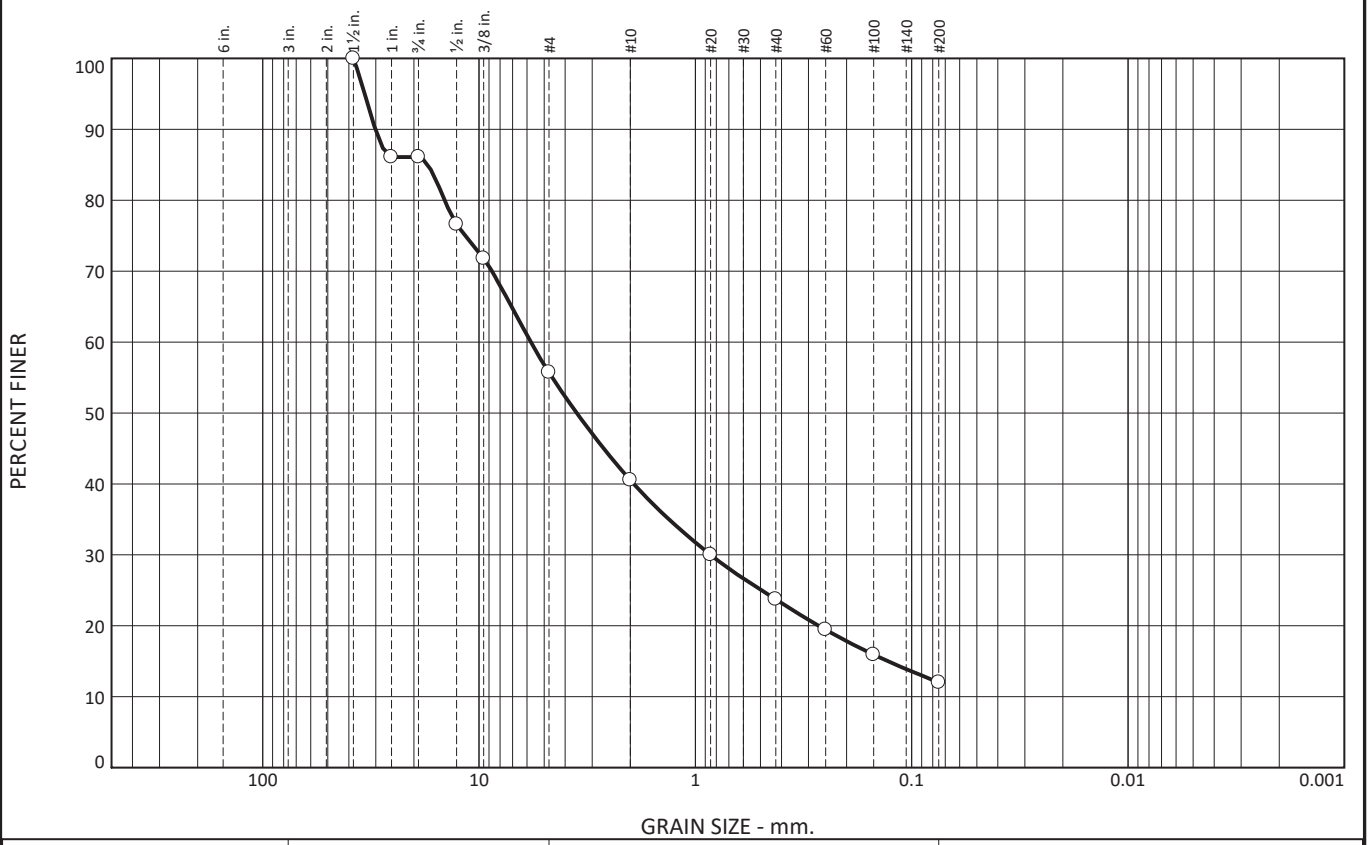
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Hudson, MA Culvert Replacements
Brigham Street and Park Street
Project No: 04.0191546.00 **Fig.** 23-S-1238

Tested By: RB / AF / JGW **Checked By:**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.9	30.4	15.2	16.8	11.7	12.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	86.1		
3/4"	86.1		
1/2"	76.6		
3/8"	71.8		
#4	55.7		
#10	40.5		
#20	30.0		
#40	23.7		
#60	19.4		
#100	15.9		
#200	12.0		

* (no specification provided)

Soil Description

Brown, GRAVEL and f-c SAND, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 30.1390 D_{85}= 17.2217 D_{60}= 5.7580
D_{50}= 3.5344 D_{30}= 0.8508 D_{15}= 0.1289
D_{10}= C_u= C_c=

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Source of Sample: Boring **Depth:** 15-17'
Sample Number: GZ-2 / S-5

Date: 03.21.23

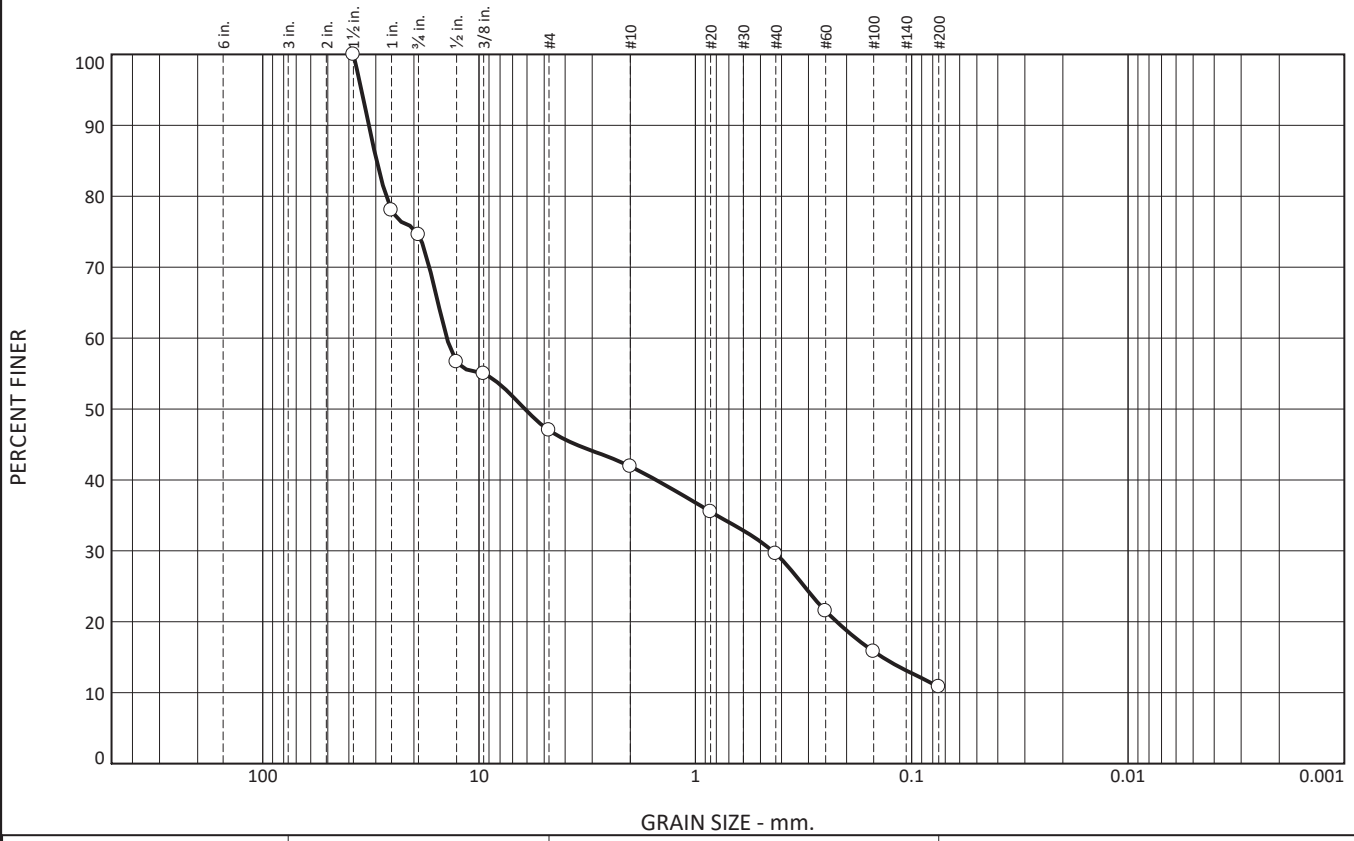
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Hudson, MA Culvert Replacements
Brigham Street and Park Street
Project No: 04.0191546.00 **Fig.** 23-S-1239

Tested By: RB / AF / JGW **Checked By:**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	25.4	27.6	5.1	12.3	18.8	10.8	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	78.0		
3/4"	74.6		
1/2"	56.6		
3/8"	55.0		
#4	47.0		
#10	41.9		
#20	35.5		
#40	29.6		
#60	21.5		
#100	15.8		
#200	10.8		

* (no specification provided)

Soil Description

Brown, GRAVEL and f-c SAND, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 32.3016 D_{85}= 29.7297 D_{60}= 14.0810
D_{50}= 6.1363 D_{30}= 0.4408 D_{15}= 0.1367
D_{10}= C_u= C_c=

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Source of Sample: Boring **Depth:** 10-12'
Sample Number: GZ-3 / S-5

Date: 03.21.23

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Hudson, MA Culvert Replacements
Brigham Street and Park Street
Project No: 04.0191546.00 **Fig.** 23-S-1240

Tested By: RB / AF / JGW **Checked By:**

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

March 13, 2023

Carly Quinn, PE
Woodard & Curran
33 Bond Street
Providence, RI 02903

RE: Wetland Resource Evaluation, Brigham Street Culvert, Hudson, Massachusetts

Dear Ms. Quinn:

On February 27, 2023, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the "Act") and its implementing regulations (310 CMR 10.00 *et seq.*; the "Regulations"); and (2) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Scott Jordan conducted the inspection.

The subject site consists of a the area within the vicinity of a proposed culvert replacement project along Brigham Street and Park Street in Hudson, Massachusetts. The upland portions of the site consist of existing single family homes with associated driveways and lawns. The wetland resources observed on the site are described below.

Methodology
The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands or, in the absence of Bordering Vegetated Wetlands, Bank was delineated in the field in accordance with the definitions set forth in the regulations at 310 CMR 10.55(2)(c) and 310 CMR 10.54(2). Section 10.55(2)(c) states that "The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." Section 10.54(2)(c) states that "The upper boundary of Bank is the first observable break in the slope or the mean annual flood level, whichever is lower." The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy "*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*," issued March 1, 1995; and (2) "*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook*," produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this report is based on the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). Federal wetlands were presumed to have boundaries conterminous with the delineated Bordering Vegetated Wetlands and Bank. One set of DEP Bordering Vegetated Wetland Delineation Field Data Forms completed for observation plots located in the wetlands

and uplands near flag B-3 is attached. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
Start RA1 to RA17 Stop	Pink Flags	Mean Annual High-water Line (MAHWL) and Bank of perennial stream located in the eastern portion of the site.
Start A1 to A2 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the central portion of the site that is associated with a perennial stream.
Start B1 to B6 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the central portion of the site that is associated with a perennial stream.
Start C1 to C5 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the central portion of the site that is associated with a perennial stream.
Start D1 to D2 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the central portion of the site that is associated with a perennial stream.
Start RB1 to RB27 Stop	Pink Flags	Mean Annual High-water Line (MAHWL) and Bank of perennial stream located in the central portion of the site.
Start E1 to E5 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the western portion of the site that is associated with a perennial stream.
Start F1 to F3 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the western portion of the site that is associated with a perennial stream.
Start RC1 to RC4 Stop	Pink Flags	Mean Annual High-water Line (MAHWL) and Bank of perennial stream located in the western portion of the site.
Start AA1 to AA12 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the eastern portion of the site, at 24 Brigham Street, that is associated with a perennial stream.

Findings

Wetlands AA, A, B, C, D, E & F (i.e., flags AA1 to AA12, A1 to A2, B1 to B6, C1 to C5, D1 to D2, E1 to E5, and F1 to F3) consists of wooded/shrub swamps located on the site that are associated with a perennial stream. Plant species observed include red maple (*Acer rubrum*) and American elm (*Ulmus americana*) trees and/or saplings; silky dogwood (*Cornus amomum*), glossy buckthorn (*Rhamnus frangula*), and American elderberry (*Sambucus canadensis*) shrubs; and sensitive fern (*Onoclea sensibilis*), spotted touch-me-not (*Impatiens capensis*), purple loosestrife (*Lythrum salicaria*), soft rush (*Juncus effusus*), spotted touch-me-not (*Impatiens capensis*), and golden-rods (*Solidago sp.*), ground cover. Evidence of wetland hydrology, including hydric soils, saturated soils, pore linings, and evidence of flooding, was observed within the delineated wetland. This vegetated wetland borders a perennial stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the perennial stream would be regulated as Bank and Land Under Water Bodies and Waterways under the Act. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands and Bank under the Act.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that "The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm." The project engineer should evaluate the most recent National Flood Insurance Program flood profile data to determine if Bordering Land Subject to Flooding occurs on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bordering Vegetated Wetlands or Bank boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (i.e., Hudson Quadrangle, dated 1997, attached), a stream that is shown as perennial is located on the site. Streams that are shown as perennial on the current USGS map are designated perennial under the Massachusetts Wetlands Protection Act regulations. Unless this perennial designation is overcome, Riverfront Area is presumed to extend 200 feet horizontally upgradient from the mean annual high-water line of the stream. Section 10.58(2)(a)2. states that the "Mean annual high-water line of a river is the line that is apparent from visible markings or changes in the character of soils or vegetation due to prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high-water line. Bankfull field indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of pointbars, changes in bank materials, or bank undercuts." Section 10.58(2)(a)2.a. states that "In most rivers, the first observable break in slope is coincident with bankfull conditions and the mean annual high-water line." The mean annual high-water line of the stream was delineated in the field with flags RA1 to RA17, RB1 to RB27 and RC1 to RC4 based upon the above-referenced regulation. Furthermore, based upon a review of the current USGS Map and observations made during the site inspection, there are no other mapped or unmapped streams located within 200 feet of the site. Accordingly, except as noted above, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act, but may overlap other wetland resources and their Buffer Zones.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas*, 15th edition, Priority Habitats and Estimated Habitats from the NHESP Interactive Viewer, valid from August 1, 2021, and Certified Vernal Pools from MassGIS, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq*.)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; "MESA") and MESA Regulations (321 CMR 10.00 *et seq*.)], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC

Scott Jordan
Senior Environmental Scientist

Attachments (12 pages)

11/W/HudsonBrighamStCulvertReport

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: Brigham Street Culvert City/Town: Hudson Sampling Date: 2/27/23

Applicant/Owner: _____ Sampling Point or Zone: TPWet @ B3

Investigator(s): Scott Jordan, EcoTec, Inc. Latitude/Longitude: 42.38299 / -71.57517

Soil Map Unit Name: 254B Merrimac Fine Sandy Loam NWI or DEP Classification: Wet meadow

Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No _____ (If no, explain in Remarks)

Are Vegetation _____ , Soil _____ , or Hydrology _____ significantly disturbed? (If yes, explain in Remarks)

Are Vegetation _____ , Soil _____ , or Hydrology _____ naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes x No _____	**Is the Sampled Area within a Wetland?** Yes x No _____
Hydric Soils criterion met?	Yes x No _____	
Wetlands hydrology present?	Yes x No _____	
Remarks, Photo Details, Flagging, etc.:		

HYDROLOGY

Field Observations:		
Surface Water Present?	Yes _____ No x	Depth (inches) _____
Water Table Present?	Yes x No _____	Depth (inches) 6"
Saturation Present (including capillary fringe)?	Yes x No _____	Depth (inches) surface

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
_____ Water-stained leaves	_____ Hydrological records	____ Direct observation of inundation
_____ Evidence of aquatic fauna	x Free water in a soil test hole	____ Drainage patterns
_____ Iron deposits	x Saturated soil	____ Drift lines
_____ Algal mats or crusts	_____ Water marks	____ Scoured areas
_____ Oxidized rhizospheres/pore linings	_____ Moss trim lines	____ Sediment deposits
_____ Thin muck surfaces	_____ Presence of reduced iron	____ Surface soil cracks
_____ Plants with air-filled tissue (aerenchyma)	_____ Woody plants with adventitious roots	____ Sparsely vegetated concave surface
_____ Plants with polymorphic leaves	_____ Trees with shallow root systems	____ Microtopographic relief
_____ Plants with floating leaves	_____ Woody plants with enlarged lenticels	____ Geographic position (depression, toe of slope, fringing lowland)
_____ Hydrogen sulfide odor		
Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):		

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Sampling Point TPwet @B3

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Red maple	Acer rubrum	FAC	15	yes	yes
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

15 = Total Cover

Shrub/Sapling Stratum Plot size 15'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. American elder	Sambucus canadensis	FACW-	10	yes	yes
2. Silky dogwood	Cornus amomum	FACW	5	yes	yes
3.					
4.					
5.					
6.					
7.					
8.					
9.					

15 = Total Cover

Herb Stratum Plot size 5'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Purple loosestrife	Lythrum salicaria	FACW+	50	yes	yes
2. Goldenrod	Solidago spp.	WET	30	yes	yes
3. Jewelweed	Impatiens capensis	FACW	20	yes	yes
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

100 = Total Cover

Sampling Point TPwet@B3

VEGETATION – continued.

Woody Vine Stratum	Plot size 30'				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. None					
2.					
3.					
4.					
			_____ = Total Cover		

Rapid Test:	Do all dominant species have an indicator status of OBL or FACW?		Yes _____ No x
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants	Do wetland indicator plants make up ≥ 50% of dominant plant species?
	6	6	Yes x No _____

Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	=
	FACW species		X 2	=
	FAC species		X 3	=
	FACU species		X 4	=
	UPL species		X 5	=
	Column Totals	(A)		(B)
Prevalence Index		B/A =		Is the Prevalence Index ≤ 3.0? Yes _____ No _____

Wetland vegetation criterion met? **Yes** x **No** _____

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

Sampling Point TPwet@B3

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-8	10YR 2/1						Mucky loam	Oa
8+							Rock	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
____ Histosol (A1)	____ Sandy Redox (S5)	____ 2 cm Muck (A10)
__x__ Histic Epipedon (A2)	____ Stripped Matrix (S6)	____ 5 cm Mucky Peat or Peat (S3)
____ Black Histic (A3)	____ Polyvalue Below Surface (S8)	____ Dark Surface (S7)
____ Hydrogen Sulfide (A4)	____ Thin Dark Surface (S9)	____ Polyvalue Below Surface (S8)
____ Stratified Layers (A5)	__x__ Loamy Mucky Mineral (F1)	____ Thin Dark Surface (S9)
____ Depleted Below Dark Surface (A11)	____ Loamy Gleyed Matrix (F2)	____ Iron-Manganese Masses (F12)
____ Thick Dark Surface (A12)	____ Depleted Matrix (F3)	____ Mesic Spodic (A17)
____ Sandy Mucky Mineral (S1)	____ Redox Dark Surface (F7)	____ Red Parent Material (F21)
____ Sandy Gleyed Matrix (S4)	____ Depleted Dark Surface (F8)	____ Very Shallow Dark Surface (TF12)
____ Dark Surface (S7)		____ Other (Include Explanation in Remarks)

Restrictive Layer (if observed) Type: _____ Depth (inches): _____

Remarks:

Hydric Soils criterion met? Yes ____x____ No _____

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: Brigham Street Culvert City/Town: Hudson Sampling Date: 2/27/23

Applicant/Owner: _____ Sampling Point or Zone: TPU@B3

Investigator(s): Scott Jordan, Ecotec, Inc. Latitude/Longitude: 42.38299/-71.57517

Soil Map Unit Name: 254B Merrimac fine sandy loam NWI or DEP Classification: lawn

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)

Are Vegetation X , Soil_____ , or Hydrology _____ significantly disturbed? (If yes, explain in Remarks)

Are Vegetation _____ , Soil_____ , or Hydrology _____ naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soils criterion met?	Yes _____ No X	
Wetlands hydrology present?	Yes _____ No X	
Remarks, Photo Details, Flagging, etc.: plot in lawn		

HYDROLOGY

Field Observations:		
Surface Water Present?	Yes _____ No X	Depth (inches) _____
Water Table Present?	Yes _____ No X	Depth (inches) _____
Saturation Present (including capillary fringe)?	Yes _____ No X	Depth (inches) _____

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
_____ Water-stained leaves	_____ Hydrological records	____ Direct observation of inundation
_____ Evidence of aquatic fauna	_____ Free water in a soil test hole	____ Drainage patterns
_____ Iron deposits	_____ Saturated soil	____ Drift lines
_____ Algal mats or crusts	_____ Water marks	____ Scoured areas
_____ Oxidized rhizospheres/pore linings	_____ Moss trim lines	____ Sediment deposits
_____ Thin muck surfaces	_____ Presence of reduced iron	____ Surface soil cracks
_____ Plants with air-filled tissue (aerenchyma)	_____ Woody plants with adventitious roots	____ Sparsely vegetated concave surface
_____ Plants with polymorphic leaves	_____ Trees with shallow root systems	____ Microtopographic relief
_____ Plants with floating leaves	_____ Woody plants with enlarged lenticels	____ Geographic position (depression, toe of slope, fringing lowland)
_____ Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Sampling Point TPU @B3

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. None					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

0 = Total Cover

Shrub/Sapling Stratum Plot size 15'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. silky dogwood	Cornus amomum	FACW	5	yes	yes
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

5 = Total Cover

Herb Stratum Plot size 5'

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. lawn/turf	Graminoae spp.	UPL	100	yes	No
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

100 = Total Cover

Sampling Point _____

VEGETATION – continued.

Woody Vine Stratum	Plot size 30'				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. None					
2.					
3.					
4.					
			0 = Total Cover		

Rapid Test:	Do all dominant species have an indicator status of OBL or FACW?		Yes _____ No X
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants	Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes X No _____
	2	1	

Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	=
	FACW species		X 2	=
	FAC species		X 3	=
	FACU species		X 4	=
	UPL species		X 5	=
	Column Totals	(A)		(B)
Prevalence Index		B/A =		Is the Prevalence Index ≤ 3.0? Yes _____ No _____

Wetland vegetation criterion met? **Yes** X **No** _____

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

Sampling Point TPUeB3

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-12	10YR2/1						FSL	
12-14	2.5Y5/4						FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
____ Histosol (A1)	____ Sandy Redox (S5)	____ 2 cm Muck (A10)
____ Histic Epipedon (A2)	____ Stripped Matrix (S6)	____ 5 cm Mucky Peat or Peat (S3)
____ Black Histic (A3)	____ Polyvalue Below Surface (S8)	____ Dark Surface (S7)
____ Hydrogen Sulfide (A4)	____ Thin Dark Surface (S9)	____ Polyvalue Below Surface (S8)
____ Stratified Layers (A5)	____ Loamy Mucky Mineral (F1)	____ Thin Dark Surface (S9)
____ Depleted Below Dark Surface (A11)	____ Loamy Gleyed Matrix (F2)	____ Iron-Manganese Masses (F12)
____ Thick Dark Surface (A12)	____ Depleted Matrix (F3)	____ Mesic Spodic (A17)
____ Sandy Mucky Mineral (S1)	____ Redox Dark Surface (F7)	____ Red Parent Material (F21)
____ Sandy Gleyed Matrix (S4)	____ Depleted Dark Surface (F8)	____ Very Shallow Dark Surface (TF12)
____ Dark Surface (S7)		____ Other (Include Explanation in Remarks)

Restrictive Layer (if observed) Type: _____ Depth (inches): _____

Remarks:

Hydric Soils criterion met? Yes _____ No X

National Flood Hazard Layer FIRMette

71°34'50"W 42°23'11"N

71°34'13"W 42°22'44"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

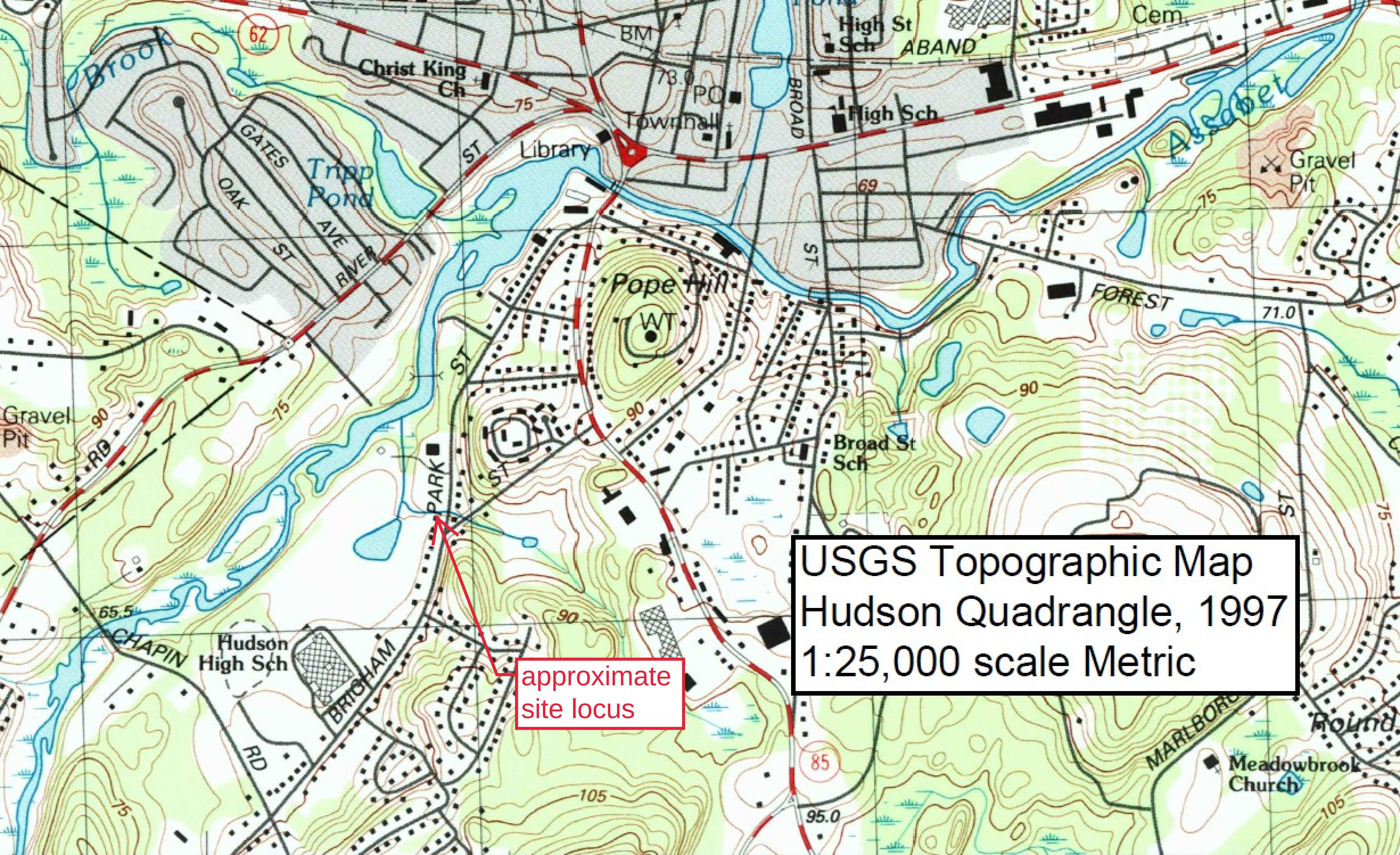
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/5/2023 at 10:11 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.


USGS Topographic Map
Hudson Quadrangle, 1997
1:25,000 scale Metric
approximate
site locus
Brook
Christ King
Ch
High St
Sch
ABAND
Cem
BM
73.0
PO
Townhall
Library
BROAD
High Sch
Assabet
Gravel
Pit
GATES
OAK
ST
AVE
RIVER
Tripp
Pond
69
ST
Pope Hill
WT
FOREST
71.0
90
Gravel
Pit
RD
75
PARK
ST
Broad St
Sch
ST
65.5
CHAPIN
Hudson
High Sch
BRIGHAM
RD
105
85
95.0
MARLBORO
Meadowbrook
Church
Round
62

Hudson Brigham St. Culvert, NHESP

NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

NHESP Certified Vernal Pools

Natural Heritage Atlas Online Data Viewer, 15th edition, valid August 1, 2021
created: 1/5/2023
Brigham Street Culvert, Hudson

approximate site locus

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

Scott Jordan
Senior Environmental Scientist

Scott Jordan is an Environmental Scientist with EcoTec, Inc. Since joining EcoTec in 2000, Mr. Jordan's duties have included wetland resource evaluation and delineation; erosion and sediment control planning and monitoring, environmental monitoring, including water quality analysis, sediment analysis and wildlife habitat impact analysis; environmental permitting at local, state, and federal level; pond and stream evaluation; wildlife habitat evaluation, vernal pool evaluation; and wetland restoration and replication design and oversight. He has served as an environmental consultant to the development community, engineering firms, municipalities, and conservation commissions. Prior to joining EcoTec, Mr. Jordan was the Senior Laboratory Technician for GeoComp Corporation where he performed numerous physical properties analysis of soils and geosynthetic materials in accordance with ASTM, and AASHTO specifications. His seven years experience evaluating New England soils includes soil analysis and classification of site-remediated soils with oil and hazardous material contamination. His educational background includes courses in organic and inorganic chemistry, biology, botany and comparative vertebrate physiology, with extensive coursework in ecology and wildlife biology; and he has completed several professional training seminars including erosion and sediment control, soil evaluation, wildlife habitat evaluation, wetland mitigation, vernal pool evaluation, water quality assessment using macro-invertebrates, and river morphology and functions. He has participated in several rare species and wildlife monitoring and inventory projects, including marsh bird surveys, marbled salamander (*Ambystoma opacum*) survey, great laurel (*Rhododendron maximum*) survey, wood turtle (*Glyptemys insculpta*) habitat assessments and sweeps, eastern box turtle (*Terrapene carolina*) habitat assessments, and greater black-backed gull (*Larus marinus*) inventory. His prior research experience includes behavioral and acoustic studies of the common loon (*Gavia immer*) in northwestern Maine.

Education: Bachelor of Science: Biology - Wildlife and Environmental, *Cum Laude*
Framingham State College, 2000
Biotechnology Certificate
Middlesex Community College, 1994

Professional Affiliations: Massachusetts Association of Conservation Commissioners
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists
Society of Soil Scientists of Southern New England

SECTION 00 41 01

BID FORM

ARTICLE 1 – DEFINED TERMS

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

ARTICLE 2 – BID RECIPIENT

2.01 This Bid is submitted to:

Town of Hudson, MA
Department of Public Works
1 Municipal Drive
Hudson, MA 01749
ATTN: Eric Ryder

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

ARTICLE 3 – BIDDER'S ACKNOWLEDGEMENTS

3.01 Bidder accepts all of the terms and conditions of the Bidding Documents including, without limitation:

A. those dealing with disposition of Bid security;

B. those included in the Supplementary Instructions to Bidders;

C. insurance and bonding requirements (Payment Bond and Performance Bond each equal to 100% of the total Contract Price) set forth in the General Conditions and Supplementary Conditions, if any;

D. Contract Times as set forth in the Agreement; and

E. provisions for liquidated damages as set forth in the Agreement.

3.02 This Bid will remain subject to acceptance for 90 days after the Bid opening or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3.03 Bidder acknowledges receipt of the following Addenda.

Addendum No.	Addendum Date

3.04 Bidder acknowledges the representations and certifications included in Section 00 45 05 are made a condition of the Bid.

ARTICLE 4 – BASIS OF BID

4.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s) based on unit prices included in **Section 00 43 22**. The method for determining award is as set forth in Section 00 21 13.

BID PRICES SHALL EXCLUDE SALES AND USE TAX.

TOTAL BASE BID PRICE (from Unit Prices Form Section 00 43 22)

_____

_____

_____ Dollars and _____Cents
(Use words)

$_____
(Use figures)

4.02 Contract Price Adjustments

A. *Owner's Contingency for Materials Escalation Price Adjustment per MGL c30s38A and (per Paragraph 11.02 of the General Conditions)*. Base Prices for diesel fuel, gasoline, liquid asphalt, and portland cement in cast-in-place concrete to be used for Contract Price Adjustments are established in Section 00 73 73, SC-12.01.

ALTERNATES (IF AWARDED BY OWNER)

TOTAL ALTERNATE A Park Street Doghouse Drainage Manhole
TOTAL BID PRICE (from Unit Prices Form Section 00 43 22):

_____

_____ $_____
(Use figures)

_____ Dollars and _____Cents
(Use words)

ALTERNATE B Park Street 36-inch CIPP Lining
TOTAL BID PRICE (from Unit Prices Form Section 00 43 22)

_____

_____ $_____
(Use figures)

_____ Dollars and _____Cents
(Use words)

ARTICLE 5 – TIME OF COMPLETION

5.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions and Supplementary Conditions, if any, on or before the dates or within the number of calendar days indicated in the Agreement.

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

ARTICLE 6 – ATTACHMENTS TO THIS BID

6.01 The following documents are fully completed, submitted with and made a part of and a condition of this Bid.

☐ 00 43 13 Bid Bond

OR

☐ Required Bid security in the form of _____

Supplements

☐ 00 43 22 Unit Prices Form

☐ 00 45 05 Bidder's Representations and Certifications **including required documents and submittals specified**

☐ 00 45 13 Bidder's Qualifications

☐ 00 45 19 Non-collusion Affidavit

ARTICLE 7 – COMMUNICATIONS WITH BIDDER

7.01 Communications concerning this Bid shall be addressed to:

Name _____

Title _____

Business Address _____

_____

Telephone No. _____

Facsimile No. _____

Email address _____

ARTICLE 8 – BID SUBMITTAL

SUBMITTED ON:
EIN/FEIN:

8.01 This Bid is submitted by:

A Corporation

Corporation Name: _____

State of incorporation: _____

Type: _____
(*General Business, Professional, Service, other*)

By: _____
(*Signature – attach evidence of authority to sign*)

Name (*typed or printed*): _____

Title: _____

(CORPORATE SEAL)
Attest: _____
(*Signature of Corporate Secretary*)

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

Date of qualification to do business as out-of-state corporation: _____

A Limited Liability Company (LLC)

LLC Name: _____

State in which organized: _____

By: _____
(*Signature – attach evidence of authority to sign*)

Name (*typed or printed*): _____

Title: _____

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

A Joint Venture

First Joint Venturer Name: _____

By: _____
(*Signature – attach evidence of authority to sign*)

Name (*typed or printed*): _____

Title: _____

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

Second Joint Venturer Name: _____

By: _____
(*Signature – attach evidence of authority to sign*)

Name (*typed or printed*): _____

Title: _____

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation and limited liability company that is a party to the joint venture should be in the manner indicated above.)

A Partnership

Partnership Name: _____(SEAL)

By: _____
(*Signature of general partner – attach evidence of authority to sign*)

Name (*typed or printed*): _____

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

An Individual

Name (*typed or printed*): _____

By: _____
(*Individual's signature*)

Doing business as: _____

Business Address: _____

_____

Phone & Facsimile Nos: _____

Email address: _____

END OF SECTION

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:

BID
Bid Due Date:
Description *(Project Name and Include Location)*:

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

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

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

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

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

3. This obligation shall be null and void if:

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

3.2 All Bids are rejected by Owner, or

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

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

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

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

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

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

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

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

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

SECTION 00 43 22

UNIT PRICES FORM

Provide unit pricing for each Bid item in both words and figures. Provide Bid item totals in figures only.

Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between prices written in words and prices written in figures will be resolved in favor of prices written in words.

Unit Prices have been computed in accordance with Paragraph 11.03.A of the General Conditions and Supplementary Conditions, if any. Estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for unit price items will be based on actual quantities determined and based on the unit prices included below as provided in the General Conditions and Supplementary Conditions, if any.

Bidder shall submit Bids for the Base Bid and all Alternates. A single Contract, if awarded, will be awarded at the Owner's option in accordance with Article 19 of Section 00 21 13, Instructions to Bidders.

BID PRICES SHALL EXCLUDE SALES AND USE TAX.

BASE BID

Item No.	Item Description with Unit or Lump Sum Price in Written Words	Estimated Quantity & Unit	Unit Bid Price (Figures)	Total Bid Item Price (Figures)
1	Mobilization/Demobilization @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
2	Site Preparation @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
3	Temporary Dewatering and Water Controls @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
4	Hot Mix Asphalt Top Course @ _____ _____ Dollars and _____Cents PER TON	12 TON		
5	Hot Mix Asphalt Binder Course @ _____ _____ Dollars and _____Cents PER TON	20 TON		
6A	Dense-Graded Crushed Stone for Sub-Base @ _____ _____ Dollars and _____Cents PER CUBIC YARD	231 CY		
6B	Gravel Borrow @ _____ _____ Dollars and _____Cents PER CUBIC YARD	802 CY		
7	Bituminous Concrete Curb @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	60 LF		

Item No.	Item Description with Unit or Lump Sum Price in Written Words	Estimated Quantity & Unit	Unit Bid Price (Figures)	Total Bid Item Price (Figures)
8A	Yellow 4-Inch Pavement Markings @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	60 LF		
8B	White 4-Inch Pavement Markings @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	120 LF		
9	Galvanized Steel Guardrail @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	121 LF		
10A	15-inch Class III Reinforced Concrete Pipe @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	60 LF		
10B	48-inch Class III Reinforced Concrete Pipe @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	75 LF		
11	Drainage Manhole (5-foot Diameter) @ _____ _____ Dollars and _____Cents PER EACH	1 EA		
12	Headwalls @ _____ _____ Dollars and _____Cents PER EACH	3 EA		
13	Slope Reinforcement @ _____ _____ Dollars and _____Cents PER SQUARE YARD	201 SY		

Item No.	Item Description with Unit or Lump Sum Price in Written Words	Estimated Quantity & Unit	Unit Bid Price (Figures)	Total Bid Item Price (Figures)
14	Rip-Rap @ _____ _____ Dollars and _____Cents PER CUBIC YARD	36 CY		
15	Stream Bed Materials @ _____ _____ Dollars and _____Cents PER CUBIC YARD	17 CY		
16	Bank Restoration @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	235 LF		
17A	Wetland Restoration @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
17B	Wetland Replication @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
18	Loam and Seed @ _____ _____ Dollars and _____Cents PER SQUARE YARD	146 SY		
19	Traffic Control @ _____ _____ Dollars and _____Cents LUMP SUM	1 LS		
20	Owner's Contingency Allowance (per Paragraph 11.02 of the General Conditions) for unforeseen Site conditions @ One Hundred Forty Thousand, Two Hundred Dollars and Zero Cents NOT TO EXCEED	1 NOT TO EXCEED	N/A	**$140,200**
21	Owner's Contingency Allowance (per Paragraph 11.02 of the General Conditions) for Materials Escalation Price Adjustment (statutory requirement) @ Twenty Five Thousand Dollars and Zero Cents NOT TO EXCEED	1 NOT TO EXCEED	N/A	**$25,000**

TOTAL BASE BID PRICE (based on Unit Price Schedule above)

_____

_____ Dollars

and _____ Cents

(Use words)

$_____
(Use figures)

INCLUDE TOTAL BASE BID PRICE ON BID FORM

ALTERNATES (IF AWARDED BY OWNER)

ALTERNATE BID PRICES SHALL EXCLUDE SALES AND USE TAX.

Item No.	Item Description with Unit Price in Written Words	Estimated Quantity & Unit	Unit Bid Price (Figures)	Total Alternate Bid Item Price (Figures)
A	Park Street Doghouse Drainage Manhole @ _____ _____ Dollars and _____ Cents PER EACH	1 EA		
B	Park Street 36-Inch Cured-In-Place Pipe (CIPP) @ _____ _____ Dollars and _____Cents PER LINEAR FOOT	330 LF		

INCLUDE TOTAL BID PRICE FOR EACH ALTERNATE ON BID FORM

END OF SECTION

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SECTION 00 45 05

BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

The undersigned, under the penalties of perjury, represents and certifies the following which is made a condition of the Bid.

1.01 BIDDER'S REPRESENTATIONS

A. Bidder has examined and carefully studied the Bidding Documents and other related data identified in the Bidding Documents.

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

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Section 00 73 10 of the Supplementary Conditions Paragraph 4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Section 00 73 10 of the Supplementary Conditions Paragraph 4.06 as containing reliable "technical data."

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

F. Based on the information and observations referred to in Paragraph E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of the Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

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

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

1.02 BIDDER'S CERTIFICATIONS

A. The Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid and has not solicited or induced any individual or entity to refrain from bidding.

C. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish Bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

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.

D. Bidder will comply with the requirements of the Contract Documents, and if Bidder is awarded a Contract, agrees to incorporate applicable provisions into all subcontracts and Purchase Orders so that such provisions will be binding upon each Subcontractor or Supplier, including as a minimum, Statutory Requirements, safety and health regulations; and Wage Rate Requirements.

1.03 BIDDER'S CERTIFICATIONS REQUIRED BY MASSACHUSETTS GENERAL LAW (MGL)

A. The Bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

B. Bidder certifies no official or employee of the Owner has a financial interest in this Contract or in the expected profit to arise from the Contract, unless the Bidder and Owner, employee or official both have notified public authorities in writing, that the Bidder and the employee fully complied with the provisions of MGL Chapter 43, Section 27 Interest In Public Contracts By Public Employees Prohibited; Penalty and provisions of MGL Chapter 268A, Section 20 Municipal Employees; Financial Interest In Contracts; Holding One Or More Elected Positions.

C. Bidder has submitted a certificate from the Secretary of State of the Commonwealth of Massachusetts that the corporation has complied with requirements of Section 15.03 of subdivision A of Part 15 of MGL Chapter 156D and the date of compliance, and further has filed all annual reports required by Section 16.22 of subdivision B of Part 16 of said Chapter 156D if Bidder is a foreign corporation. Bidder certifies it will provide such certificate for each Subcontractor that is a foreign corporation if it receives a Notice of Intent to Award.

D. Bidder certifies, under the penalties of perjury, to the best of its knowledge and belief, that all state tax returns have been filed and all state taxes paid pursuant to MGL Chapter 62C, Section 49A, and has submitted a Certificate of Good Standing with respect to all returns due and taxes from the Commonwealth of Massachusetts Department of Revenue certifying Bidder has complied with all laws relating to taxes, reporting of employees and contractors, and withholding and remitting of child support. Bidder certifies it will provide such certificate for each Subcontractor if it receives a Notice of Intent to Award.

E. Bidder certifies that if awarded the Contract, the following will be submitted prior to execution of the Agreement in accordance with MGL Chapter 30, Section 39R *Definitions; contract provisions; management and financial statements; enforcement.*

- To Owner - A statement by management on internal accounting control and a statement prepared by an independent certified public accountant regarding management's statement; and
- To DCAMM - An audited financial statement for the most recent completed fiscal year.

F. Bidder certifies that if awarded the Contract, any Work involving the removal, containment, or encapsulation of asbestos or material containing asbestos will only be performed by a licensed contractor in accordance with MGL Chapter 149, Section 6B and any sheet metal Work will be performed by a contractor licensed in accordance with 271 CMR 1.00, et seq. governing licensing, permitting, and sheet metal work in Massachusetts.

G. Bidder is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work and further certifies that all employees to be employed at the Work Site 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 if Bidder is awarded a Contract, shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

H. Bidder is not presently debarred from bidding on or entering into a public contract in the Commonwealth of Massachusetts under the provisions of MGL Chapter 29, Section 29F, or any other applicable debarment provisions of any other chapter of the MGL or any rule or regulations promulgated thereunder; and is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

I. Bidder understands the Bid is subject to MGL Chapter 66 et seq, *Public Records*, and as such, related submittals, purchase orders, related pricing documents, and invoices will be public documents, and may be available for public and private distribution, except as specifically excluded. The Bidder agrees to provide the Owner copies of any documents requested under this law at no charge to the Owner or the requestor.

SUBMITTED ON:
By:
Authorized person per Bid Form

END OF SECTION

SECTION 00 45 13

BIDDER'S QUALIFICATIONS

The following data, statements of experience, personnel, equipment and general qualifications are submitted as a part of the Bid and the Bidder represents and guarantees the truthfulness and accuracy thereof and **its ability to meet the qualifications requirements specified in Section 01 43 05 and the Specifications**. Attach additional sheets as necessary properly cross referenced.

1.01 GENERAL

A. Bidder's organization is a _____ (entity type) and has been in business continuously from the year _____.

Bidder has operated under the same business name and organization structure for the last 5 years on at least 5 projects ☐ yes ☐ no

If no, indicate other business names: _____

B. Bidder's organization has had experience in construction comparable to that required by the Contract Documents as a prime contractor for _____ years and as a subcontractor for _____ years.

1.02 BIDDER EXPERIENCE

A. Identify at least 10 projects in the same region as the Project completed within the last 10 years **which are similar in type, character, physical size, and complexity to that required by the Contract Documents**.

Client/Owner Name/Address	Project Name/Location	CURRENT Contact Name, Phone, Email	Contract Value	Time Period

1.03 BIDDER AND SUBCONTRACTOR EXPERIENCE

A. Identify at least 5 projects that included crossing culvert replacements across public roadways within the last 10 years.

Client/Owner Name/Address	Project Name/Location	CURRENT Contact Name, Phone, Email	Contract Value	Time Period

B. Identify at least 5 projects that included pavement and street repair within public streets within the last 10 years.

Client/Owner Name/Address	Project Name/Location	CURRENT Contact Name, Phone, Email	Contract Value	Time Period

1.04 CURRENT LICENSES

A. Indicate Bidder and Subcontractor(s) current licenses including design professionals and surveyors.

Name	State	Type	License number

1.05 PERSONNEL

A. Identify supervisory personnel that are currently employed by the Bidder and available for assignment to the Project (project manager, superintendents, principal foremen and engineers).

1. Identify full-time on-Site superintendent in responsible charge of the Work with at least 10 years' experience as superintendent on comparable projects.

2. Identify project manager assigned full-time with at least 10 years' experience as project manager on comparable projects.

Name	Title	Years of Experience
	Full time, on-Site Superintendent	
	Full time Project Manager assigned	

B. Attach detailed resumes of qualifications, previous employers and experience for each supervisory staff listed above.

1.06 PROPOSED DESIGN PROFESSIONALS AND SURVEYORS

A. The following design professionals and surveyors are to be employed or retained by the Bidder and available for assignment to the Project.

Name	Address	Area of Responsibility	Years of Experience

B. Attach detailed resumes of qualifications, previous employers and experience for each design professional and surveyor listed above.

1.07 EMERGENCY RESPONSE CAPABILITIES

A. Describe Bidder's 24 hour/7 days per week emergency response and communication capabilities. Attach additional documentation as necessary.

1.08 EQUIPMENT

A. Identify equipment available for use on the Project. Indicate whether owned by Bidder's organization or rented. Attach additional sheets as necessary.

Type of Equipment	Size or Capacity	Owned or Rented

1.09 BUSINESS INTERESTS

A. Identify the names and addresses of the members of the Board of Directors of corporation, or the names and addresses of all persons and parties interested in this Bid as partners of a partnership or as individuals. Attach additional sheets as necessary.

Name	Address	Telephone No.

B. Identify the bank or banks representing the financial responsibility of the Bidder.

Name of Bank	Address	Contact Name and Telephone No.

1.10 VIOLATIONS

A. Following is a list of violations Bidder and its main Subcontractors have received or been the subject of, or otherwise been involved in, regarding any state or local ethic laws, regulation, code, ordinance, policy, or standard, or offenses arising out of submission of bids or the performance of work on public works projects or contracts over the last 5 years. Attach additional sheets as necessary.

Name and Location of the Project	
Nature of the Violation/Offense	
Duration and dates during which the violation/offense took place	
Name and Location of the Project	
Nature of the Violation/Offense	
Duration and dates during which the violation/offense took place	
Name and Location of the Project	
Nature of the Violation/Offense	
Duration and dates during which the violation/offense took place	

1.11 LABOR DISPUTES

A. Identify labor disputes the Bidder has been the subject of, or otherwise been involved in, during the last 5 years. For these purposes, "labor disputes" shall include picketing or any other activity which disrupted or delayed the work. Attach additional sheets as necessary.

Name and Location of the Project	
Nature of the Dispute	
Duration and dates during which the dispute took place	
How the dispute was resolved	
Name and Location of the Project	
Nature of the Dispute	
Duration and dates during which the dispute took place	
How the dispute was resolved	

END OF SECTION

SECTION 00 45 19

NON-COLLUSION AFFIDAVIT

_____, being duly sworn, depose and, under the penalty of perjury, say that the following is true:

1. I am the person responsible within my firm for the final decision as to the price(s) and amount of this Bid or, if not, that I have written authorization, enclosed herewith, from that person to make the statements set out below on his or her behalf and on the behalf of my firm.

2. The price(s) and amount of this Bid have been arrived at independently, without collusion, consultation, communication, or agreement for the purpose of restricting competition with any other contractor, competitor, Bidder, or potential Bidder.

3. Unless otherwise required by law, neither the price(s) nor the amount of this Bid have been disclosed to any other firm or person who is a Bidder, competitor, or potential Bidder on the Project, and will not be so disclosed either directly or indirectly prior to Bid opening.

4. No attempt has been made or will be made to solicit, cause, or induce any firm, partnership, corporation, or person to submit or not submit a Bid on this Project, or to submit a Bid higher than the Bid of this firm, or submit an intentionally high or noncompetitive Bid or other form of complementary Bid, or for the purpose of restricting competition.

5. The Bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary Bid.

6. My firm has not offered or entered into a subcontracting agreement regarding the purchase of materials or services from any firm or person, or offered, promised, or paid cash or anything of value to any firm or person, whether in connection with this or any other Project, in consideration for an agreement or promise by any firm or person to refrain from proposing or to submit a complementary Bid on the Project.

7. My firm has not accepted nor been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for my firm's submitting a complementary Bid or agreeing to do so, on the Project.

8. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval, or submission of my firm's Bid on the Project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, act, or other conduct inconsistent with any of the statements and representations made in this affidavit.

_____
Company Name

_____
Signature

_____
Company Position

Date: _____

Attest: _____

Date: _____

END OF SECTION

SAMPLE NOTICE OF INTENT TO AWARD (C-00 50 55)

TO BE COMPLETED & ISSUED AFTER BID REVIEW ON OWNER LETTERHEAD

Date

[Bidder Contact
Bidder Company
Bidder Address]

SUBJECT: NOTICE OF INTENT TO AWARD
[PROJECT TITLE/OWNER]

You are notified that your Bid dated _____ for the above Contract has been considered.

You are the apparent Successful Bidder and the Owner intends that the above Contract be awarded to you. The Total Contract Price of the awarded Contract will be $_____ [Lump Sum OR based on Unit Prices], subject to the following conditions being met and subject to required reviews and approvals [OPTIONAL and specifically, funding agency approval by [_____.]

You must comply with the following conditions precedent **within 15 days** of the date of receipt of this Notice of Intent to Award:

1. Deliver the Contract security (Bonds) and insurance documentation as specified in the General Conditions and Supplementary Conditions (Articles 2 and 5).

2. Deliver the following completed and executed certifications and documents:

    a.

    b.

    c. Items to be provided by Subcontractors:

    -

3. Other conditions precedent:

    - *LIST OTHERS IF ANY*

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Intent to Award, and declare your Bid security forfeited.

After confirming that you have complied with the above conditions and required approvals are obtained, Owner will deliver a Notice of Award and the conformed Contract Documents with the Agreement for execution.

INSERT OWNER NAME (Owner)

By:_____
[Name and Title]

Copy to Engineer

SAMPLE NOTICE OF AWARD (C-00 51 00)

TO BE COMPLETED & ISSUED WITH CONFORMED AGREEMENT & CONTRACT ON OWNER LETTERHEAD

Date

[Bidder Contact
Bidder Company
Bidder Address]

SUBJECT: NOTICE OF AWARD
[PROJECT TITLE/OWNER]

You are notified that your Bid dated [insert date] for the above Contract has been considered, and that you are the Successful Bidder and are awarded a Contract for [insert description].

The Total Contract Price of the awarded Contract is $_____ [Lump Sum OR based on Unit Prices].

_____ unexecuted counterparts of the Agreement and 1 copy of the Contract Documents [(except for Drawings)] accompanies this Notice of Award. [OR have been transmitted or made available electronically.] [Sets Drawings will be delivered separately from the other Contract Documents.]

You must comply with the following conditions precedent.

- Return all executed counterparts of the Agreement to Owner **within 10 days** of receipt of this Notice of Award.
- [Add others as necessary]

After obtaining required reviews and approvals for Contract execution, Owner shall deliver one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions and Supplementary Conditions, if any.

INSERT OWNER NAME (Owner)

By:_____
[Name and title]

Copy to Engineer

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SECTION 00 52 10

AGREEMENT FORM

THIS AGREEMENT is by and between **Town of Hudson, MA** ("Owner") and _____ ("Contractor"). Owner and Contractor hereby agree as follows.

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as installation of concrete culvert and headwalls at Brigham Street, open channel restoration between Brigham and Park Streets, installation of Park Street headwall, and alternate CIPP relining of Park Street Culvert; and all materials and equipment, construction, and services inherent to the Work.

1.02 The Work includes the principal features specified in Section 01 11 00 – Summary of Work.

ARTICLE 2 – THE PROJECT

2.01 The Project under the Contract Documents is generally known as **"Brigham Street Culvert Replacement and Park Street Culvert Maintenance"**.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Woodard & Curran, Inc. (Engineer), which is to act as Owner's representative, assume all duties and responsibilities and have the 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 4 – CONTRACT TIMES

4.01 *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.

4.02 *Substantial Completion and Final Payment*

A. The Work shall be substantially complete within 155 calendar days from the commencement of Contract Times as provided in Paragraph 2.03 of the Standard General and Supplementary Conditions and completed and ready for final payment, in accordance with Paragraph 14.07 of the Standard General Conditions, 176 calendar days from the commencement of Contract Times.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the Standard General Conditions and Supplementary Conditions, if any. 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 **$1,000** for each day that expires after the time specified in Paragraph 4.02 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 **$1,000** for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraph 5.01.A below based on unit pricing stated in Contractor's Bid attached hereto:

TOTAL PRICE [INCLUDING ALTERNATE #]
[IN WORDS] Dollars and [IN WORDS] Cents

$[DOLLAR AMOUNT]

A. Unit Prices have been computed in accordance with Paragraph 11.03.A of the Standard General Conditions and Supplementary Conditions, if any.

B. The prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 11.03 of the Standard General Conditions and Supplementary Conditions, if any, estimated quantities are not guaranteed (except for those that may be estimated by the Contractor), and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the Standard General Conditions and Supplementary Conditions, if any. Final payment for unit price items will be based on actual quantities determined and based on the unit prices in the Unit Prices Form.

C. When the accepted quantity of any item of Unit Price Work performed by the Contractor (as measured in accordance with 9.07 of the General and Supplementary Conditions, if any) differs from the estimated quantity indicated in the attachment(s) to this Agreement for an item of Unit Price Work, no adjustment or allowance will be made for any increased expenses, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor

resulting either directly or indirectly from such increased or decreased quantities, or from unbalanced allocation of overhead expense among the Unit Price Work items on the part of the Contractor, or subsequent loss of expected reimbursements therefor.

5.02 *Adjustments to the Contract Price*

A. Adjustments to the Contract Price for Owner's Contingency Allowances will be made in accordance with the General Conditions, Paragraph 11.02.C and Supplementary Conditions, if any.

1. Adjustments to the Contract Price will be made for materials based on the Base Prices and index established for adjustments in accordance with price adjustment clauses included in Section 00 73 73, SC-12.01. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due to Contractor on account of Work covered by this Owner's contingency and the Contract Price shall be correspondingly adjusted. Contractor shall not receive payment for any unused portion of this Owner's contingency.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the Standard General Conditions and Supplementary Conditions, if any. Applications for Payment will be processed by Engineer as provided in the Standard General Conditions and Supplementary Conditions, if any, and the General Requirements.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the Standard General Conditions and Supplementary Conditions, if any, (and in the case of Unit Price Work based on the number of units completed).

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the Standard General Conditions and Supplementary Conditions, if any, and additional retainage allowed by Laws and Regulations.

a. Progress Payments of 95 percent for Work completed (with the balance of 5 percent being retainage) and;

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance of 5 percent being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 99 percent of the Work completed (with the balance of 1 percent being retainage), less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and Supplementary Conditions, if any, and less the Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected (Punch List) attached to the certificate of Substantial Completion and subject to Paragraph 14.04 of the General Conditions and Supplementary Conditions, if any.

   However, retainage for items planted in the ground shall remain at 5 percent of the cost of such items until Final Payment per Massachusetts General Laws Chapter 30, Section 39G.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General and Supplementary Conditions, if any, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General and Supplementary Conditions, if any, shall bear interest at the rate 3 percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston per Massachusetts General Laws Chapter 30, Section 39G. Interest shall not be accrued on retainage.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS AND CERTIFICATIONS

8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding 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 of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) 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; the Contract Documents; 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 referred to in Paragraph 8.01.E above, Contractor does not consider that 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.

8.02 The Contractor certifies, under the penalties of perjury, that:

A. Contractor has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

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

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

B. Contractor certifies no official or employee of the Owner has a financial interest in this Contract or in the expected profit to arise from the Contract, unless the Contractor and Owner, employee or official both have notified public authorities in writing, that the Contractor and the employee fully complied with the provisions of MGL Chapter 43, Section 27 *Interest In Public Contracts By Public Employees Prohibited; Penalty* and provisions of MGL Chapter 268A, Section 20 *Municipal Employees; Financial Interest In Contracts; Holding One Or More Elected Positions*.

C. Contractor has complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting of child support and, has provided for itself and each Subcontractor, a Certificate of Good Standing from the Department of Revenue with respect to all returns due and taxes and further, certifies that, to the best of its knowledge and belief, all state tax returns have been filed and all state taxes have been paid as required by Law pursuant to Massachusetts General Laws Chapter 62C, Section 49A.

D. If a foreign corporation, Contractor has provided for itself and each Subcontractor that is a foreign corporation, a certificate of the state secretary stating that the corporation has complied with requirements of Massachusetts General Laws Chapter 156D, Part 15, Section 15.03 of subdivision A and the date of compliance, and further has filed all annual reports required by Section 16.22 of subdivision B of Part 16 of said Chapter 156D, pursuant to Massachusetts General Laws Chapter 30, Section 39L.

E. Contractor is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work and further certifies that all employees to be employed at the Work Site 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 shall furnish documentation of successful completion of said course with the first certified payroll report for each employee, all as required by Massachusetts General Laws Chapter 30, Section 39S.

F. Contractor is not presently debarred from entering into a public contract Commonwealth of Massachusetts under the provisions of Massachusetts General Laws Chapter 29, Section 29F, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulations promulgated thereunder; and is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

G. Pursuant to Massachusetts General Laws Chapter 30, Section 39R, Contractor has provided a statement by management on internal accounting controls, a statement prepared by an independent certified public accountant regarding management's statement, and an audited financial statement to DCAMM for the most recent completed fiscal year.

H. Contractor shall not participate in or cooperate with an international boycott, as defined in Section 999 (b)(3) and (4) of the Internal Revenue code 1986, as amended, or engage in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws.

8.03 The representations and certifications Contractor submitted with its Bid shall remain valid during the period of this Agreement.

8.04 Contractor agrees to incorporate the applicable provisions of the Contract Documents into all subcontracts and Purchase Orders so that such provisions will be binding upon each Subcontractor or Supplier.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement and attachments

COMPLETE LISTING AFTER AWARD

- Bid Form (submitted by XXXX and dated XXX)
- Bid Supplements and attachments
- Performance Bond
- Payment Bond
- Insurance certificates
- *List others*

2. Forms listed in 00 60 00

3. Standard General Conditions in Section 00 72 05

4. Supplementary Conditions as listed in Section 00 01 10, Table of Contents

5. General Requirements and Specifications as listed in Section 00 01 10, Table of Contents

6. Drawings as listed in Section 00 01 15, List of Drawing Sheets

7. 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. Work Change Directives

   c. Change Orders

B. The documents listed in Paragraph 9.01.A are attached to this Agreement and made a part hereof.

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the Standard General Conditions and Supplementary Conditions, if any.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the Standard General Conditions and Supplementary Conditions, if any.

10.02 *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.

10.03 *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.

10.04 *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.

10.05 *Contract is Public Record*

A. The Contract is subject to MGL Chapter 66 et seq, *Public Records*, and as such, related submittals, purchase orders, related pricing documents, and invoices will be public documents, and may be available for public and private distribution, except as specifically excluded. The Contractor agrees to provide the Owner copies of any documents requested under this law at no charge to the Owner or the requestor.

SIGNATURES APPEAR ON THE FOLLOWING PAGE

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 have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:
TOWN OF HUDSON, MA

By:_____

_____
Printed Name

_____
Title

By: _____

_____
Printed Name

_____
Title

Attest:_____

_____
Title

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 or other documents authorizing execution of this Agreement.)

CONTRACTOR:

By: _____

_____
Printed Name

_____
Title

License No._____

Attest:_____

_____
Title

Address for giving notices:

Agent for service of process:

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

END OF SECTION

Approved as to Form by Owner's Counsel:

By:_____

Printed Name _____

Date _____

Pursuant to MGL c.44, s31C, I certify that an appropriation has been made in the total amount of the Agreement.

By: _____

_____
Printed Name (Owner's Auditor/Accountant)

_____
Dept. or Business Name

Date: _____

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND (Form C-006113.13)

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)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

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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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PAYMENT BOND (Form C-006113.16)

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

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
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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SAMPLE NOTICE TO PROCEED (C-00 55 00)

TO BE COMPLETED ON OWNER LETTERHEAD

Date

[Bidder Contact
Bidder Company
Bidder Address]

SUBJECT: NOTICE TO PROCEED
[PROJECT TITLE/OWNER]

You are notified that the Contract Times under the above Contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents.

[OR for the following portion(s) of the Work:
[Describe the limits of the Work covered if option above chosen]

A Notice to Proceed for the remaining Work will follow.]

In accordance with Article 4 of the Agreement, the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____
OR [*the date of Substantial Completion is _____, and the date of readiness for final payment is _____]

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions and Supplementary Conditions if any, provide that you must have delivered to Owner (with copies to Engineer and other identified additional insureds and loss payees) certificates of insurance which you are required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

- Comply with Articles 2.05 and 2.06 of the General and Supplementary Conditions (if any)
- *[*add other requirements*]*

INSERT OWNER NAME (Owner)

By:_____
[Name and title]

Copy to Engineer

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SECTION 00 60 00

PROJECT FORMS

The following forms are included in this Section and shall be used for the Project as specified in the General Conditions and Supplementary Conditions if any, and the General Requirements. Completed and execution versions of these forms used during the Project shall be incorporated into the Agreement and made a part thereof.

Submittal Transmittal (Form C-00 62 11)
Application for Payment (Form C-00 62 76)
Request for Interpretation/Information (Form C-00 63 15)
Field Order (Form C-00 63 36)
Work Change Directive (Form C-00 63 49)
Change Request (Form C-00 63 60)
Change Order (Form C-00 63 63 MA)
Notice of Substantial Completion (Form C-00 65 15)
Certificate of Substantial Completion (Form C-00 65 16)
Notice of Completion (Form C-00 65 18)

END OF SECTION

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SUBMITTAL TRANSMITTAL (Form C-00 62 11)

Owner:		Transmittal No.:	
Project:		Date:	
Contract No.:			
Contract Title:			
Specification Section No.:			

Assign a consecutive, unique number to each submittal and use same on resubmittals. For "Revision", A =original submittal; B = 1st resubmittal; C (and beyond) = additional resubmittals

Submittal (Item) No.	Revision (A B C etc.)	Date	Title/Description	Vendor/Manufacturer	Copies

☐ The material and equipment, and requirements for construction/installation contained in Submittal No.(s) _____ have been reviewed and we certify that they are correct and in strict conformance with the requirements specified (no exceptions or deviations)

☐ The material and equipment and requirements for construction/installation contained in Submittal No.(s) _____ have been reviewed and we certify that they are correct and in strict conformance with the requirements specified except for the following deviations (list below or attach listing):

_____

_____

CONTRACTOR'S NAME_____

ADDRESS_____

BY: _____ DATE: _____

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

FORM C-00 62 76

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	**$**
2. Net change by Change Orders	**$**
3. Current Contract Price (Line 1 ± 2)	**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	**$**
5. RETAINAGE:	
a. X _____ Work Completed	**$**
b. X _____ Stored Material	**$**
c. Total Retainage (Line 5a + Line 5b)	**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**
8. AMOUNT DUE THIS APPLICATION	**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	**$**

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Approved by: _____ _____

Progress Estimate - Lump Sum Work FORM C-00 62 76

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period				
	Totals							

Progress Estimate - Unit Price Work

FORM C-00 62 76

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

A				B	B(2)	C	D	E	F		
Item		Bid Item Quantity	Unit Price	Bid Item Value ($)	Estimated Quantity Installed This Month	Estimated Quantity Installed To Date (Include This Month)	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
Bid Item No.	Description										
	moblize										
	Totals										

Stored Material Summary FORM C-00 62 76

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

REQUEST FOR INTERPRETATION/INFORMATION (Form C-00 63 15)

RFI #: _____ ☐ **Attachment**

To: _____ From: _____

Attn: _____ Issue Date: _____

Project: _____ Required Reply Date: _____

DISTRIBUTION:

Contractor	Owner	Engineer
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____

REFERENCES:

- Specifications: _____ Section: _____ Page/Paragraph: _____
- Drawings: _____ Issue Date: _____ Detail/Sections: _____
- Work Area: _____ Grid/Level: _____

RFI DESCRIPTION:

From: _____ Tel No: _____ Fax: No: _____

Initial: _____ E-mail: _____

RFI REPLY: (response may be transmitted in separate document)

Possible Cost Effect Yes: ☐ No: ☐ **Possible Schedule Effect** Yes: ☐ No: ☐

From: _____ Reply Date: _____ xc: _____

Initial: _____ _____

Based on: CASE Form B-1999

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Field Order (C-00 63 36)

No. _____

Date of Issuance: _____ Effective Date: _____

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

Attention:
You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____ _____
(Specification Section(s)) (Drawing(s) / Detail(s))

Description: _____

Attachments: _____

	Engineer:
Receipt Acknowledged by Contractor:	Date:

Copy to Owner

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Work Change Directive (Form C-00 63 49)

No. _____

Date of Issuance: _____ Effective Date: _____

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

Contractor is directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

_____

_____

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

☐ Nonagreement on pricing of proposed change.

☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price $_____ (increase/decrease) Contract Time _____ (increase/decrease)
days

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

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CHANGE REQUEST (FORM C-00 63 60)
(Design Changes/Deviations/Substitutions)

CR NO.
DATE

Project:

Request Initiated by:
- ☐ Contractor
- ☐ Owner
- ☐ Engineer

Impact to Contract Price expected ☐
Impact to Contract Time expected ☐
Change Orders will be processed separately

Request submitted as (format):

Description of Change (☐ documentation attached)

Reason for Change

Response: ☐ This constitutes a Written Amendment to the Agreement.

Review of the proposed change/deviation/substitution by Engineer is for general compatibility with the design concept of the Project. This review does not extend to means, methods, sequences, or procedures of construction or to issues of safety incident thereto. This review shall not relieve the Contractor from responsibility for full compliance with the requirements specified in the Contract Documents and to determine and verify the information contained therein.

Recommended By Engineer for Acceptance (subject to above comments if any) ☐ recommended for processing and approval under a separate Change Order NAME: *Signature* *Date*	☐ Approved by Owner (no schedule or cost impact) ☐ Acknowledged by Owner – to be processed and approved under a separate Change Order NAME: *Signature* *Date*
Approved by Contractor ☐ Change Order to be requested NAME: *Signature* *Date*	

This page intentionally left blank

Change Order No. _____

(Form C-00 63 63) MA

Date of Issuance: _____ Effective Date: _____

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

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

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: $_____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable):	Approved by Funding Agency (if applicable):	Approved by Funding Agency (if applicable):
_____	_____	_____
Date: _____	Date: _____	Date: _____

Pursuant to MGL c.44, s31C, I certify that appropriated funds are available for the total amount of this Change Order.

_____ Date: _____

Owner's Auditor/Accountant (Name)

Pursuant to MGL c.30, s39I, reasons for deviation are as stated above or attached. The specified deviation(s) does not materially injure the Project as a whole, the Work is of the same cost and quality or an equitable adjustment has been agreed upon, and the deviation is in the best interest of the Owner.

_____ Date: _____

Owner

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

This page intentionally left blank

Notice of Substantial Completion (C-00 65 15)

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		

This NOTICE of Substantial Completion applies to:

☐ The following Systems, Equipment or specified portions : ☐ : All Work under the Contract Documents

:

Date of Substantial Completion for above

The following documents are attached to and made part of this Notice.

Submitted by Contractor

Date

This page intentionally left blank

Certificate of Substantial Completion (Form C-00 65 16)

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

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

Notice of Completion (Form C-00 65 18)

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		

This NOTICE of Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions:

Date of final Completion

The Work to which this Notice applies is ready for inspection by authorized representatives of Engineer and Owner. Contractor has completed all corrections, delivered all required documentation, and the Project, or portion designated above, is complete. The Date of Completion of the Project or portion thereof designated above is hereby declared by the Contractor.
.

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

Final Punchlist

Final Application for Payment

Only the **making and acceptance of final payment** will constitute:

1. A waiver of all claims by Owner against Contractor, except claims arising from any unsettled liens, from Defective Construction appearing after final inspection; from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
2. A waiver of all claims by Contractor against Owner other than those previously timely made in writing and still unsettled.

Submitted by Contractor

Date

This page intentionally left blank

See various sections of the Supplementary Conditions for additional modifications and supplements

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

SECTION 00 72 05
STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

The Associated General Contractors of America
Skill · Responsibility · Integrity

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

_____

AMERICAN SOCIETY OF CIVIL ENGINEERS

_____

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

REVISIONS HIGHLIGHTED WITHIN THE TEXT OF THIS SECTION HAVE BEEN PREPARED BY WOODARD & CURRAN

See various sections of the Supplementary Conditions for additional modifications and supplements

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

See various sections of the Supplementary Conditions for additional modifications and supplements

SECTION 00 72 05
STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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See various sections of the Supplementary Conditions for additional modifications and supplements

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. 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 which is evidence of the agreement between Owner and Contractor covering the Work.

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. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed. May also be referred to as "Proposal" which may be used interchangeably and shall have the same meaning.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Supplementary Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer 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, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

See various sections of the Supplementary Conditions for additional modifications and supplements

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor and complement the Specifications. Shop Drawings and other Contractor submittals are not Drawings as so defined. May also be referred to as "Plans", which may be used interchangeably and shall have the same meaning. Notes on Drawings are directed to Contractor unless specifically noted otherwise.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

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

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

21. *General Requirements*—Sections of Division 01 of the Specifications which govern the Work in all sections of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

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

See various sections of the Supplementary Conditions for additional modifications and supplements

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given 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 under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *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. May also be referred to as "Construction Schedule", which may be used interchangeably and shall have the same meaning.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

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

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *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.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *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 for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto. The Specifications are based on the guidelines of the Construction Specifications Institute (CSI) Project Resource Manual, and are directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases in the Specifications.

43. *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 at the Site.

44. *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.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *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 Subcontractor.

See various sections of the Supplementary Conditions for additional modifications and supplements

48. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

50. *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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

B. Additional Terms

1. *Final Completion*—The time at which all Work is completed and ready for final payment in accordance with Paragraph 14.07 of these General Conditions.

2. *Industry Practice*—The written practices, methods, materials, supplies and equipment, as changed from time to time, that are commonly used in the industry applicable to the Project to design, construct and operate facilities and plants, or any practices, methods and acts, which in the exercise of reasonable judgment in light of the facts known at the time, could have been expected to accomplish the desired results consistent with good business practices, reliability, safety and expedition.

3. *Installer*—The entity engaged by Contractor or a Subcontractor for installation, erection, application and similar required operations of a particular portion of the Work at the Site, including who has specialty experience in the Work they are engaged to perform.

4. *Punch List*—A list of open items representing portions of the Work which Contractor, Engineer, Owner reasonably agree is not complete on the date of Substantial Completion but which items will not significantly interfere with the safe, reliable operation and integrity of the Project or its intended use.

~~52.~~5. *Purchase Order*—A written agreement between Contractor and a Supplier for provision of material and equipment.

6. *Warranty Period*—The correction period after the date of Substantial Completion per Paragraph 13.07 of these General Conditions.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F 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 Paragraph 9.09 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. See also Paragraph 17.02 of these General Conditions.

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 14.04 or 14.05).

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. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

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. ~~When Contractor delivers the executed counterparts~~Prior to execution of the Agreement ~~to Owner~~, Contractor shall ~~also~~ deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Prior to execution of the Agreement and b~~B~~efore any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ~~ten~~ 2 printed or hard copies of the Contract Documents and Drawings ~~and Project Manual~~. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *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 Agreement 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 Agreement. In no event will the Contract Times commence to run later than the ~~sixtieth~~ 90th day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, unless mutually agreed otherwise.~~, whichever date is earlier.~~

2.04 *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 the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), 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 Documents and the lead times for equipment and materials per the listing in subparagraph 2.05.A.4;

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 which will be confirmed in writing by Contractor at the time of submission. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work; and.

4. a complete listing of equipment and materials with lead times between placing orders and delivery, including normal allowances of time for processing and correcting Shop Drawings.

B. *Evidence of Insurance*: In accordance with Paragraph 2.01.

2.06 *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 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, 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 instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *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 2.05.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 component parts of the Work.

4. Contractor's listing of equipment and materials with lead times must be reflected in the Progress Schedule. All orders for long lead items shall be placed within 30 days after Effective Date of the Agreement if delivery is critical to scheduling. Failure to place orders in accordance with the Progress Schedule may result in full liability for liquidated damages if Milestones and Contract Times are not met.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all and comprise the entire agreement between Owner and Contractor concerning the Work. If any term or provision of any of the Contract Documents, or the application thereof to any party or circumstance shall, to any extent, be determined to be invalid or unenforceable, the remaining provisions of the Contract Documents, or the application of such term or provision to parties or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of each of the Contract Documents shall be valid and shall be enforced to the fullest extent permitted by Laws and Regulations.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

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

1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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, 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 Contract Documents. 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 Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies:

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, 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) any standard, specification, manual, or code, or (c) 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 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall ~~not~~ be liable to Owner or Engineer for failure to report any such conflict, error, ambiguity, or discrepancy in the Contract Documents ~~unless~~ if Contractor ~~had actual knowledge~~knew or reasonably should have known of such conflict, error, ambiguity, or discrepancy ~~thereof~~.

B. Resolving Discrepancies:

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

a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier 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

2. 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.

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.

3.06 *Electronic Data*

A. ~~Unless otherwise stated in the Supplementary Conditions, t~~The data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies), files transmitted in in portable document format (PDF), and other electronic media formats of text, data, graphics or other file types supported by any digital document exchange system implemented for the Project, all of which are understood by all parties to constitute official Project correspondence and submittals . ~~Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk.~~ If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *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. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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 the Work is to be performed 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.

4.02 *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 contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed 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 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. (Not Used)~~*Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.~~

C. Possible Price and Times Adjustments:

1. The Contract Price or the Contract Times, or both, ~~will~~ may be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in Paragraph 4.03.A; and

   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 Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final 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

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

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A,or

   ~~c.~~d. written notice is submitted after final payment.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner 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 shall not be responsible for 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 such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents;

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

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated:

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated ~~or not shown or indicated with reasonable accuracy~~ in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

3. Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, shall not be liable to Contractor for any Claims for losses or damages incurred by Contractor related to Underground Facilities not shown or indicated (including but not limited to all fees and changes of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs).

4.05 *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.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work unless Contractor caused or contributed to such Hazardous Environmental Condition. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) 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 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in Paragraph 10.05.

F. 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. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. 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: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. 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 a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, 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 Documents. 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 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds 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 each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within ~~20~~ 5 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured such as a letter from Contractor's insurance company(s) and agents confirming types and limits of coverage) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

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

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed, complies with the requirements of Article 5, and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed 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:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. 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; ~~and~~

6. 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~~.~~;

7. claims arising out of violation of Laws or Regulations; and

8. claims for damages because of negligent acts, errors and omissions arising out of performing or providing professional services.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.~~6~~8 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be ~~listed~~ included as additional insureds, and 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided herein and in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until ~~at least 30 days~~ prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide) and will contain waiver provisions in accordance with Paragraph 5.07;

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

a. Such insurance shall remain in effect for two years after final payment.

b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

7. In the event general liability insurance is provided on a claims-made policy, the retroactive date of such policy shall not be later than the date of the Notice to Proceed or the Effective Date of the Agreement, whichever is earlier. For construction periods extending beyond the expiration date of an initial claims-made policy, the retroactive date of all subsequent claims-made policies shall not be later than the date of the Notice to Proceed.

C. The limits of liability for the insurance required by Paragraph 5.04 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 coverage:

Minimum limit of liability	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Employer's Liability	$1,000,000

2. Contractor's General Liability:

$1,000,000 per occurrence; $2,000,000 general aggregate; including:

- Broad Form Property Damage Liability including coverage for acts of terrorism
- Completed Operations and Product Liability
- Contractual Liability
- Independent Contractors
- Explosion, Collapse & Underground Hazards
- Personal Injury Coverage, Exclusion Deleted
- Damage to Rented Premises
- Medical Expenses

Pollution Liability (covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from the Contractor's operations and completed operations maintained for no less than three years after final completion): $1,000,000

Excess or Umbrella Liability: $5,000,000 per occurrence; $5,000,000 general aggregate

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

Combined Single Limit of $1,000,000 for bodily injury & property damage covering Contractor and any vehicles owned, hired and non-owned by the Contractor

See various sections of the Supplementary Conditions for additional modifications and supplements

4. Professional Liability (E&O for engineers, architects or surveyors): $1,000,000 for each claim with an annual aggregate of at least $2,000,000 if professional services are required under the Specifications

5. Owners Protective Liability: as may be specified in the Supplementary Conditions

D. Any self-insured retention (not allowed for Worker's Compensation) and/or deductibles must be identified and cannot exceed $100,000 per occurrence without the prior approval of the Owner. Contractor must provide either an audited financial statement to confirm solvency or a letter of credit guaranteeing the $100,000 in case of loss for the duration of the Project and for the Correction Period.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, 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 (ongoing and completed) under the Contract Documents.

5.06 *Property Insurance*

A. ~~Unless otherwise provided in the Supplementary Conditions,~~ Owner may, in its discretion, purchase and maintain property insurance upon the Work at the Site. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. Contractor shall be responsible for any ~~(subject to such~~ deductible amounts or self-insured retention as may be provided in the Supplementary Conditions or required by Laws and Regulations~~)~~. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" or Special Forms 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~~ special form perils or causes of loss, including but not limited to: fire, lightning, flood, pollution, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, 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.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued; and

~~7.~~8. comply with the requirements of Paragraph 5.06.C of the General Conditions.

B. (Not used)~~Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.~~

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until ~~at least 30 days~~ prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work. ~~to the extent of any deductible amounts that are identified in the Supplementary Conditions.~~ The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss. ~~, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.~~

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or

causes of loss covered thereby. All such policies 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 of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their 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 Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (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 as trustee 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 utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.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, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds* *(Not used)*

~~A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order~~.

~~B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with~~

~~the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.~~

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If ~~either~~ Owner ~~or Contractor~~ has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the ~~other party~~ Contractor in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the ~~objecting party~~Owner shall so notify the ~~other party~~Contractor in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. ~~Owner and~~ Contractor shall ~~each~~ provide to the ~~other~~ Owner, such additional information in respect of insurance provided as ~~the other~~ may be reasonably requested. If ~~either party~~Contractor does not purchase or maintain all of the bonds and insurance required ~~of such party~~ by the Contract Documents, ~~such party~~Contractor shall notify the ~~other party~~Owner 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. Without prejudice to any other right or remedy, the ~~other party~~Owner may elect to obtain equivalent bonds or insurance to protect ~~such other party's~~Owner's interests at the expense of the ~~party~~ Contractor~~who was required to provide such coverage~~, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *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. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

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.

6.02 *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. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *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, startup, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, 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.

D. Provision of any instructions:

1. will not be effective to assign to Owner, or any of Owner's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 8.09; and

2. will not be effective to assign to Engineer, or any of Engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 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 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "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, make or catalogue number, or the name of a particular Supplier, the specification or description 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 or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion 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, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, 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; and

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

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.

2. Substitute Items:

   a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

   b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

   c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

   d. 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:

      1) shall certify that the proposed substitute item will:

         a) perform adequately the functions and achieve the results called for by the general design,

         b) be similar in substance to that specified, and

         c) be suited to the same use as that specified;

      2) will state:

         a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

         b) 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

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

      3) will identify:

         a) all variations of the proposed substitute item from that specified, and

         b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

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

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. 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.

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Bidding Requirements or Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and ~~if~~ the Contractor has submitted a list thereof in accordance with the Bidding Requirements or Supplementary Conditions (which shall be included as an attachment to the Agreement), Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated

for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. 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 any right of Owner or Engineer to reject defective Work.

C. 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. 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 moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. 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.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

1. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (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 such policies and any other property insurance applicable to the Work. If the insurers on any

such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

2. Such agreement between Contractor and the Subcontractor or Supplier shall specifically include dispute resolution provisions similar to those in Article 16 (if any) and provisions required by Laws and Regulations identified in the various Supplementary Conditions.

6.07 *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.

D. At the Owner's option, Contractor shall defend claims in connection with any alleged infringement of such rights.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *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 observes that the Specifications or Drawings are at variance with any Laws or Regulations, Contractor shall give Engineer prompt written notice thereof, and any necessary changes will be authorized by one of the methods set forth in Paragraph 3.04. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear 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. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. 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 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 by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other 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 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 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 property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. 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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs (if any) and other safety requirements 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 6.13.A.2 or 6.13.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 (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 for protection of the Work 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 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *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.

6.15 *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.

6.16 *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.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings:

a. Submit number of copies specified in the General Requirements.

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 6.17.D.

2. Samples:

a. Submit number of Samples specified in the Specifications.

b. 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 6.17.D.

B. 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. Submittal Procedures:

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

a. reviewed and coordinated each 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 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 and approval of that 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 both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval 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 6.17.C.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's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1. or for errors or omissions in a Shop Drawing or Sample.

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 in order to obtain required approval of an item with no more than 3 submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

3. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

6.18 *Continuing the Work*

A. 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, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *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 in accordance with Subcontractor warranties, manufacturers and Suppliers warranties on equipment and material, and extended or special warranties and will not be defective for the correction period specified in 13.07. Owner and Engineer and ~~its~~ their officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

1. Contractor shall obtain and preserve for the benefit of the Owner:

a. manufacturers' and Suppliers' written warranties and guarantees on equipment and material incorporated into the Work;

b. written warranties and guarantees from each Subcontractor engaged in the performance of the Work; and

2. extended or special warranties.

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 or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; ~~or~~

7. any correction of defective Work by Owner; or~~.~~

8. any acceptance by Owner or any failure to do so.

D. Contractor shall prepare and execute a written general warranty and guarantee applicable to the Work reflecting the provisions of this Paragraph 6.19, Article 13 and other applicable provisions of the Contract Documents pertaining to warranties and guarantees, Subcontractor, manufacturers and Supplier warranties and guarantees, and extended or special warranties and guarantees. Contractor shall submit this written general warranty and guarantee in accordance with Article 14 and the General Requirements.

E. Provision of any warranties or guarantees:

1. will not be effective to assign to Owner, or any of Owner's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 8.09; and

~~8.~~2. will not be effective to assign to Engineer, or any of Engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09.

~~D.~~F. The warranty and guarantee provisions of this Paragraph 6.19 shall be in addition to and not in limitation of any other warranties, guarantees or remedies allowed by Law or required by the Contract Documents.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, 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 or wrongful 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 6.20.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.

1. Without limiting the generality of the preceding Paragraph, the Contractor hereby specifically agrees to indemnify, defend, and hold harmless the Owner and Engineer from all such claims, losses or expenses which arise out of injuries of employees of the Contractor or any of its Subcontractors or Suppliers of any tier related to performance of the Work. It is the Owner's intention that all financial risk of injuries related to the Work be borne by the Contractor, and that the Owner have no financial responsibility, direct or indirect, for any such claims.

C. The indemnification obligations of Contractor under Paragraph 6.20.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, provided however, that if the claim, cost, loss or damage referred to in this Paragraph 6.20 results from failure of the Engineer to discover a condition, Underground Facilities or object which is underground or otherwise not reasonably observable by the Engineer, and if said failure to discover either was or should have been apparent to the Contractor in that the said condition or object is omitted from the Engineer's maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications, then the Contractor shall be liable for indemnification of the Engineer and Owner under Paragraph 6.20 for claims, costs, losses and damages resulting from said failure to discover unless Contractor shall have notified Engineer of the existence

and location of such condition or object prior to the occurrence of such claims, costs, losses and damages and in sufficient time for Engineer to have made provisions therefor; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage~~.~~; or

3. caused by the negligent acts, errors or omissions of any of them.

6.21 *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 law.

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, Shop Drawings 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 6.21, 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 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. 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. ~~The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.~~

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, 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.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer ~~to whom Contractor makes no reasonable objection,~~ whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *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. However, the Owner shall have the right to direct the Contractor to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *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.

8.12 *Compliance with Safety Program*

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 pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *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 Documents.

9.02 *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 9.09. 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. However, the Engineer shall have the right to direct the Contractor to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided ~~in the Supplementary Conditions~~herein, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. 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.

B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall perform the following.

1. *Schedules:* Review the Progress Schedule, schedule of Shop Drawing and Samples submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other Project-related meetings, and prepare and circulate copies of minutes thereof.

3. *Liaison*:

   a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, to assist in providing information regarding the intent of the Contract Documents.

   b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

   c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

See various sections of the Supplementary Conditions for additional modifications and supplements

4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

5. *Shop Drawings and Samples:*

   a. Record date of receipt of Samples and approved Shop Drawings.

   b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

6. *Modifications:*

   a. Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer.

   b. Transmit to Contractor in writing, decisions as issued by Engineer.

7. *Review of Work and Rejection of Defective Work:*

   a. Conduct onSite observations of Contractor's Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

   b. Report to Engineer whenever RPR believes that any part of Contractor's Work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of Work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

8. *Inspections, Tests, and System Startups:*

   a. Verify that tests, equipment, and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

   b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems startups.

9. *Records:*

   a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of Contractor, Subcontractors, and major Suppliers.

   b. Maintain records for use in preparing Project documentation.

10. *Reports:*

   a. Furnish periodic reports to Engineer as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.

   b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

   c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition or conditions that may impede the compliant operation of existing facilities on Site.

11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

13. *Completion:*

   a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of the Punch List (lists of items to be completed or corrected).

   b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final Punch List (list of items to be completed and deficiencies to be remedied).

   c. Observe whether all items on the final Punch List have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. 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, Suppliers, or Contractor's superintendent.

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 unless such advice or directions are specifically required by the Contract Documents.

5. Advise on, issue directions regarding, or assume control over 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 or determine operational protocol that may affect the compliant operation of existing facilities.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with 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, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. 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 Paragraph 10.05.

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

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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. However, the Engineer shall have the right to direct the Contractor to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto. 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 14.07.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 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

F. Engineer will have no responsibility or authority:

1. To order changes in construction which will result in additional costs or which will require extensions of Contract Times;

2. To suspend all or any portion of Contractor's operations;

3. To terminate all or any portion of the Work;

4. To make final acceptance of all or any portion of the Work; and

5. To operate or maintain any portion of the Work.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *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 by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *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 as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. 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; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *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.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than ~~30~~ 14 days) after the start of the event giving rise thereto. Failure to comply with this notice requirement shall constitute a waiver of the Claim. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within ~~60~~ 30 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

G. Contractor shall not have the right to stop performance of the Work pending resolution of a Claim.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs 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 11.01.B, 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, 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 11.01.

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. Small tools and manual equipment are not allowable and considered to be included in overhead.

        1) Rentals of construction equipment and machinery and the parts thereof whether rented from Contractor or others in accordance with rates published in current edition of the Rental Rate Blue Book® for construction equipment published by EquipmentWatch® (www.equipmentwatch.com). When Contractor-owned equipment is ordered by Owner or Engineer to be held at standby, equipment rental rates shall be 50% of normal rate. Rental or standby shall not include time that equipment is inoperative because of malfunction or breakdown and shall cease when the use thereof is no longer necessary for the Work. The rental rate, shall be determined as follows.

            a) For equipment already on the Project: the monthly prorated rental rate by hourly use.

            b) For equipment not on the Project: most cost effective daily, weekly or monthly rate. 1 month normal use = 176 hours.

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 5.06.D), 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 telegrams, long distance telephone calls, telephone 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 Contractor is required by the Contract Documents to purchase and maintain.

B. *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, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which 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 Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work 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 or when a Claim for an 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 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, 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.

11.02 *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: (Not used)

~~1. Contractor agrees that:~~

~~a. 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~~

~~b. 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. Owner's Contingency Allowances:

1. Contractor agrees that Owner's ~~a~~ contingency allowance, if any, is for the sole use of Owner to cover ~~un~~estimated anticipated costs for certain items.

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 Owner's contingency allowances, and the Contract Price shall be correspondingly adjusted. Contractor shall not receive payment for any unused portion of the contingency allowance.

11.03 *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. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

~~D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 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; and~~

~~2. there is no corresponding adjustment with respect to any other item of Work; and~~

~~3. Contractor believes that Contractor 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 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* 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 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be ~~15~~ 10 percent;

   b. for costs incurred under Paragraph 11.01.A.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 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of ~~15~~ 10 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor, provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the costs incurred by the Subcontractor who actually performs the Work;

   d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

   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 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, acts of war or terrorism, or acts of God (force majeure).

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, 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 Price or the Contract Times, or both. 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.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of war or terrorism, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is 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 described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests 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.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. (Not Used)~~Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:~~

~~1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;~~

~~2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and~~

~~3. as otherwise specifically provided in the Contract Documents.~~

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. Except where responsibility for a specific inspection or test is expressly allocated to Owner in the Specifications or by Laws and Regulations, Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. 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.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense. ~~unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.~~

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, 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 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 Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. 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, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *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, 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.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *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 land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

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 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. 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) will be paid by Contractor and may be deducted from amounts otherwise due the Contractor.

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, including materials, equipment and supplies or as defined in manufacturers' and Suppliers' warranties (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, 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 and the terms of this Paragraph 13.07 will continue to apply.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. 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) 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 pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *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 in accordance with Paragraph 13.06.A, 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, Owner may, after seven days written notice to Contractor, or immediately in the case of an emergency, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, 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, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. 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 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A 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.

14.02 *Progress Payments*

A. 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 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.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, 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 9.07, 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 Documents; 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 moneys 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

    b. the Contract Price has been reduced by Change Orders;

    c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

    d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

    a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

    b. 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 and provides an indemnity satisfactory to Owner for all claims, costs, losses and damages arising out of such Liens;

    c. there are other items entitling Owner to a set-off against the amount recommended including liability for liquidated damages and correction of defective work by Owner or others; or

    d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action 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, when Contractor remedies the reasons for such action.

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 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use and final testing has been completed in accordance with the General Requirements, Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor in the Punchlist as incomplete) using the Notice of Substantial Completion form included in the Contract Documents, submit the Contractor's written general warranty and guarantee per Paragraph 6.19.D., and request that Engineer issue a certificate of Substantial Completion.

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 tentative certificate of Substantial Completion which shall fix the date of Substantial Completion using the Certificate of Substantial Completion included in the Contract Documents. There shall be attached to the certificate a Punch List (tentative list of items to be completed or corrected before final payment). Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised Punch List (tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. 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 ~~tentative list~~Punch List.

14.05 *Partial Utilization*

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. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and 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 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and 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 14.04 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 5.10 regarding property insurance.

B. Owner may request in writing that Contractor permit Owner to separately operate any part of the Work although it is not substantially complete subject to the following conditions.

1. 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 not substantially complete to determine the status of completion and will prepare a Punch List before final payment.

2. If Contractor does not indicate in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the Punch List and will deliver such list to Owner and Contractor, together with a written recommendation as to the division of responsibilities between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work pending final payment.

3. The Engineer's recommendation and Punch List will become binding upon Owner and Contractor at the time the Owner takes over and separately operates such part of the Work unless otherwise agreed in writing and so informed Engineer.

4. During such separate operation by Owner and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct Punch List and to complete other related Work.

14.06 *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 is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *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, warranties, updated Contractor's written general warranty and guarantee per Paragraph 6.19.D if modified, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, and Engineer has indicated that the Work is acceptable (subject to the provisions of Paragraph 14.09), Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled;

~~c.~~d. Notice of Completion; and

~~d.~~e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) 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.

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 Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. 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 14.09. 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. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted as detailed on the Notice of Completion. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for

such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *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 notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will 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 established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents; or

5. Contractor commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if Contractor takes any equivalent or similar action by filing a petition or otherwise under any Laws and Regulations in effect at such time relating to the bankruptcy or insolvency; or

6. a petition is filed against Contractor under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against Contractor under any Laws and Regulations in effect at the time relating to bankruptcy or insolvency; or

7. Contractor makes a general assignment for the benefit of creditors; or

8. a trustee, receiver, custodian or agent of Contractor is appointed under applicable law or under contract, whose appointment or authority to take charge of property of Contractor is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of Contractor's creditors; or

9. Contractor admits in writing its inability to pay its debts generally as they become due.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. 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

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.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 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed 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.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. 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. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *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;

3. ~~all~~ reasonable claims, costs, losses, and damages (including but not limited to ~~all~~ reasonable fees and charges of engineers, architects, attorneys, and other professionals and ~~all~~ reasonable court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) 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 15.03.

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 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 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 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Subject to the requirements in Paragraph 10.05, Owner and Contractor shall attempt in good faith to resolve all unsettled Claims, counterclaims, disputes and other matters in question between them arising out of or relating to the Contract Documents ("Disputes") promptly by negotiation, as follows. All negotiations pursuant to this clause are confidential and shall be treated as compromise and settlement negotiations for purposes of the Federal Rules of Evidence and state Rules of Evidence.

1. Either party may give the other party written notice of any Dispute not resolved.

2. Managers of both parties at levels at least one level above the Project personnel involved in the dispute shall meet at a mutually acceptable time and place within 5 business days after delivery of such notice, and thereafter as often as they reasonably deem necessary, to exchange relevant information and to attempt to resolve the Dispute.

3. If the matter has not been resolved within 30 days from the referral of the Dispute to the managers, or if no meeting has taken place within 10 days after such referral, either party may initiate mediation as provided hereinafter.

~~A.~~B. Subject to Paragraph 16.01.A, e~~E~~ither Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

~~B.~~C. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

~~C.~~D. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *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 to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents 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.

17.03 *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 Documents. 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.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

17.07 *Professional Fees and Court Costs Included*

A. In any action or proceeding to enforce or interpret any contractual provision or to resolve any conflict or dispute relating to or arising from this Contract, the prevailing party shall be entitled to recover, as part of its claim, award or judgment, reasonable attorneys; fees and associated costs and expenses, including expenses of engineering, claims and other consultants.

END OF SECTION

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SECTION 00 73 10

GENERAL SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2007 Edition) included in Section 00 72 05. All provisions that are not so amended or supplemented remain in full force and effect unless amended or supplemented in another Section. The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in this Section have the meanings stated below, if any, which are applicable to both the singular and plural thereof. The address system used herein is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

This Section may include certain provisions required by Laws and Regulations but does not represent or reflect all applicable provisions and policies or Laws and Regulations and may only include excerpts and portions thereof. Other required provisions and policies, and Laws and Regulations, shall be deemed to be so included and incorporated herein. Contractor is solely responsible to determine, obtain, review and interpret the full text of applicable provisions and policies, Regulations, and Laws.

SC-2.05 *Before Starting Construction*

Pursuant to subparagraph 2.05.A.1 regarding Progress Schedule, do not include weekends in Work hours.

Pursuant to subparagraph 2.05.A.3 regarding the Schedule of Values, the prices in the Unit Prices Form included as Section 00 43 22 will constitute the minimum items for the preliminary Schedule of Values for this Project.

Add the following immediately after Paragraph 2.05.B.

B. Additionally, within 10 days after the Effective Date of the Agreement, Contractor shall submit a Construction Operations Plan incorporating the schedules submitted pursuant to Paragraph 2.05.A and covering the following.

1. Coordination of Supplier/manufacturer’s expected equipment lead times with mobilization

2. Construction methods and sequence of operations

3. Proposed Site access

4. Proposed erosion control measures and proposed measures to minimize impacts to existing vegetation and impacts to water quality in compliance with the General Requirements

SC-2.07 ***Initial Acceptance of Schedules***

Add the following immediately after subparagraph 2.07.A.4.

5. Contractor's Construction Operations Plan submitted pursuant to Paragraph 2.05.C. will be acceptable to Engineer if it accurately and reasonably addresses all aspects of the Work.

SC 4.01 ***Availability of Lands***

Pursuant to Paragraph 4.01.A, easements and rights-of-way exist for the Project and are reflected on the Drawings. Documentation is on file with Owner and available upon request.

SC-4.02 ***Subsurface and Physical Conditions***

Pursuant to Paragraph 4.02.A,

1. the following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:

   a. Geotechnical Engineering Memorandum dated April 21, 2023, prepared by GZA GeoEnvironmental, Inc. (GZA), consisting of 24 pages

   b. Wetland Resource Evaluation, Brigham Street Culvert dated March 13, 2023 prepared by EcoTec, Inc., consisting of 16 pages

   c. Brigham Street Culvert Feasibility Study dated July, 2023 prepared by Woodard & Curran, Inc.

   The "technical data" upon which Contractor may rely shall be limited to facts, measurements, field observations, boring logs, soil type and similar data. "Technical data" shall not include opinions regarding suitability of material, dewatering methodologies, soil stability, slope stabilization methods and other opinions or professional judgments.

2. The following drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) are known to Owner:

   a. NONE

3. The reports identified above are not part of the Contract Documents, but the "technical data" contained therein upon which Contractor may rely, as expressly identified and established above, are incorporated in the Contract Documents by reference and may be reflected in the Drawings. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

4. Copies of reports identified above are included as specified in 00 31 00.

Add the following after subparagraph 4.02.B.3.

C. **NOTE: Existing conditions may not be accurately reflected in the current design due to recent severe storm events and failure of existing culvert. Contractor shall verify existing conditions.**

SC- 4.04 ***Underground Facilities***

Add the following immediately after subparagraph 4.04.A.d.

1) Contractor shall support existing utilities during construction. In case support structure fails, Contractor shall be responsible for providing bypass and any immediate mitigation.

SC-4.05 ***Reference Points***

Pursuant to Paragraph 4.05.A, surveys exist for the Project. and are reflected on the Drawings. Copies of surveys may be examined at Engineer's offices during regular business hours.

SC-4.06 ***Hazardous Environmental Conditions at Site***

Pursuant to Paragraph 4.06.A,

1. the following reports regarding Hazardous Environmental Conditions at the Site are known to Owner:

   a. NONE

7. The following drawings regarding Hazardous Environmental Conditions at the Site are known to Owner:

   a. NONE

SC-5.04 ***Contractor's Insurance***

Pursuant to Paragraph 5.04.A, in addition to the individuals and entities specified in subparagraph 5.04.B.1, include the following as loss payees.

NONE

Pursuant to subparagraph 5.04.C.5, also provide Owner's Protective Liability in the amount of $3,000,000 general aggregate ($1,000,000 per occurrence for bodily injury & property damage).

SC-5.06 ***Property Insurance***

Replace subparagraph 5.06.A.2 in its entirety with the following.

8. be written on a Builder's Risk "all-risk"/Special Forms 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 the following special form perils or causes of loss, including but not limited to: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

SC-6.02 ***Labor; Working Hours***

Add the following immediately after Paragraph 6.02.B.

1. Regular working hours for this Project are 7:00 a.m. to 5:00 p.m., Monday through Friday.

2. Work on weekends and holidays is not permitted.

3. Notify Owner in advance if it is necessary to work more than 8 hours in one day.

SC-6.08 ***Permits***

Add the following immediately after Paragraph 6.08.A.

B. Contractor shall comply with the following licenses and permits Owner has obtained for the Project included in Section 00 31 00.

- Order of Conditions, to be provided when available
- U.S. Army Corps of Engineers General Permit, to be provided when available

C. Excavator operators shall obtain a Drain Layer License from the Town of Hudson and must be well versed with Hudson's rules and regulations for Roadway, Water and Sewer.

SC-6.09 ***Laws and Regulations***

Add the following immediately after Paragraph 6.09.C.

D. Contractor shall allow access to the Site and Project records by authorized local, State, and Federal agencies and representatives.

SC-6.13 ***Safety and Protection***

Add the following immediately after Paragraph 6.13.B.

1. Contractor shall comply with the following minimum requirements and is solely responsible to determine, obtain, review and interpret the full text of applicable Laws and Regulations.

    - Hazard Communication Standard 1910.1200 regulated by OSHA, including providing and maintaining Safety Data Sheets, labeling of hazardous substances, and providing required protective equipment and training and instruction to personnel on the Site including Owner and Engineer's personnel
    - Code of Federal Regulations, Chapter XVII-Occupational Safety and Health Administration (OSHA), Department of Labor, Title 29, Part 1926, Safety and Health Regulations for Construction
        - 1926 Subpart AA Confined Spaces in Construction
    - ANSI/ASSE A10 series of safety construction standards including the "Manual of Accident Prevention In Construction" published by The Associated General Contractors of America
    - AASHTO Guide on Occupational Safety on Highway Construction Projects, Subpart N, 1926.550, relating to protection of personnel and equipment under electric lines and construction equipment clearances at overhead electric lines especially during operations using large vehicles

SC-7.01 ***Related Work at Site***

Pursuant to Paragraph 7.01, Owner has not and does not intend to separately contract for other work on the Project at the Site.

SC-9.01 ***Owner's Representative***

Add the following immediately after Paragraph 9.01.A.

B. Nothing contained in the Contract Documents shall be construed to create a contractual relationship of any kind between the Engineer and Contractor, or between any person or entities other than the Owner and Contractor. The Engineer shall, however, be entitled to performance and enforcement of obligations under the Contract Documents intended to facilitate performance of the Engineer's duties.

SC-13.07 ***Correction Period***

Add the following immediately after subparagraph 13.07.A.4.

5. Maintain trench width pavement during the 1-year Warranty Period. Refill areas that have settled or are unsatisfactory for traffic.

SC-14.02 ***Progress Payments***

Add the following language at the end of subparagraph 14.02.C.1.

For the purposes of this Paragraph, "Owner" shall mean "Owner's approving authorities".

SC-14.07 ***Final Payment***

Add the following language at the end of subparagraph 14.07.C.1.

For the purposes of this Paragraph, "Owner" shall mean "Owner's approving authorities".

SC-16 DISPUTE RESOLUTION

Add the following immediately after Paragraph 16.01.D.

16.02 Arbitration

A. All Claims or counterclaims, disputes, or other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for Claims which have been waived by the making or acceptance of final payment as provided by Paragraph 14.09) including but not limited to those not resolved under the provisions of Paragraphs 10.05 or 16.01, will be subject to arbitration in accordance with the rules of Construction Industry Rules of the American Arbitration Association, subject to the conditions and limitations of this Paragraph 16.02. This agreement to arbitrate, and any other

agreement or consent to arbitrate entered into, will be specifically enforceable under the prevailing Laws of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to this Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the 30-day period specified in Paragraph 16.01.D, and in all other cases, within a reasonable time after the Claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such Claim or other dispute or matter in question would be barred by the applicable statute of limitations.

D. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

E. Consolidation shall be by order of the arbitrator(s) in any pending case, or if the arbitrator(s) fail to make an order, a party may apply to a court of competent jurisdiction for such order. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity shall be specifically enforceable in accordance with the Laws of any court having jurisdiction thereof.

F. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include: (i) a concise breakdown of the award; (ii) a written explanation of the award specifically citing the Contract Document provisions deemed applicable and relied on in making the award.

G. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the controlling Laws relating to vacating or modifying an arbitral award.

H. If the parties decline to arbitrate, such Claims, disputes and other matters shall be decided by a court having jurisdiction.

16.03 General

A. The Contractor will require similar dispute resolution provisions in agreements with its Subcontractors and Suppliers.

B. Contractor shall not have the right to stop performance of the Work pending resolution of a Claim or dispute.

C. NOTWITHSTANDING any provision contained in this Article or elsewhere in the Contract Documents, the Owner reserves the following rights in connection with Claims and disputes between the Owner and the Contractor:

1. The right to institute legal action against the Contractor in any court of competent jurisdiction in lieu of demanding arbitration pursuant to this Article, in which case the Claims or disputes which are the subject of such action shall be decided by such court, and not by arbitration.

2. The right to obtain from any court of competent jurisdiction a stay of any arbitration instituted by the Contractor, provided that the application for such stay is made before the appointment of the neutral arbitrator in such arbitration, in which case the Claims or disputes which are the subject of such arbitration shall be decided by such court, and not by arbitration.

3. The right to require the Contractor to join as a party in any arbitration between the Owner and the Engineer relating to the Project, in which case the Contractor agrees to be bound by the decision of the arbitrator or arbitrators in such arbitration.

END OF SECTION

SECTION 00 73 43

WAGE RATE REQUIREMENTS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2007 Edition) included in Section 00 72 05. All provisions that are not so amended or supplemented remain in full force and effect unless amended or supplemented in another Section. The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated within the Sections listed below, if any, which are applicable to both the singular and plural thereof.

The content of this Section does not represent or reflect all applicable Laws and Regulations and may only include excerpts and portions of certain Laws and Regulations. Other provisions and policies, and Laws and Regulations, shall be deemed to be so included and incorporated herein. Contractor is solely responsible to determine, obtain, review and interpret the full text of applicable Laws and Regulations.

The Project is subject to prevailing wage rates as issued by the Director of the Executive Office of Labor and Workforce Development (EOLWD), Department of Labor Standards (DLS) and the requirements of MGL Chapter 149, Sections 26, 27 and 27A to 27H. Pursuant to MGL Chapter 149, Section 34B, wages paid to reserve police officers shall be the same prevailing rate of wage paid to regular police officers at the location of the Project.

Comply with requirements available on the Executive Office of Labor and Workforce Development website at https://www.mass.gov/prevailing-wage-program and https://www.mass.gov/service-details/prevailing-wage-for-contractors. See Guide to Contractors at https://www.mass.gov/doc/a-guide-to-prevailing-wage-for-contractors-on-public-works-projects/download.

Submit required records and statements of compliance in accordance with MGL Chapter 149, Section 27B using the latest Weekly Payroll and Compliance forms available on the EOLWD website. Copies included in this section are for information only.

Wage determination schedules are included at the end of this section. In case of discrepancy between state wage rates and Federal wage rates, if any, the higher wage rates shall apply.

ATTACHMENTS

A. Massachusetts Prevailing Wage Law forms (samples)

B. Wage Determination Schedules

END OF SECTION

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WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form is available from the Department of Labor Standards (DLS) at www.mass.gov/dols/pw and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

On a weekly basis, every contractor and subcontractor is required to submit a certified copy of their weekly payroll records to the awarding authority; this includes the payroll forms and the Statement of Compliance form. The certified payroll records must be submitted either by regular mail or by e-mail to the awarding authority. Once collected, the awarding authority is required to preserve those records for three years from the date of completion of the project.

Each such contractor and subcontractor shall furnish weekly **and** within 15 days after completion of its portion of the work, to the awarding authority directly by first-class mail or e-mail, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form, accompanied by their payroll:

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by _____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:	Address:	Phone No.:	Payroll No.:

Employer's Signature:	Title:	Contract No:	Tax Payer ID Number	Work Week Ending:

Awarding Authority's Name:	Public Works Project Name:	Public Works Project Location:	Min. Wage Rate Sheet Number

General / Prime Contractor's Name:	Subcontractor's Name:		"Employer" Hourly Fringe Benefit Contributions

Employee Name & Complete Address	Work Classification:	Employee is OSHA 10 certified (?)	Appr. Rate (%)	Hours Worked Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C)	ERISA Pension Plan (D)	Supp. Unemp. (E)	Total Hourly Prev. Wage (B+C+D+E) (F)	Project Gross Wages (A x F) Total Gross Wages	Check No. (H)

Are all apprentice employees identified above currently registered with the MA DLS's Division of Apprentice Standards? YES ☐ NO ☐

For all apprentices performing work during the reporting period, attach a copy of the apprentice identification card issued by the Massachusetts Department of Labor Standards / Division of Apprentice Standards. No apprentices are identified above ☐

NOTE: Pursuant to MGL c. 149, s. 27B, every contractor and subcontractor is required to submit a **true and accurate** copy of their certified weekly payroll records to the awarding authority by first-class mail or e-mail. In addition, each weekly payroll must be accompanied by a statement of compliance signed by the employer. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date Received by Awarding Authority
/ /

MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: Town of Hudson, MA

Contract Number: 0234865.01 **City/Town:** HUDSON

Description of Work: Install concrete culvert & headwalls, open channel restoration, install headwall, with Alternate for CIPP relining at various locations.

Job Location: Brigham Street at unnamed stream crossing

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 annual update requirement is not applicable to 27F "rental of equipment" contracts. **The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.**
- 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.

Issue Date: 04/22/2024 **Wage Request Number:** 20240422-012

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$38.95	$15.07	$18.67	$0.00	$72.69
	06/01/2024	$39.95	$15.07	$18.67	$0.00	$73.69
	12/01/2024	$39.95	$15.07	$20.17	$0.00	$75.19
	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 *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.02	$15.07	$18.67	$0.00	$72.76
	06/01/2024	$40.02	$15.07	$18.67	$0.00	$73.76
	12/01/2024	$40.02	$15.07	$20.17	$0.00	$75.26
	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 *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.14	$15.07	$18.67	$0.00	$72.88
	06/01/2024	$40.14	$15.07	$18.67	$0.00	$73.88
	12/01/2024	$40.14	$15.07	$20.17	$0.00	$75.38
	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 *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
	06/01/2024	$39.94	$9.65	$17.14	$0.00	$66.73
	12/01/2024	$41.27	$9.65	$17.14	$0.00	$68.06
	06/01/2025	$42.66	$9.65	$17.14	$0.00	$69.45
	12/01/2025	$44.04	$9.65	$17.14	$0.00	$70.83
	06/01/2026	$45.48	$9.65	$17.14	$0.00	$72.27
	12/01/2026	$46.92	$9.65	$17.14	$0.00	$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2023	$40.80	$14.50	$11.05	$0.00	$66.35
	06/01/2024	$41.80	$14.50	$11.05	$0.00	$67.35
	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
ASPHALT RAKER *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 2*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
	06/01/2024	$39.94	$9.65	$17.14	$0.00	$66.73
	12/01/2024	$41.27	$9.65	$17.14	$0.00	$68.06
	06/01/2025	$42.66	$9.65	$17.14	$0.00	$69.45
	12/01/2025	$44.04	$9.65	$17.14	$0.00	$70.83
	06/01/2026	$45.48	$9.65	$17.14	$0.00	$72.27
	12/01/2026	$46.92	$9.65	$17.14	$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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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 (LOWELL)*	02/01/2024	$60.26	$11.49	$22.90	$0.00	$94.65
	08/01/2024	$62.36	$11.49	$22.90	$0.00	$96.75
	02/01/2025	$63.66	$11.49	$22.90	$0.00	$98.05
	08/01/2025	$65.81	$11.49	$22.90	$0.00	$100.20
	02/01/2026	$67.16	$11.49	$22.90	$0.00	$101.55
	08/01/2026	$69.36	$11.49	$22.90	$0.00	$103.75
	02/01/2027	$70.76	$11.49	$22.90	$0.00	$105.15

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Lowell*

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.13	$11.49	$22.90	$0.00	$64.52
2	60	$36.16	$11.49	$22.90	$0.00	$70.55
3	70	$42.18	$11.49	$22.90	$0.00	$76.57
4	80	$48.21	$11.49	$22.90	$0.00	$82.60
5	90	$54.23	$11.49	$22.90	$0.00	$88.62

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.18	$11.49	$22.90	$0.00	$65.57
2	60	$37.42	$11.49	$22.90	$0.00	$71.81
3	70	$43.65	$11.49	$22.90	$0.00	$78.04
4	80	$49.89	$11.49	$22.90	$0.00	$84.28
5	90	$56.12	$11.49	$22.90	$0.00	$90.51

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$45.48	$9.65	$18.22	$0.00	$73.35
	06/01/2024	$46.96	$9.65	$18.22	$0.00	$74.83
	12/01/2024	$48.43	$9.65	$18.22	$0.00	$76.30
	06/01/2025	$49.93	$9.65	$18.22	$0.00	$77.80
	12/01/2025	$51.43	$9.65	$18.22	$0.00	$79.30
	06/01/2026	$52.98	$9.65	$18.22	$0.00	$80.85
	12/01/2026	$54.48	$9.65	$18.22	$0.00	$82.35
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	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
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	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"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 2 (Eastern Massachusetts)*	03/01/2024	$47.12	$9.83	$19.97	$0.00	$76.92
	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 - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$21.20	$9.83	$1.73	$0.00	$32.76
2	45	$21.20	$9.83	$1.73	$0.00	$32.76
3	55	$25.92	$9.83	$3.40	$0.00	$39.15
4	55	$25.92	$9.83	$3.40	$0.00	$39.15
5	70	$32.98	$9.83	$16.51	$0.00	$59.32
6	70	$32.98	$9.83	$16.51	$0.00	$59.32
7	80	$37.70	$9.83	$18.24	$0.00	$65.77
8	80	$37.70	$9.83	$18.24	$0.00	$65.77

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

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER WOOD FRAME *CARPENTERS-ZONE 3 (Wood Frame)*	10/01/2023	$25.55	$7.02	$4.80	$0.00	$37.37
	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 - 10/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$15.33	$7.02	$0.00	$0.00	$22.35
2	60	$15.33	$7.02	$0.00	$0.00	$22.35
3	65	$16.61	$7.02	$1.00	$0.00	$24.63
4	70	$17.89	$7.02	$1.00	$0.00	$25.91
5	75	$19.16	$7.02	$4.80	$0.00	$30.98
6	80	$20.44	$7.02	$4.80	$0.00	$32.26
7	85	$21.72	$7.02	$4.80	$0.00	$33.54
8	90	$23.00	$7.02	$4.80	$0.00	$34.82

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

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $18.52/ 3&4 $21.07/ 5&6 $28.70/ 7&8 $31.26

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (LOWELL)*	01/01/2024	$49.33	$13.00	$23.57	$1.30	$87.20

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CEMENT MASONRY/PLASTERING - Lowell*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.67	$13.00	$15.93	$0.00	$53.60
2	60	$29.60	$13.00	$18.57	$1.30	$62.47
3	65	$32.06	$13.00	$19.57	$1.30	$65.93
4	70	$34.53	$13.00	$20.57	$1.30	$69.40
5	75	$37.00	$13.00	$21.57	$1.30	$72.87
6	80	$39.46	$13.00	$22.57	$1.30	$76.33
7	90	$44.40	$13.00	$23.57	$1.30	$82.27

Notes:

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

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$56.13	$15.00	$16.40	$0.00	$87.53
	06/01/2024	$57.45	$15.00	$16.40	$0.00	$88.85
	12/01/2024	$58.93	$15.00	$16.40	$0.00	$90.33
	06/01/2025	$60.26	$15.00	$16.40	$0.00	$91.66
	12/01/2025	$61.73	$15.00	$16.40	$0.00	$93.13
	06/01/2026	$63.06	$15.00	$16.40	$0.00	$94.46
	12/01/2026	$64.54	$15.00	$16.40	$0.00	$95.94
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2024	$56.06	$9.95	$23.95	$0.00	$89.96
	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.03	$9.95	$0.00	$0.00	$37.98
2	55	$30.83	$9.95	$6.66	$0.00	$47.44
3	60	$33.64	$9.95	$7.26	$0.00	$50.85
4	65	$36.44	$9.95	$7.87	$0.00	$54.26
5	70	$39.24	$9.95	$20.32	$0.00	$69.51
6	75	$42.05	$9.95	$20.93	$0.00	$72.93
7	80	$44.85	$9.95	$21.53	$0.00	$76.33
8	90	$50.45	$9.95	$22.74	$0.00	$83.14

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 2*	12/01/2023	$44.48	$9.65	$18.07	$0.00	$72.20

For apprentice rates see "Apprentice- LABORER"

DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20

For apprentice rates see "Apprentice- LABORER"

DEMO: BURNERS *LABORERS - ZONE 2*	12/01/2023	$45.23	$9.65	$18.07	$0.00	$72.95

For apprentice rates see "Apprentice- LABORER"

DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 2*	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20

For apprentice rates see "Apprentice- LABORER"

DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2023	$45.23	$9.65	$18.07	$0.00	$72.95

For apprentice rates see "Apprentice- LABORER"

DEMO: WRECKING LABORER *LABORERS - ZONE 2*	12/01/2023	$44.48	$9.65	$18.07	$0.00	$72.20

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$73.60	$9.40	$23.12	$0.00	$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53
ELECTRICIAN *ELECTRICIANS LOCAL 96*	09/03/2023	$45.99	$13.00	$18.84	$0.00	$77.83
	09/01/2024	$47.05	$13.99	$19.22	$0.00	$80.26
	09/07/2025	$48.16	$14.98	$19.60	$0.00	$82.74
	09/06/2026	$49.38	$15.96	$20.00	$0.00	$85.34

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 96*

Effective Date - 09/03/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.40	$13.00	$0.55	$0.00	$31.95
2	45	$20.70	$13.00	$0.62	$0.00	$34.32
3	48	$22.08	$13.00	$15.49	$0.00	$50.57
4	55	$25.29	$13.00	$15.94	$0.00	$54.23
5	65	$29.89	$13.00	$16.59	$0.00	$59.48
6	80	$36.79	$13.00	$17.55	$0.00	$67.34

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.82	$13.99	$0.56	$0.00	$33.37
2	45	$21.17	$13.99	$0.64	$0.00	$35.80
3	48	$22.58	$13.99	$15.79	$0.00	$52.36
4	55	$25.88	$13.99	$16.26	$0.00	$56.13
5	65	$30.58	$13.99	$16.91	$0.00	$61.48
6	80	$37.64	$13.99	$17.90	$0.00	$69.53

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2024	$61.98	$16.18	$20.96	$0.00	$99.12
	01/01/2025	$62.83	$16.28	$21.36	$0.00	$100.47
	01/01/2026	$63.68	$16.38	$21.76	$0.00	$101.82
	01/01/2027	$64.53	$16.48	$22.16	$0.00	$103.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 41*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.99	$16.18	$0.00	$0.00	$47.17
2	55	$34.09	$16.18	$20.96	$0.00	$71.23
3	65	$40.29	$16.18	$20.96	$0.00	$77.43
4	70	$43.39	$16.18	$20.96	$0.00	$80.53
5	80	$49.58	$16.18	$20.96	$0.00	$86.72

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.42	$16.28	$0.00	$0.00	$47.70
2	55	$34.56	$16.28	$21.36	$0.00	$72.20
3	65	$40.84	$16.28	$21.36	$0.00	$78.48
4	70	$43.98	$16.28	$21.36	$0.00	$81.62
5	80	$50.26	$16.28	$21.36	$0.00	$87.90

Notes:

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2024	$43.39	$16.18	$20.96	$0.00	$80.53
	01/01/2025	$43.98	$16.28	$21.36	$0.00	$81.62
	01/01/2026	$44.58	$16.38	$21.76	$0.00	$82.72
	01/01/2027	$45.17	$16.48	$22.16	$0.00	$83.81
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$50.30	$14.50	$16.15	$0.00	$80.95
	05/01/2024	$51.54	$14.50	$16.15	$0.00	$82.19
	11/01/2024	$52.83	$14.50	$16.15	$0.00	$83.48
	05/01/2025	$54.27	$14.50	$16.15	$0.00	$84.92
	11/01/2025	$55.56	$14.50	$16.15	$0.00	$86.21
	05/01/2026	$57.00	$14.50	$16.15	$0.00	$87.65
	11/01/2026	$58.29	$14.50	$16.15	$0.00	$88.94
	05/01/2027	$59.72	$14.50	$16.15	$0.00	$90.37
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$51.87	$14.50	$16.15	$0.00	$82.52
	05/01/2024	$53.12	$14.50	$16.15	$0.00	$83.77
	11/01/2024	$54.42	$14.50	$16.15	$0.00	$85.07
	05/01/2025	$55.87	$14.50	$16.15	$0.00	$86.52
	11/01/2025	$57.17	$14.50	$16.15	$0.00	$87.82
	05/01/2026	$58.62	$14.50	$16.15	$0.00	$89.27
	11/01/2026	$59.92	$14.50	$16.15	$0.00	$90.57
	05/01/2027	$61.37	$14.50	$16.15	$0.00	$92.02
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$24.93	$14.50	$16.15	$0.00	$55.58
	05/01/2024	$25.66	$14.50	$16.15	$0.00	$56.31
	11/01/2024	$26.42	$14.50	$16.15	$0.00	$57.07
	05/01/2025	$27.27	$14.50	$16.15	$0.00	$57.92
	11/01/2025	$28.03	$14.50	$16.15	$0.00	$58.68
	05/01/2026	$28.88	$14.50	$16.15	$0.00	$59.53
	11/01/2026	$29.64	$14.50	$16.15	$0.00	$60.29
	05/01/2027	$30.49	$14.50	$16.15	$0.00	$61.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 96*	09/03/2023	$45.99	$13.00	$18.84	$0.00	$77.83
	09/01/2024	$47.05	$13.99	$19.22	$0.00	$80.26
	09/07/2025	$48.16	$14.98	$19.60	$0.00	$82.74
	09/06/2026	$49.38	$15.96	$20.00	$0.00	$85.34
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINT/COMMISSIONING *ELECTRICIANS LOCAL 96*	09/03/2023	$45.99	$13.00	$18.84	$0.00	$77.83
	09/01/2024	$47.05	$13.99	$19.22	$0.00	$80.26
	09/07/2025	$48.16	$14.98	$19.60	$0.00	$82.74
	09/06/2026	$49.38	$15.96	$20.00	$0.00	$85.34
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$44.47	$15.00	$16.40	$0.00	$75.87
	06/01/2024	$45.53	$15.00	$16.40	$0.00	$76.93
	12/01/2024	$46.71	$15.00	$16.40	$0.00	$78.11
	06/01/2025	$47.77	$15.00	$16.40	$0.00	$79.17
	12/01/2025	$48.94	$15.00	$16.40	$0.00	$80.34
	06/01/2026	$50.00	$15.00	$16.40	$0.00	$81.40
	12/01/2026	$51.18	$15.00	$16.40	$0.00	$82.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$25.48	$9.65	$17.14	$0.00	$52.27
	06/01/2024	$26.51	$9.65	$17.14	$0.00	$53.30
	12/01/2024	$26.51	$9.65	$17.14	$0.00	$53.30
	06/01/2025	$27.59	$9.65	$17.14	$0.00	$54.38
	12/01/2025	$27.59	$9.65	$17.14	$0.00	$54.38
	06/01/2026	$28.71	$9.65	$17.14	$0.00	$55.50
	12/01/2026	$28.71	$9.65	$17.14	$0.00	$55.50
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	03/01/2024	$54.73	$8.83	$20.27	$0.00	$83.83
	09/01/2024	$56.23	$8.83	$20.27	$0.00	$85.33
	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

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$24.63	$8.83	$1.76	$0.00	$35.22
2	45	$24.63	$8.83	$1.76	$0.00	$35.22
3	55	$30.10	$8.83	$3.52	$0.00	$42.45
4	55	$30.10	$8.83	$3.52	$0.00	$42.45
5	70	$38.31	$8.83	$16.75	$0.00	$63.89
6	70	$38.31	$8.83	$16.75	$0.00	$63.89
7	80	$43.78	$8.83	$18.51	$0.00	$71.12
8	80	$43.78	$8.83	$18.51	$0.00	$71.12

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

Notes: Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 2)*	01/01/2024	$45.56	$9.95	$23.95	$0.00	$79.46
	07/01/2024	$46.76	$9.95	$23.95	$0.00	$80.66
	01/01/2025	$47.96	$9.95	$23.95	$0.00	$81.86

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.78	$9.95	$0.00	$0.00	$32.73
2	55	$25.06	$9.95	$6.66	$0.00	$41.67
3	60	$27.34	$9.95	$7.26	$0.00	$44.55
4	65	$29.61	$9.95	$7.87	$0.00	$47.43
5	70	$31.89	$9.95	$20.32	$0.00	$62.16
6	75	$34.17	$9.95	$20.93	$0.00	$65.05
7	80	$36.45	$9.95	$21.53	$0.00	$67.93
8	90	$41.00	$9.95	$22.74	$0.00	$73.69

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.38	$9.95	$0.00	$0.00	$33.33
2	55	$25.72	$9.95	$6.66	$0.00	$42.33
3	60	$28.06	$9.95	$7.26	$0.00	$45.27
4	65	$30.39	$9.95	$7.87	$0.00	$48.21
5	70	$32.73	$9.95	$20.32	$0.00	$63.00
6	75	$35.07	$9.95	$20.93	$0.00	$65.95
7	80	$37.41	$9.95	$21.53	$0.00	$68.89
8	90	$42.08	$9.95	$22.74	$0.00	$74.77

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$30.27	$15.00	$0.00	$0.00	$45.27
2	60	$33.02	$15.00	$16.40	$0.00	$64.42
3	65	$35.77	$15.00	$16.40	$0.00	$67.17
4	70	$38.52	$15.00	$16.40	$0.00	$69.92
5	75	$41.27	$15.00	$16.40	$0.00	$72.67
6	80	$44.02	$15.00	$16.40	$0.00	$75.42
7	85	$46.78	$15.00	$16.40	$0.00	$78.18
8	90	$49.53	$15.00	$16.40	$0.00	$80.93

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$30.98	$15.00	$0.00	$0.00	$45.98
2	60	$33.80	$15.00	$16.40	$0.00	$65.20
3	65	$36.61	$15.00	$16.40	$0.00	$68.01
4	70	$39.43	$15.00	$16.40	$0.00	$70.83
5	75	$42.25	$15.00	$16.40	$0.00	$73.65
6	80	$45.06	$15.00	$16.40	$0.00	$76.46
7	85	$47.88	$15.00	$16.40	$0.00	$79.28
8	90	$50.70	$15.00	$16.40	$0.00	$82.10

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2024	$57.22	$14.59	$27.50	$2.98	$102.29
	08/01/2024	$58.97	$14.59	$27.50	$2.98	$104.04
	02/01/2025	$60.72	$14.59	$27.50	$2.98	$105.79
	08/01/2025	$62.57	$14.59	$27.50	$2.98	$107.64
	02/01/2026	$64.52	$14.59	$27.50	$2.98	$109.59
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 96*	09/03/2023	$45.99	$13.00	$18.84	$0.00	$77.83
	09/01/2024	$47.05	$13.99	$19.22	$0.00	$80.26
	09/07/2025	$48.16	$14.98	$19.60	$0.00	$82.74
	09/06/2026	$49.38	$15.96	$20.00	$0.00	$85.34
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2024	$57.22	$14.59	$27.50	$2.98	$102.29
	08/01/2024	$58.97	$14.59	$27.50	$2.98	$104.04
	02/01/2025	$60.72	$14.59	$27.50	$2.98	$105.79
	08/01/2025	$62.57	$14.59	$27.50	$2.98	$107.64
	02/01/2026	$64.52	$14.59	$27.50	$2.98	$109.59
For apprentice rates see "Apprentice- SHEET METAL WORKER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	03/01/2024	$65.28	$12.70	$21.80	$0.00	$99.78
	09/01/2024	$67.08	$12.70	$21.80	$0.00	$101.58
	03/01/2025	$68.88	$12.70	$21.80	$0.00	$103.38
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	03/01/2024	$65.28	$12.70	$21.80	$0.00	$99.78
	09/01/2024	$67.08	$12.70	$21.80	$0.00	$101.58
	03/01/2025	$68.88	$12.70	$21.80	$0.00	$103.38
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 2*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.61	$9.65	$17.14	$0.00	$65.40
	06/01/2024	$39.94	$9.65	$17.14	$0.00	$66.73
	12/01/2024	$41.27	$9.65	$17.14	$0.00	$68.06
	06/01/2025	$42.66	$9.65	$17.14	$0.00	$69.45
	12/01/2025	$44.04	$9.65	$17.14	$0.00	$70.83
	06/01/2026	$45.48	$9.65	$17.14	$0.00	$72.27
	12/01/2026	$46.92	$9.65	$17.14	$0.00	$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2023	$53.50	$14.75	$19.61	$0.00	$87.86
	09/01/2024	$56.92	$14.75	$19.61	$0.00	$91.28
	09/01/2025	$60.34	$14.75	$19.61	$0.00	$94.70
	09/01/2026	$63.76	$14.75	$19.61	$0.00	$98.12

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

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.75	$14.75	$14.32	$0.00	$55.82
2	60	$32.10	$14.75	$15.37	$0.00	$62.22
3	70	$37.45	$14.75	$16.43	$0.00	$68.63
4	80	$42.80	$14.75	$17.49	$0.00	$75.04

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.46	$14.75	$14.32	$0.00	$57.53
2	60	$34.15	$14.75	$15.37	$0.00	$64.27
3	70	$39.84	$14.75	$16.43	$0.00	$71.02
4	80	$45.54	$14.75	$17.49	$0.00	$77.78

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (WORCESTER AREA)*	03/16/2024	$53.67	$8.35	$26.70	$0.00	$88.72

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Worcester*

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$32.20	$8.35	$26.70	$0.00	$67.25
2	70	$37.57	$8.35	$26.70	$0.00	$72.62
3	75	$40.25	$8.35	$26.70	$0.00	$75.30
4	80	$42.94	$8.35	$26.70	$0.00	$77.99
5	85	$45.62	$8.35	$26.70	$0.00	$80.67
6	90	$48.30	$8.35	$26.70	$0.00	$83.35

Notes:

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 2*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65

Apprentice - *LABORER - Zone 2*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$22.72	$9.65	$16.89	$0.00	$49.26
2	70	$26.50	$9.65	$16.89	$0.00	$53.04
3	80	$30.29	$9.65	$16.89	$0.00	$56.83
4	90	$34.07	$9.65	$16.89	$0.00	$60.61

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65
	06/01/2024	$39.19	$9.65	$17.14	$0.00	$65.98
	12/01/2024	$40.52	$9.65	$17.14	$0.00	$67.31
	06/01/2025	$41.91	$9.65	$17.14	$0.00	$68.70
	12/01/2025	$43.29	$9.65	$17.14	$0.00	$70.08
	06/01/2026	$44.73	$9.65	$17.14	$0.00	$71.52
	12/01/2026	$46.17	$9.65	$17.14	$0.00	$72.96

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$22.72	$9.65	$17.14	$0.00	$49.51
2	70	$26.50	$9.65	$17.14	$0.00	$53.29
3	80	$30.29	$9.65	$17.14	$0.00	$57.08
4	90	$34.07	$9.65	$17.14	$0.00	$60.86

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$23.51	$9.00	$16.89	$0.00	$49.40
2	70	$27.43	$9.00	$16.89	$0.00	$53.32
3	80	$31.35	$9.00	$16.89	$0.00	$57.24
4	90	$35.27	$9.00	$16.89	$0.00	$61.16

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 2*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 2*	12/01/2023	$38.36	$9.40	$16.89	$0.00	$64.65
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 2*	12/01/2023	$37.95	$9.65	$17.20	$0.00	$64.80
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 2*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 2*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65
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*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2024	$47.89	$11.49	$21.37	$0.00	$80.75
	08/01/2024	$49.57	$11.49	$21.37	$0.00	$82.43
	02/01/2025	$50.61	$11.49	$21.37	$0.00	$83.47
	08/01/2025	$52.33	$11.49	$21.37	$0.00	$85.19
	02/01/2026	$53.41	$11.49	$21.37	$0.00	$86.27
	08/01/2026	$55.17	$11.49	$21.37	$0.00	$88.03
	02/01/2027	$56.29	$11.49	$21.37	$0.00	$89.15

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

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.95	$11.49	$21.37	$0.00	$56.81
2	60	$28.73	$11.49	$21.37	$0.00	$61.59
3	70	$33.52	$11.49	$21.37	$0.00	$66.38
4	80	$38.31	$11.49	$21.37	$0.00	$71.17
5	90	$43.10	$11.49	$21.37	$0.00	$75.96

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.79	$11.49	$21.37	$0.00	$57.65
2	60	$29.74	$11.49	$21.37	$0.00	$62.60
3	70	$34.70	$11.49	$21.37	$0.00	$67.56
4	80	$39.66	$11.49	$21.37	$0.00	$72.52
5	90	$44.61	$11.49	$21.37	$0.00	$77.47

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2024	$62.42	$11.49	$23.56	$0.00	$97.47
	08/01/2024	$64.52	$11.49	$23.56	$0.00	$99.57
	02/01/2025	$65.82	$11.49	$23.56	$0.00	$100.87
	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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.21	$11.49	$23.56	$0.00	$66.26
2	60	$37.45	$11.49	$23.56	$0.00	$72.50
3	70	$43.69	$11.49	$23.56	$0.00	$78.74
4	80	$49.94	$11.49	$23.56	$0.00	$84.99
5	90	$56.18	$11.49	$23.56	$0.00	$91.23

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.26	$11.49	$23.56	$0.00	$67.31
2	60	$38.71	$11.49	$23.56	$0.00	$73.76
3	70	$45.16	$11.49	$23.56	$0.00	$80.21
4	80	$51.62	$11.49	$23.56	$0.00	$86.67
5	90	$58.07	$11.49	$23.56	$0.00	$93.12

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	01/01/2024	$42.76	$10.08	$21.47	$0.00	$74.31
	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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$23.52	$10.08	$5.50	$0.00	$39.10
2	65	$27.79	$10.08	$6.50	$0.00	$44.37
3	75	$32.07	$10.08	$18.97	$0.00	$61.12
4	85	$36.35	$10.08	$19.97	$0.00	$66.40

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

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

MORTAR MIXER *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$24.41	$15.00	$16.40	$0.00	$55.81
	06/01/2024	$25.01	$15.00	$16.40	$0.00	$56.41
	12/01/2024	$25.67	$15.00	$16.40	$0.00	$57.07
	06/01/2025	$26.27	$15.00	$16.40	$0.00	$57.67
	12/01/2025	$26.93	$15.00	$16.40	$0.00	$58.33
	06/01/2026	$27.52	$15.00	$16.40	$0.00	$58.92
	12/01/2026	$28.19	$15.00	$16.40	$0.00	$59.59
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$29.86	$15.00	$16.40	$0.00	$61.26
	06/01/2024	$30.58	$15.00	$16.40	$0.00	$61.98
	12/01/2024	$31.38	$15.00	$16.40	$0.00	$62.78
	06/01/2025	$32.10	$15.00	$16.40	$0.00	$63.50
	12/01/2025	$32.90	$15.00	$16.40	$0.00	$64.30
	06/01/2026	$33.62	$15.00	$16.40	$0.00	$65.02
	12/01/2026	$34.42	$15.00	$16.40	$0.00	$65.82
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2024	$56.06	$9.95	$23.95	$0.00	$89.96
	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.03	$9.95	$0.00	$0.00	$37.98
2	55	$30.83	$9.95	$6.66	$0.00	$47.44
3	60	$33.64	$9.95	$7.26	$0.00	$50.85
4	65	$36.44	$9.95	$7.87	$0.00	$54.26
5	70	$39.24	$9.95	$20.32	$0.00	$69.51
6	75	$42.05	$9.95	$20.93	$0.00	$72.93
7	80	$44.85	$9.95	$21.53	$0.00	$76.33
8	90	$50.45	$9.95	$22.74	$0.00	$83.14

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	01/01/2024	$46.96	$9.95	$23.95	$0.00	$80.86
	07/01/2024	$48.16	$9.95	$23.95	$0.00	$82.06
	01/01/2025	$49.36	$9.95	$23.95	$0.00	$83.26

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.48	$9.95	$0.00	$0.00	$33.43
2	55	$25.83	$9.95	$6.66	$0.00	$42.44
3	60	$28.18	$9.95	$7.26	$0.00	$45.39
4	65	$30.52	$9.95	$7.87	$0.00	$48.34
5	70	$32.87	$9.95	$20.32	$0.00	$63.14
6	75	$35.22	$9.95	$20.93	$0.00	$66.10
7	80	$37.57	$9.95	$21.53	$0.00	$69.05
8	90	$42.26	$9.95	$22.74	$0.00	$74.95

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.08	$9.95	$0.00	$0.00	$34.03
2	55	$26.49	$9.95	$6.66	$0.00	$43.10
3	60	$28.90	$9.95	$7.26	$0.00	$46.11
4	65	$31.30	$9.95	$7.87	$0.00	$49.12
5	70	$33.71	$9.95	$20.32	$0.00	$63.98
6	75	$36.12	$9.95	$20.93	$0.00	$67.00
7	80	$38.53	$9.95	$21.53	$0.00	$70.01
8	90	$43.34	$9.95	$22.74	$0.00	$76.03

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2024	$45.02	$9.95	$23.95	$0.00	$78.92
	07/01/2024	$46.22	$9.95	$23.95	$0.00	$80.12
	01/01/2025	$47.42	$9.95	$23.95	$0.00	$81.32

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.51	$9.95	$0.00	$0.00	$32.46
2	55	$24.76	$9.95	$6.66	$0.00	$41.37
3	60	$27.01	$9.95	$7.26	$0.00	$44.22
4	65	$29.26	$9.95	$7.87	$0.00	$47.08
5	70	$31.51	$9.95	$20.32	$0.00	$61.78
6	75	$33.77	$9.95	$20.93	$0.00	$64.65
7	80	$36.02	$9.95	$21.53	$0.00	$67.50
8	90	$40.52	$9.95	$22.74	$0.00	$73.21

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.11	$9.95	$0.00	$0.00	$33.06
2	55	$25.42	$9.95	$6.66	$0.00	$42.03
3	60	$27.73	$9.95	$7.26	$0.00	$44.94
4	65	$30.04	$9.95	$7.87	$0.00	$47.86
5	70	$32.35	$9.95	$20.32	$0.00	$62.62
6	75	$34.67	$9.95	$20.93	$0.00	$65.55
7	80	$36.98	$9.95	$21.53	$0.00	$68.46
8	90	$41.60	$9.95	$22.74	$0.00	$74.29

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2024	$45.56	$9.95	$23.95	$0.00	$79.46
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	07/01/2024	$46.76	$9.95	$23.95	$0.00	$80.66
	01/01/2025	$47.96	$9.95	$23.95	$0.00	$81.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.78	$9.95	$0.00	$0.00	$32.73
2	55	$25.06	$9.95	$6.66	$0.00	$41.67
3	60	$27.34	$9.95	$7.26	$0.00	$44.55
4	65	$29.61	$9.95	$7.87	$0.00	$47.43
5	70	$31.89	$9.95	$20.32	$0.00	$62.16
6	75	$34.17	$9.95	$20.93	$0.00	$65.05
7	80	$36.45	$9.95	$21.53	$0.00	$67.93
8	90	$41.00	$9.95	$22.74	$0.00	$73.69

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.38	$9.95	$0.00	$0.00	$33.33
2	55	$25.72	$9.95	$6.66	$0.00	$42.33
3	60	$28.06	$9.95	$7.26	$0.00	$45.27
4	65	$30.39	$9.95	$7.87	$0.00	$48.21
5	70	$32.73	$9.95	$20.32	$0.00	$63.00
6	75	$35.07	$9.95	$20.93	$0.00	$65.95
7	80	$37.41	$9.95	$21.53	$0.00	$68.89
8	90	$42.08	$9.95	$22.74	$0.00	$74.77

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2024	$43.62	$9.95	$23.95	$0.00	$77.52
	07/01/2024	$44.82	$9.95	$23.95	$0.00	$78.72
	01/01/2025	$46.02	$9.95	$23.95	$0.00	$79.92

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.81	$9.95	$0.00	$0.00	$31.76
2	55	$23.99	$9.95	$6.66	$0.00	$40.60
3	60	$26.17	$9.95	$7.26	$0.00	$43.38
4	65	$28.35	$9.95	$7.87	$0.00	$46.17
5	70	$30.53	$9.95	$20.32	$0.00	$60.80
6	75	$32.72	$9.95	$20.93	$0.00	$63.60
7	80	$34.90	$9.95	$21.53	$0.00	$66.38
8	90	$39.26	$9.95	$22.74	$0.00	$71.95

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.41	$9.95	$0.00	$0.00	$32.36
2	55	$24.65	$9.95	$6.66	$0.00	$41.26
3	60	$26.89	$9.95	$7.26	$0.00	$44.10
4	65	$29.13	$9.95	$7.87	$0.00	$46.95
5	70	$31.37	$9.95	$20.32	$0.00	$61.64
6	75	$33.62	$9.95	$20.93	$0.00	$64.50
7	80	$35.86	$9.95	$21.53	$0.00	$67.34
8	90	$40.34	$9.95	$22.74	$0.00	$73.03

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$37.86	$9.65	$17.14	$0.00	$64.65
	06/01/2024	$39.19	$9.65	$17.14	$0.00	$65.98
	12/01/2024	$40.52	$9.65	$17.14	$0.00	$67.31
	06/01/2025	$41.91	$9.65	$17.14	$0.00	$68.70
	12/01/2025	$43.29	$9.65	$17.14	$0.00	$70.08
	06/01/2026	$44.73	$9.65	$17.14	$0.00	$71.52
	12/01/2026	$46.17	$9.65	$17.14	$0.00	$72.96
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$38.78	$15.07	$18.67	$0.00	$72.52
	06/01/2024	$39.78	$15.07	$18.67	$0.00	$73.52
	12/01/2024	$39.78	$15.07	$20.17	$0.00	$75.02
	01/01/2025	$39.78	$15.57	$20.17	$0.00	$75.52
	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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$9.40	$23.12	$0.00	$57.06
2	60	$29.44	$9.40	$23.12	$0.00	$61.96
3	70	$34.35	$9.40	$23.12	$0.00	$66.87
4	75	$36.80	$9.40	$23.12	$0.00	$69.32
5	80	$39.26	$9.40	$23.12	$0.00	$71.78
6	80	$39.26	$9.40	$23.12	$0.00	$71.78
7	90	$44.16	$9.40	$23.12	$0.00	$76.68
8	90	$44.16	$9.40	$23.12	$0.00	$76.68

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $34.01/ 3&4 $41.46/ 5&6 $62.80/ 7&8 $69.25

Apprentice to Journeyworker Ratio:1:5

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	03/01/2024	$65.28	$12.70	$21.80	$0.00	$99.78
	09/01/2024	$67.08	$12.70	$21.80	$0.00	$101.58
	03/01/2025	$68.88	$12.70	$21.80	$0.00	$103.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$26.11	$12.70	$9.05	$0.00	$47.86
2	45	$29.38	$12.70	$21.80	$0.00	$63.88
3	60	$39.17	$12.70	$21.80	$0.00	$73.67
4	70	$45.70	$12.70	$21.80	$0.00	$80.20
5	80	$52.22	$12.70	$21.80	$0.00	$86.72

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$26.83	$12.70	$9.05	$0.00	$48.58
2	45	$30.19	$12.70	$21.80	$0.00	$64.69
3	60	$40.25	$12.70	$21.80	$0.00	$74.75
4	70	$46.96	$12.70	$21.80	$0.00	$81.46
5	80	$53.66	$12.70	$21.80	$0.00	$88.16

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	03/03/2024	$67.74	$14.32	$19.11	$0.00	$101.17
	09/01/2024	$69.54	$14.32	$19.11	$0.00	$102.97
	03/02/2025	$71.34	$14.32	$19.11	$0.00	$104.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 03/03/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$23.71	$14.32	$6.88	$0.00	$44.91
2	40	$27.10	$14.32	$7.82	$0.00	$49.24
3	55	$37.26	$14.32	$10.65	$0.00	$62.23
4	65	$44.03	$14.32	$12.53	$0.00	$70.88
5	75	$50.81	$14.32	$14.41	$0.00	$79.54

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$24.34	$14.32	$6.88	$0.00	$45.54
2	40	$27.82	$14.32	$7.82	$0.00	$49.96
3	55	$38.25	$14.32	$10.65	$0.00	$63.22
4	65	$45.20	$14.32	$12.53	$0.00	$72.05
5	75	$52.16	$14.32	$14.41	$0.00	$80.89

Notes:
** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$69.00, Step5 with lic$76.87

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	03/01/2024	$65.28	$12.70	$21.80	$0.00	$99.78
	09/01/2024	$67.08	$12.70	$21.80	$0.00	$101.58
	03/01/2025	$68.88	$12.70	$21.80	$0.00	$103.38
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER *LABORERS - ZONE 2*	12/01/2023	$38.86	$9.65	$17.14	$0.00	$65.65
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$39.36	$9.40	$16.89	$0.00	$65.65
	06/01/2024	$40.69	$9.40	$16.89	$0.00	$66.98
	12/01/2024	$42.02	$9.40	$16.89	$0.00	$68.31
	06/01/2025	$43.41	$9.40	$16.89	$0.00	$69.70
	12/01/2025	$44.79	$9.40	$16.89	$0.00	$71.08
	06/01/2026	$46.23	$9.40	$16.89	$0.00	$72.52
	12/01/2026	$47.67	$9.40	$16.89	$0.00	$73.96

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS 170 - Dauphinais (Bellingham)*	01/01/2024	$27.00	$10.76	$5.45	$0.00	$43.21
	12/01/2024	$27.60	$11.26	$6.15	$0.00	$45.01
	01/01/2025	$27.60	$11.26	$6.15	$0.00	$45.01
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2024	$50.03	$12.78	$21.45	$0.00	$84.26
	08/01/2024	$51.53	$12.78	$21.45	$0.00	$85.76
	02/01/2025	$52.78	$12.78	$21.45	$0.00	$87.01
	08/01/2025	$54.28	$12.78	$21.45	$0.00	$88.51
	02/01/2026	$55.53	$12.78	$21.45	$0.00	$89.76

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.02	$12.78	$6.21	$0.00	$44.01
2	60	$30.02	$12.78	$21.45	$0.00	$64.25
3	65	$32.52	$12.78	$21.45	$0.00	$66.75
4	75	$37.52	$12.78	$21.45	$0.00	$71.75
5	85	$42.53	$12.78	$21.45	$0.00	$76.76

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.77	$12.78	$6.21	$0.00	$44.76
2	60	$30.92	$12.78	$21.45	$0.00	$65.15
3	65	$33.49	$12.78	$21.45	$0.00	$67.72
4	75	$38.65	$12.78	$21.45	$0.00	$72.88
5	85	$43.80	$12.78	$21.45	$0.00	$78.03

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*	02/01/2024	$50.28	$12.78	$21.45	$0.00	$84.51
	08/01/2024	$51.78	$12.78	$21.45	$0.00	$86.01
	02/01/2025	$53.03	$12.78	$21.45	$0.00	$87.26
	08/01/2025	$54.53	$12.78	$21.45	$0.00	$88.76
	02/01/2026	$55.78	$12.78	$21.45	$0.00	$90.01
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2024	$57.22	$14.59	$27.50	$2.98	$102.29
	08/01/2024	$58.97	$14.59	$27.50	$2.98	$104.04
	02/01/2025	$60.72	$14.59	$27.50	$2.98	$105.79
	08/01/2025	$62.57	$14.59	$27.50	$2.98	$107.64
	02/01/2026	$64.52	$14.59	$27.50	$2.98	$109.59

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$24.03	$14.59	$6.13	$0.00	$44.75
2	42	$24.03	$14.59	$6.13	$0.00	$44.75
3	47	$26.89	$14.59	$12.11	$1.61	$55.20
4	47	$26.89	$14.59	$12.11	$1.61	$55.20
5	52	$29.75	$14.59	$13.09	$1.72	$59.15
6	52	$29.75	$14.59	$13.34	$1.73	$59.41
7	60	$34.33	$14.59	$14.75	$1.91	$65.58
8	65	$37.19	$14.59	$15.73	$2.03	$69.54
9	75	$42.92	$14.59	$17.69	$2.26	$77.46
10	85	$48.64	$14.59	$19.15	$2.47	$84.85

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$24.77	$14.59	$6.13	$0.00	$45.49
2	42	$24.77	$14.59	$6.13	$0.00	$45.49
3	47	$27.72	$14.59	$12.11	$1.63	$56.05
4	47	$27.72	$14.59	$12.11	$1.63	$56.05
5	52	$30.66	$14.59	$13.09	$1.75	$60.09
6	52	$30.66	$14.59	$13.34	$1.76	$60.35
7	60	$35.38	$14.59	$14.75	$1.94	$66.66
8	65	$38.33	$14.59	$15.73	$2.06	$70.71
9	75	$44.23	$14.59	$17.69	$2.30	$78.81
10	85	$50.12	$14.59	$19.15	$2.52	$86.38

Notes:

Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.24	$15.07	$18.67	$0.00	$72.98
	06/01/2024	$40.24	$15.07	$18.67	$0.00	$73.98
	12/01/2024	$40.24	$15.07	$20.17	$0.00	$75.48
	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
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.53	$15.07	$18.67	$0.00	$73.27
	06/01/2024	$40.53	$15.07	$18.67	$0.00	$74.27
	12/01/2024	$40.53	$15.07	$20.17	$0.00	$75.77
	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 A) Zone 1*	03/01/2024	$69.75	$10.90	$23.20	$0.00	$103.85
	10/01/2024	$71.55	$10.90	$23.20	$0.00	$105.65
	03/01/2025	$73.35	$10.90	$23.20	$0.00	$107.45

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$24.41	$10.90	$12.80	$0.00	$48.11
2	40	$27.90	$10.90	$13.60	$0.00	$52.40
3	45	$31.39	$10.90	$14.40	$0.00	$56.69
4	50	$34.88	$10.90	$15.20	$0.00	$60.98
5	55	$38.36	$10.90	$16.00	$0.00	$65.26
6	60	$41.85	$10.90	$16.80	$0.00	$69.55
7	65	$45.34	$10.90	$17.60	$0.00	$73.84
8	70	$48.83	$10.90	$18.40	$0.00	$78.13
9	75	$52.31	$10.90	$19.20	$0.00	$82.41
10	80	$55.80	$10.90	$20.00	$0.00	$86.70

Effective Date - 10/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$25.04	$10.90	$12.80	$0.00	$48.74
2	40	$28.62	$10.90	$13.60	$0.00	$53.12
3	45	$32.20	$10.90	$14.40	$0.00	$57.50
4	50	$35.78	$10.90	$15.20	$0.00	$61.88
5	55	$39.35	$10.90	$16.00	$0.00	$66.25
6	60	$42.93	$10.90	$16.80	$0.00	$70.63
7	65	$46.51	$10.90	$17.60	$0.00	$75.01
8	70	$50.09	$10.90	$18.40	$0.00	$79.39
9	75	$53.66	$10.90	$19.20	$0.00	$83.76
10	80	$57.24	$10.90	$20.00	$0.00	$88.14

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 *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2024	$61.34	$11.49	$23.59	$0.00	$96.42
	08/01/2024	$63.44	$11.49	$23.59	$0.00	$98.52
	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

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.67	$11.49	$23.59	$0.00	$65.75
2	60	$36.80	$11.49	$23.59	$0.00	$71.88
3	70	$42.94	$11.49	$23.59	$0.00	$78.02
4	80	$49.07	$11.49	$23.59	$0.00	$84.15
5	90	$55.21	$11.49	$23.59	$0.00	$90.29

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.72	$11.49	$23.59	$0.00	$66.80
2	60	$38.06	$11.49	$23.59	$0.00	$73.14
3	70	$44.41	$11.49	$23.59	$0.00	$79.49
4	80	$50.75	$11.49	$23.59	$0.00	$85.83
5	90	$57.10	$11.49	$23.59	$0.00	$92.18

Notes:

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$48.33	$9.65	$18.22	$0.00	$76.20
	06/01/2024	$49.81	$9.65	$18.22	$0.00	$77.68
	12/01/2024	$51.28	$9.65	$18.22	$0.00	$79.15
	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"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.45	$9.65	$18.22	$0.00	$72.32
	06/01/2024	$45.93	$9.65	$18.22	$0.00	$73.80
	12/01/2024	$47.40	$9.65	$18.22	$0.00	$75.27
	06/01/2025	$48.90	$9.65	$18.22	$0.00	$76.77
	12/01/2025	$50.40	$9.65	$18.22	$0.00	$78.27
	06/01/2026	$51.95	$9.65	$18.22	$0.00	$79.82
	12/01/2026	$53.45	$9.65	$18.22	$0.00	$81.32
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	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"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.82	$15.07	$18.67	$0.00	$73.56
	06/01/2024	$40.82	$15.07	$18.67	$0.00	$74.56
	12/01/2024	$40.82	$15.07	$20.17	$0.00	$76.06
	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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	12/01/2023	$56.56	$9.65	$18.67	$0.00	$84.88
	06/01/2024	$58.04	$9.65	$18.67	$0.00	$86.36
	12/01/2024	$59.51	$9.65	$18.67	$0.00	$87.83
	06/01/2025	$61.01	$9.65	$18.67	$0.00	$89.33
	12/01/2025	$62.51	$9.65	$18.67	$0.00	$90.83
	06/01/2026	$64.06	$9.65	$18.67	$0.00	$92.38
	12/01/2026	$65.56	$9.65	$18.67	$0.00	$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2023	$58.56	$9.65	$18.67	$0.00	$86.88
	06/01/2024	$60.04	$9.65	$18.67	$0.00	$88.36
	12/01/2024	$61.51	$9.65	$18.67	$0.00	$89.83
	06/01/2025	$63.01	$9.65	$18.67	$0.00	$91.33
	12/01/2025	$64.51	$9.65	$18.67	$0.00	$92.83
	06/01/2026	$66.06	$9.65	$18.67	$0.00	$94.38
	12/01/2026	$67.56	$9.65	$18.67	$0.00	$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2023	$48.63	$9.65	$18.67	$0.00	$76.95
	06/01/2024	$50.11	$9.65	$18.67	$0.00	$78.43
	12/01/2024	$51.58	$9.65	$18.67	$0.00	$79.90
	06/01/2025	$53.08	$9.65	$18.67	$0.00	$81.40
	12/01/2025	$54.58	$9.65	$18.67	$0.00	$82.90
	06/01/2026	$56.13	$9.65	$18.67	$0.00	$84.45
	12/01/2026	$57.63	$9.65	$18.67	$0.00	$85.95
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2023	$50.63	$9.65	$18.67	$0.00	$78.95
	06/01/2024	$52.11	$9.65	$18.67	$0.00	$80.43
	12/01/2024	$53.58	$9.65	$18.67	$0.00	$81.90
	06/01/2025	$55.08	$9.65	$18.67	$0.00	$83.40
	12/01/2025	$56.58	$9.65	$18.67	$0.00	$84.90
	06/01/2026	$58.13	$9.65	$18.67	$0.00	$86.45
	12/01/2026	$59.63	$9.65	$18.67	$0.00	$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2024	$39.24	$15.07	$18.67	$0.00	$72.98
	06/01/2024	$40.24	$15.07	$18.67	$0.00	$73.98
	12/01/2024	$40.24	$15.07	$20.17	$0.00	$75.48
	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
VOICE-DATA-VIDEO TECHNICIAN *ELECTRICIANS LOCAL 96*	09/03/2023	$34.49	$13.00	$17.22	$0.00	$64.71
	09/01/2024	$35.29	$13.99	$17.57	$0.00	$66.85
	09/07/2025	$36.12	$14.98	$17.91	$0.00	$69.01
	09/06/2026	$37.04	$15.96	$18.27	$0.00	$71.27

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *VOICE-DATA-VIDEO TECHNICIAN - Local 96*

Effective Date - 09/03/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.25	$13.00	$4.31	$0.00	$34.56
2	55	$18.97	$13.00	$4.36	$0.00	$36.33
3	60	$20.69	$13.00	$16.81	$0.00	$50.50
4	65	$22.42	$13.00	$16.86	$0.00	$52.28
5	70	$24.14	$13.00	$16.91	$0.00	$54.05
6	75	$25.87	$13.00	$16.97	$0.00	$55.84
7	80	$27.59	$13.00	$17.02	$0.00	$57.61
8	85	$29.32	$13.00	$17.07	$0.00	$59.39

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.65	$13.99	$4.41	$0.00	$36.05
2	55	$19.41	$13.99	$4.46	$0.00	$37.86
3	60	$21.17	$13.99	$17.15	$0.00	$52.31
4	65	$22.94	$13.99	$17.20	$0.00	$54.13
5	70	$24.70	$13.99	$17.25	$0.00	$55.94
6	75	$26.47	$13.99	$17.30	$0.00	$57.76
7	80	$28.23	$13.99	$17.36	$0.00	$59.58
8	85	$30.00	$13.99	$17.41	$0.00	$61.40

Notes:

Apprentice to Journeyworker Ratio:1:1

WAGON DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2023	$38.11	$9.65	$17.14	$0.00	$64.90
	06/01/2024	$39.44	$9.65	$17.14	$0.00	$66.23
	12/01/2024	$40.77	$9.65	$17.14	$0.00	$67.56
	06/01/2025	$42.16	$9.65	$17.14	$0.00	$68.95
	12/01/2025	$43.54	$9.65	$17.14	$0.00	$70.33
	06/01/2026	$44.98	$9.65	$17.14	$0.00	$71.77
	12/01/2026	$46.42	$9.65	$17.14	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	03/03/2024	$67.74	$14.32	$19.11	$0.00	$101.17
	09/01/2024	$69.54	$14.32	$19.11	$0.00	$102.97
	03/02/2025	$71.34	$14.32	$19.11	$0.00	$104.77
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

SECTION 00 73 73

STATUTORY REQUIREMENTS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2007 Edition) included in Section 00 72 05. Provisions not so amended or supplemented remain in full force and effect unless amended or supplemented in another section. The terms used in this section have the meanings stated in the General Conditions. Additional terms used in this section, if any, have the meanings stated below which are applicable to both the singular and plural thereof. The address system used herein is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

This section includes certain provisions required by Laws and Regulations but does not represent or reflect all applicable provisions and policies or Laws and Regulations and may only include excerpts and portions thereof. Other required provisions and policies, and Laws and Regulations, shall be deemed to be so included and incorporated herein. Contractor is solely responsible to determine, obtain, review and interpret the full text of applicable provisions and policies, Regulations, and Laws.

The Project is specifically subject to the provisions of the Massachusetts General Laws ("MGL").

SC-1.01.A.15 *Contractor*

Add the following language at the end of the definition.

> Also referred to as "general Contractor" in applicable statutory provisions which may be used interchangeably and shall have the same meaning.

SC-1.01.A.29 *Owner*

Add the following language at the end of the definition.

> Also referred to as "*Awarding Authority*" or "*contracting authority*" in applicable statutory provisions which may be used interchangeably and shall have the same meaning.

SC-1.01.A.44 *Substantial Completion*

Add the following language at the end of the definition.

> For the purposes of MGL Chapter 30, Section 39G, *Completion of public works; semi-final and final estimates; payments*; *extra work; disputed items*, Substantial Completion shall also mean either that the Work has been completed except for Work having a valued at less than 1 percent of the then adjusted total Contract Price, or substantially all of the Work has been completed and opened to public use except for minor incomplete or unsatisfactory Work items that do not materially impair the usefulness of the Work as required by the Contract.

SC-1.01.B *Additional Terms*

Add the following new definition.

7. *material or Material* -- As used in MGL Chapter 30, Section 39M, *Contracts for construction and materials; manner of awarding,* regarding items equal to those specified, the word "material" shall mean and include any article, assembly, system, included in the Work, or any component part thereof.

SC-3 *CONTRACT DOCUMENTS: INTENT, AMEND, REUSE*

Add the following immediately after Paragraph 3.06.

3.07 *Public Records*

B. Pursuant to MGL Chapter 66 et seq, *Public Records*, related submittals, purchase orders, related pricing documents, and invoices will be public documents, and may be available for public and private distribution, except as specifically excluded. The Contractor will provide the Owner copies of any documents requested under this Law at no charge to the Owner or the requestor.

SC-4.03 *Differing Subsurface or Physical Conditions*

Delete Paragraph 4.03.B in its entirety and insert the following in its place.

B. Pursuant to MGL Chapter 30, Section 39N*, Construction contracts; equitable adjustment in contract price for differing subsurface or latent physical conditions*:

"If, during the progress of the Work, the Contractor or the Awarding Authority discovers that the actual subsurface or latent physical conditions encountered at the Site differ substantially or materially from those shown on the Plans or indicated in the Contract Documents either the Contractor or the contracting authority may request an equitable adjustment in the Contract Price of the Contract applying to Work affected by the differing Site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the Plans or indicated in the Contract Documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Plans and Contract Documents and are of such a nature as to cause an increase or decrease in the cost of performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the contracting authority shall make an equitable adjustment in the Contract Price and the Contract shall be modified in writing accordingly."

SC-5.01 ***Performance, Payment, and Other Bonds***

Add the following immediately after Paragraph 5.01.A.

1. Pursuant to MGL Chapter 30, Section 39A*, Construction contracts for public ways, airports or public works; truck rentals; security for payment,* and MGL Chapter 149, Section 29, *Bonds for payment for labor, materials, rentals or transportation charges (et al),* the required payment bond shall also cover payment by the Contractor and Subcontractors for the rental or hire of dump trucks and ". . .. the rental or hire of vehicles, steam shovels, rollers propelled by steam or other power, concrete mixers, tools and other appliances and equipment employed in such construction, . . ." and ". . . for payment of transportation charges directly related to such rental or hire. . ." Such security for payment of transportation charges shall be incorporated by appropriate reference thereto as an additional obligation or condition in the required bonds.

2. In addition, such bonds shall cover ". . . payment by Contractor and Subcontractors of any sums due trustees or other persons authorized to collect such payments from the Contractor or Subcontractors, for health and welfare plans, supplementary unemployment benefit plans and other fringe benefits which are payable in cash and provided for in collective bargaining agreements between organized labor and the Contractor or Subcontractors."

SC-5.02 ***Licensed Sureties and Insurers***

Add the following immediately after Paragraph 5.02.A.

1. Pursuant to MGL Chapter 149, Section 29D, *Surety company; bonds:*

   "Every bid bond, every performance bond and every payment bond issued for any construction work in the commonwealth shall be the bond of a surety company organized pursuant to section 105 of chapter 175 or of a surety company authorized to do business in the commonwealth under the provisions of section 106 of said chapter 175 and be approved by the U.S. Department of Treasury and are acceptable as sureties and reinsurers on federal bonds under Title 31 of the United States Code, sections 9304 to 9308. "

2. If there is more than one surety company, the surety companies shall be jointly and severally liable.

SC-5.04 *Contractor's Insurance*

Add the following language at the end of subparagraph 5.04.A.1.

, pursuant to MGL Chapter 149, Section 34A, *Contracts for public works; workers' compensation insurance; breach of contract; enforcement and violation of statute:*

"Every Contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public building or other public works for the commonwealth or any political subdivision thereof shall contain stipulations requiring that the Contractor shall, before commencing performance of such Contract, provide by insurance for the payment of compensation and the furnishing of other benefits under chapter one hundred and fifty-two to all persons to be employed under the Contract, and that the Contractor shall continue such insurance in full force and effect during the term of the Contract. No officer or agent contracting in behalf of the commonwealth or any political subdivision thereof shall award such a Contract until he has been furnished with sufficient proof of compliance with the aforesaid stipulations. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the Contract and shall operate as an immediate termination thereof. No cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the officer or agent who awarded the Contract at least fifteen days prior to the intended effective date thereof, which date shall be expressed in said notice. Notice of cancellation sent by the party proposing cancellation by registered mail, postage prepaid, with a return receipt of the addressee requested, shall be a sufficient notice. An affidavit of any officer, agent or employee of the insurer or of the insured, as the case may be, duly authorized for the purpose, that he has so sent such notice addressed as aforesaid shall be prima facie evidence of the sending thereof as aforesaid. This section shall apply to the legal representative, trustee in bankruptcy, receiver, assignee, trustee and the successor in interest of any such Contractor. The superior court shall have jurisdiction in equity to enforce this section.

"Whoever violates any provision of this section shall be punished by a fine of not more than one hundred dollars or by imprisonment for six months, or both; and, in addition, any contractor who violates any provision of this section shall be prohibited from contracting, directly or indirectly, with the commonwealth or any political subdivision thereof, for the construction, alteration, demolition, maintenance or repair of, or addition to, any public works or public building for a period of two years from the date of conviction of said violation."

Delete the words "materially changed" per Massachusetts insurance Laws in subparagraph 5.04.B.4. line 2.

Add the following language at the end of subparagraph 5.04.C.1,

, in compliance with MGL Chapter 152

SC-5.06 ***Property Insurance***

Delete the words "or materially changed" per Massachusetts insurance Laws in Paragraph 5.04.C. line 3.

SC-6.02 ***Labor; Working Hours***

Add the following immediately after Paragraph 6.02.A.

1. Pursuant to MGL Chapter 30, Section 39S, *Contracts for construction; requirements***,** Contractor shall furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work.

2. Pursuant to MGL Chapter 149, Section 26*, Public works; preference to veterans and citizens; wages,* preference shall be given to citizens of the Commonwealth of Massachusetts, citizens of the town or city where the Project is located, veterans and service-disabled veterans, and citizens of the United States.

3. The Contractor shall comply with the provisions of MGL Chapter 151B, *Unlawful Discrimination Because of Race, Color, Religious Creed, National Origin, Ancestry or Sex.*

4. The Contractor shall not participate in or cooperate with an international boycott, as defined in Section 999 (b)(3) and (4) of the Internal Revenue Code as amended, or engage in conduct declared to be unlawful by MGL Chapter 151E, *Prohibition Of Certain Discrimination By Businesses, Section 2.*

Add the following immediately after Paragraph 6.02.B.

1. Pursuant to MGL Chapter 149, Section 30, *Eight hour day and six day week; emergencies; work on highways,* and Section 34*, Public contracts; stipulation as to hours and days of work; void contracts*:

   "Every contract, except for the purchase of material or supplies, involving the employment of laborers, workmen, mechanics, foremen or inspectors, to which the commonwealth or any county or any town, subject to section thirty, is a party, shall contain a stipulation that no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency, or, in case any town subject to section thirty-one is a party to such a contract, more than eight

hours in any one day, except as aforesaid; provided, that in contracts entered into by the department of highways for the construction or reconstruction of highways there may be inserted in said stipulation a provision that said department, or any contractor or sub-contractor for said department, may employ laborers, workmen, mechanics, foremen and inspectors for more than eight hours in any one day in such construction or reconstruction when, in the opinion of the commissioner, public necessity so requires. Every such contract not containing the aforesaid stipulation shall be null and void."

SC-6.05 ***Substitutes and "Or-Equals"***

Add the following language at the end of Paragraph 6.05.A.

The provisions of MGL Chapter 30, Section 39M, subsection (b) also apply to this Paragraph.

SC-6.09 ***Laws and Regulations***

Add the following immediately after Paragraph 6.09.A

1. MGL Chapter 260, Section 2B *Tort Actions Arising from Improvements to Real Property* shall apply.

SC-6.10 ***Taxes***

Add the following immediately after Paragraph 6.10.A.

1. MGL Chapter 64H, Section 6*, Exemptions,* subsection (f), exempts from Massachusetts sales tax, building materials and supplies to be used in the Project, and Contractor shall not include any amount therefor. The words "building materials and supplies" shall include all materials and supplies consumed, employed or expended in the construction, reconstruction, alteration, remodeling or repair of any building, structure, public highway, bridge, or other such public work, as well as such materials and supplies physically incorporated therein. Said words shall also include rental charges for construction vehicles, equipment and machinery rented specifically for use on the Project Site, or while being used exclusively for the transportation of materials for the Project.

SC-6.12 *Record Documents*

Add the following immediately after Paragraph 6.12.A.

B. Subject to the provisions of MGL Chapter 266, Section 67C, *Capital facility construction projects, etc.; false entries in records; penalties,* and pursuant to MGL Chapter 30, Section 39R*, Keeping and maintaining books, records, and accounts; statement of management on internal accounting control; financial statements; enforcement:*

> "(b). . .(1) The Contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor, and
>
> "(2) until the expiration of six years after final payment, the office of inspector general, and the commissioner of capital asset management and maintenance shall have the right to examine any books, documents, papers or records of the Contractor or of his Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or his Subcontractors, and
>
> "(3) if the agreement is a contract as defined herein, the Contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the Awarding Authority, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the Contractor's independent certified public accountant approving or otherwise commenting on the changes, and
>
> "(4) if the agreement is a contract as defined herein, the Contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and
>
> "(5) if the agreement is a contract as defined herein, the Contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.
>
> "(c) Every Contractor awarded a contract shall file with the Awarding Authority a statement of management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:
>
> "(1) transactions are executed in accordance with management's general and specific authorization;

"(2) transactions are recorded as necessary

i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

ii. to maintain accountability for assets;

"(3) access to assets is permitted only in accordance with management's general or specific authorization; and

"(4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference. Every Contractor awarded a contract shall also file with the Awarding Authority a statement prepared and signed by an independent certified public accountant, stating that he has examined the statement of management on internal accounting controls, and expressing an opinion as to (1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and (2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

"(d) Every Contractor awarded a contract by the commonwealth or by any political subdivision thereof shall annually file with the commissioner of capital asset management and maintenance during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the Awarding Authority upon request.

"(e) . . . A Contractor's failure to satisfy any of the requirements of this section may be grounds for debarment pursuant to section forty-four C of chapter one hundred and forty-nine.

"(f) Records and statements required to be made, kept or filed under the provisions of this section shall not be public records as defined in section seven of chapter four and shall not be open to public inspection; provided, however, that such records and statements shall be made available pursuant to the provisions of clause (2) of paragraph (b)."

SC-6.13 *Safety and Protection*

Add the following immediately after subparagraph 6.13.B.1. (added in Section 00 73 10).

2. Pursuant to *MGL Chapter 30, Section 39S*, all employees to be employed at the Work Site 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. Any employee found on a Work Site subject to this section without documentation of successful completion of 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 shall be subject to immediate removal.

3. This Project is also subject to the following.

   - MGL Chapter 82, *The Laying Out, Alteration, Relocation and Discontinuance Of Public Ways, And Specific Repairs Thereon*, *Section 40*
     Section 40 Definitions
     Section 40A Excavations; notice
     Section 40B Designation of location of underground facilities
     Section 40C Excavator's responsibility to maintain designation markings; damage caused by excavator
     Section 40D Local laws requiring excavation permits; public ways
     Section 40E: Violations of Secs. 40A to 40E; punishment
   - MGL Chapter 82A, *Excavation and Trench Safety*
     Section 1 Unattended open trenches; safety hazards; rules and regulations; fines
     Section 2 Trench excavating permits; permits issued by board or officer; certificate of insurance; fees
     Section 3 Form of trench excavation permits; required statements
     Section 4 Definitions
     Section 5 Additional requirements
   - MGL Chapter 149
     Section 6C Health and safety of general public and asbestos workers; rules and regulations
     Section 129A Shoring Trenches for local governments
   - Massachusetts Department of Labor and Industries, Division of Occupational Safety (Chapter 454 CMR 10.00 et seq.)
   - Massachusetts Department of Public Safety "*Excavation and Trench Safety*" (Chapter 520 CMR 14.00 et seq.)

SC-6.20 *Indemnification*

Add the following immediately after subparagraph 6.20.C.3.

D. The provisions of MGL Chapter 258, *Claims and Indemnity Procedure for the Commonwealth, its Municipalities, Counties and Districts and the Officers and Employees Thereof* shall apply.

SC-8.09 *Limitations on Owner's Responsibilities*

Add the following immediately after Paragraph 8.09.A.

1. Pursuant to MGL Chapter 30, Section 39J *Public construction contracts; effect of decisions of contracting body or administrative board,* a decision on a dispute shall not be final or conclusive if such decision is made in bad faith, fraudulently, capriciously, or arbitrarily, is unsupported by substantial evidence, or is based upon error of law.

SC-9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

Replace "with reasonable promptness" with "within 30 days pursuant to MGL Chapter 30, Section 39P, *Contracts for construction and materials; awarding authority's decisions on interpretation of specifications, etc.; time limit; notice* in Paragraph 9.08.B.

Add the following new paragraph immediately after Paragraph 9.08.D.

E. Pursuant to MGL Chapter 30, Section 39J *Public construction contracts; effect of decisions of contracting body or administrative board,* a decision on a dispute shall not be final or conclusive if such decision is made in bad faith, fraudulently, capriciously, or arbitrarily, is unsupported by substantial evidence, or is based upon error of law.

SC-10.01 *Authorized Changes in the Work*

Add the following immediately after Paragraph 10.01.A.

1. Changes to the Work are subject to the requirements of MGL Chapter 30, Section 39I, *Deviations from plans and specifications.*

SC-10.05 *Claims*

Add the following immediately after Paragraph 10.05.G.

H. Presentation of false, fictitious, or fraudulent Claims is subject to the provisions of MGL Chapter 266, Section 67B, *Presentation of false claims*.

SC-11.01. ***Cost of the Work***

Add the following immediately after subparagraph 11.01.A.1.

a. Comply with prevailing wage requirements included in Section 00 73 43.

Add the following immediately after subparagraph 11.01.A.4.

a. Pursuant to MGL Chapter 149, Section 34B, *Contracts for public works; wages for reserve police officer,* the Contractor shall pay to any reserve police officer employed by him in any city or town, the prevailing rate of wage paid to regular police officers in such city or town.

Add the following immediately after subparagraph 11.01.A.5.d.

1) The Project is exempt from sales tax as set forth in SC-6.10.

SC-12.01 ***Change of Contract Price***

Add the following immediately after subparagraph 12.01.B.3. as required by MGL Chapter 30, Section 38A *Price adjustment clause in contracts for road, bridge, water and sewer projects awarded.*

4. ***Monthly Price Adjustments for Certain Materials***: As required by Massachusetts Chapter 150 of the Acts of 2013, the following price adjustment clauses for fuel (both diesel and gasoline), liquid asphalt and Portland cement contained in cast-in-place concrete shall be applicable to the Project. The following Base Prices are established for the Project, based on period prices shown below as published by the Massachusetts Department of Transportation - Highway Division at

https://www.mass.gov/service-details/massdot-current-contract-price-adjustments

Liquid Asphalt - $637.50 per TON (April, 2024)
Diesel - $3.155 per GALLON (March, 2024)
Gasoline - $2.695 per GALLON (March, 2024)
Portland Cement - $425.53 per TON (April, 2024)

a. **Monthly Price Adjustment for Hot Mix Asphalt (HMA) Mixtures**: This adjustment will provide for either additional compensation to the Contractor or repayment to the Owner, depending on an increase or decrease in the Period Price of Liquid Asphalt.

1) Base Price: The Base Price of liquid asphalt listed above is the fixed price determined at the time of Bid by the Owner by using the same method as for the determination of the Period Price detailed below.

2) Price Adjustment: The Price Adjustment will be based on the variance in price for the liquid asphalt component only from the Base Price to the Period Price. It shall not include transportation or other charges. This Price Adjustment will occur on a monthly basis.

3) Period Price: The Period Price for this Contract shall be the Liquid Asphalt Period Price, per Ton.

4) Applicability: The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the Project in accordance with the Contract Documents.

5) Payment/Credit of Price Adjustment: The Contract Price of the hot mix asphalt mixture will be paid under the respective items in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the Work has been performed, using the monthly Period Price for the month during which the Work was performed. The Price Adjustment will be a separate payment item and processed by Change Order. It will be determined by multiplying the number of tons of hot mix asphalt mixtures placed within pay limits during each monthly period as shown on submitted certified weigh slips times the liquid asphalt content percentage times the variance in price between Base Price and Period Price of liquid asphalt. This Price Adjustment will be paid or credited if the variance from the Base Price is 5 percent or more for a monthly period. No further Price Adjustments will be processed after the Contract is finally complete, unless an extension of Contract Time is approved by the Owner.

b. **Monthly Price Adjustment for Diesel Fuel and Gasoline**: This adjustment will provide for either additional compensation to the Contractor or repayment to the Owner, depending on an increase or decrease in the Period Price of Diesel Fuel or Gasoline.

1) Base Price: The Base Price of Diesel Fuel and Gasoline listed above is the fixed price determined at the time of Bid by the Owner by using the same method as for the determination of the Period Price detailed below.

2) Price Adjustment: The Price Adjustment will be based on the variance in price from the Base Price to the Period Price.

3) Period Price: The Period Price for this Contract shall be the current Diesel Period Price and Gasoline Period Price per Gallon.

4) Applicability: The fuel Price Adjustment will apply to the overall Project.

5) Payment/Credit of Price Adjustment: The Price Adjustment will be a separate payment item and processed by Change Order. The price adjustment, as herein provided, upwards or downwards, will be made after the Work has been performed, using the monthly Period Price for the month during which the Work was performed. This Price Adjustment will be paid or credited if the variance from the Base Price is 5 percent or more for a monthly period. No further Price Adjustments will be processed after the Contract is finally complete, unless an extension of Contract Time is approved by the Owner.

c. **Monthly Price Adjustment for Portland Cement Concrete Mixes**: This adjustment will provide for either additional compensation to the Contractor or repayment to the Owner, depending on an increase or decrease in the Period Price of Portland cement.

1) Base Price: The Base Price of Portland cement listed above is the fixed price determined at the time of Bid by the Owner by using the same method as for the determination of the Period Price detailed below.

2) Price Adjustment: The Price Adjustment will be based on the variance in price for the Portland cement component only from the Base Price to the Period Price. It shall not include transportation or other charges. This Price Adjustment will occur on a monthly basis.

3) Period Price: The Period Price for this Contract shall be the current Portland cement Period Price per Ton.

4) Applicability: The price adjustment applies only to the actual Portland cement content in the mix placed on the Project in accordance with the Contract Documents.

5) Payment/Credit of Price Adjustment: The Contract Price of the Portland cement content in the mix will be paid under the respective items in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the Work has been performed, using the monthly Period Price for the month during which the Work was performed. The Price Adjustment will be a separate payment item and processed by Change Order. It will be determined by multiplying the number of cubic yards of Portland cement concrete placed during each monthly period times the Portland cement content percentage times the variance in price between the Base Price and Period Price of Portland cement. This Price Adjustment will be paid or credited if the variance from the Base Price is 5 percent or more for a monthly period. No further Price Adjustments will be processed after the Contract is finally complete, unless an extension of Contract Time is approved by the Owner.

SC-14.02. ***Progress Payments***

Add the following language to Paragraph 14.02.A.

The provisions of MGL Chapter 30, Section 39G*, Completion of public works; semi-final and final estimates; payments; extra work; disputed items*, covering "periodic estimate" and "periodic payment" apply to this Project and shall be considered Progress Payments per Paragraph 14.02. The forms listed in Section 00 60 00 and included in the Contract Documents will be utilized.

Add the following immediately after subparagraph 14.02.A.1.

a. Pursuant to MGL Chapter 30, Section 39S, *Contracts for construction; requirements***,** provide certification for each employee employed at the Work Site of successful completion of 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.

Add the following immediately after subparagraph 14.02.D.3.

E. Pursuant to MGL Chapter 30, Section 39F, *Construction contracts; assignment and subrogation; subcontractor defined; enforcement of claim for direct payment; deposit, reduction of disputed amounts* regarding payment to Subcontractors, the following provisions shall be included in any subcontract in connection with Work under the Contract Documents.

"(a) Forthwith after the general Contractor receives payment on account of a periodic estimate, the general Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the general Contractor.

"(b) Not later than the 65th day after each Subcontractor substantially completes his Work in accordance with the Plans and Specifications, the entire balance due under the subcontract less amounts retained by the Awarding Authority as the estimated cost of completing the incomplete and unsatisfactory items of Work, shall be due the Subcontractor; and the Awarding Authority shall pay that amount to the general Contractor. The general Contractor shall forthwith pay to the Subcontractor the full amount received from the Awarding Authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the general Contractor.

"(c) Each payment made by the Awarding Authority to the general Contractor pursuant to subparagraphs (a) and (b) above for the labor performed and the materials furnished by a Subcontractor shall be made to the general Contractor for the account of that Subcontractor; and the Awarding Authority shall take reasonable steps to compel the general Contractor to make each such payment to each such Subcontractor. If the Awarding Authority has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the general Contractor or which is to be included in a payment to the general Contractor for payment to the Subcontractor as provided in subparagraphs (a) and (b) above, the Awarding Authority shall act upon the demand as provided in this section of the MGL.

"(d) If, within seventy days after the Subcontractor has substantially completed the subcontract Work, the Subcontractor has not received from the general Contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general Contractor, less any amount retained by the Awarding Authority as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the Awarding Authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the Awarding Authority, and a copy shall be delivered to or sent by certified mail to the general Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially

completed the subcontract work. Within 10 days after the Subcontractor has delivered or so mailed the demand to the Awarding Authority and delivered or so mailed a copy to the general Contractor, the general Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Awarding Authority and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general Contractor and of the amount due for each Claim made by the general Contractor against the Subcontractor.

"(e) Within fifteen days after receipt of the demand by the Awarding Authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the Awarding Authority shall make direct payment to the Subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general Contractor, less any amount (i) retained by the Awarding Authority as the estimated cost of completing the incomplete or unsatisfactory items of Work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general Contractor in the sworn reply; provided, that the Awarding Authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The Awarding Authority shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

"(f) The Awarding Authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) above in an interest-bearing joint account in the names of the general Contractor and the Subcontractor in a bank in Massachusetts selected by the Awarding Authority or agreed upon by the general Contractor and the Subcontractor and shall notify the general Contractor and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.

"(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) above shall be made out of amounts payable to the general Contractor at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts which later become payable to the general Contractor and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the

obligation of the Awarding Authority to the general Contractor to the extent of such payment.

"(h) The Awarding Authority shall deduct from payments to a general Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f) above, are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any Claims against such amounts by creditors of the general Contractor."

SC 14.04 ***Substantial Completion***

Add the following immediately after Paragraph 14.04.E.

F. The provisions of MGL Chapter 30, Section 39G*, Completion of public works; semi-final and final estimates; payments; extra work; disputed items,* covering substantial completion apply to this Project. The forms listed in Section 00 60 00 and included in the Contract Documents will be utilized.

SC 14.07 ***Final Payment***

Add the following immediately after subparagraph 14.07.A.1.

a. The provisions *of* MGL Chapter 30, Section 39G, *Completion of public works; semi-final and final estimates; payments; extra work; disputed items* covering the final estimate and completion of the Work apply to this Project. The forms listed in Section 00 60 00 and included in the Contract Documents will be utilized.

SC-15.01 ***Owner May Suspend Work***

Add the following immediately after Paragraph 15.01.A.

1. Pursuant to MGL Chapter 30, Section 39O, *Contracts for construction and materials; suspension, delay or interruption due to order of awarding authority; adjustment in contract price; written claim*:

". . . (a) The Awarding Authority may order the general Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Awarding Authority; provided however, that if there is a suspension, delay or interruption for 15 days or more or due to a failure of the Awarding Authority to act within the time specified in the Contract, the Awarding Authority shall make an adjustment in the Contract Price for any increase in the cost of performance of the Contract but shall not include any profit to the general Contractor on such increase; and provided further, that the

Awarding Authority shall not make any adjustment in the Contract Price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract Price under any other Contract provisions.

"(b) The general Contractor must submit the amount of a Claim under provision (a) above to the Awarding Authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under the Contract and, except for costs due to a suspension order, the Awarding Authority shall not approve any costs in the Claim incurred more than 20 days before the general Contractor notified the Awarding Authority in writing of the act or failure to act involved in the Claim.

"In the event a suspension, delay, interruption or failure to act of the Awarding Authority increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the general Contractor for payment for an increase in the cost of his performance as provisions (a) and (b) above give the general Contractor against the Awarding Authority, but nothing in provisions (a) and (b) above shall in any way change, modify or alter any other rights which the general Contractor or the Subcontractor may have against each other."

SC-17.05 ***Controlling Law***

Add the following immediately after Paragraph 17.05.A.

1. This Contract is subject to all Laws and Regulations of the United States of America (including the U.S. Code of Federal Regulations), the Commonwealth of Massachusetts and other public authorities, and all amendments thereto. Where any requirements contained herein do not conform to or are inconsistent with such Laws and Regulations to which the Contract is subject or by which it is governed, such Laws and Regulations shall have precedence over any matters set forth herein.

2. The Project is specifically subject to MGL Chapters 30 and 149 for contracts awarded pursuant to MGL Chapter 30, Section 39M.

3. Statutes, Regulations, and portions and summaries thereof which are set forth or referred to in the Contract Documents shall be construed to include all amendments thereto in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids). The Owner and Engineer make no representation as to and assume no responsibility for the correctness or completeness of such statutory matters referred to or set forth herein.

4. Any provision in violation of the foregoing shall be deemed null, void and of no effect. Where conflicts with Laws and Regulations exist, the more stringent requirement shall apply.

END OF SECTION

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Project Description

B. Description of the Work

C. Work Sequence and Coordination

D. Special Requirements

E. Attachments

1.02 PROJECT DESCRIPTION

A. The Project is generally described as the Brigham Street Culvert Replacement and Park Street Culvert Maintenance Project.

1.03 DESCRIPTION OF THE WORK

A. The Work includes labor, material and equipment, services required for construction, testing, and commissioning of the Project in accordance with the Contract Documents and as more specifically described in the Specifications and Drawings and includes, but is not limited to, the following principal features.

1. Installation of temporary erosion and sedimentation control measures including a coffer dam, turbidity curtain, and sediment barriers.

2. Providing temporary support and protection for existing utilities designated to remain within the Project limit of Work.

3. Excavation and removal and disposal of the existing culvert underneath Brigham Street.

4. Installation of concrete culvert, associated headwalls, and backfilling with proposed aggregate materials.

5. Installation of cleanout structure on Park Street culvert.

6. Restoration of any temporarily disturbed areas adjacent to the Brigham Street and Park Street culverts.

7. Repair of any temporarily disturbed areas adjacent to the stream bed.

8. Grading adjacent to Brigham Street and Park Street.

9. Paving, installation of guardrail and rehabilitation of surface conditions along Brigham Street.

10. Stabilization of affected surface areas within the Project limit of Work; and all material and equipment, construction and services inherent to the Work.

B. Work Site locations: generally as shown on the Drawings.

C. Existing conditions and Site data: per the Drawings and Section 00 31 00.

1.04 WORK SEQUENCE AND COORDINATION

A. Sequence

1. Sequence Work to minimize shutdowns and reflect sequencing in the construction schedule.

B. Coordination

1. Coordinate Work with the Town and relevant permitting agencies, as required by Contract Documents.

2. Maintain access to facilities for the Owner throughout the Project.

3. Maintain existing 2-inch sewer line during construction.

4. After the new culvert is in-place, coordinate with Owner to allow water main replacement and coordination with Town and Eversource for reinstallation of gas main.

1.05 SPECIAL REQUIREMENTS

A. Portions of the Work are within wetlands, stream, and riverfront resources areas, and are subject to the jurisdiction of the Town's Conservation Commission, the Massachusetts Department of Environmental Protection, and the Army Corps of Engineers. Comply with the special requirements of the Order of Conditions and Army Corps General Permits, to be provided when available.

B. Coordinate with Owner for police details.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 15 30

PAYMENT AND ADMINISTRATIVE PROCEDURES AND QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements relating to payment, the process of contract administration, and the methods of communicating, controlling, and assuring quality. This Section applies to all Specifications and Drawings.

B. Certain provisions required by Laws and Regulations may be referenced. Contractor is responsible to determine and obtain applicable Laws and Regulations and to review and interpret the full text of such Laws and Regulations.

C. Section Includes

1.02 PAYMENT PROCEDURES
Schedule of Values
Payment Procedures
Change Procedures
Measurement and Payment Procedures
Correlation of Submittals

1.03 ADMINISTRATIVE REQUIREMENTS
Project Management and Coordination; Meetings
Documentation of Progress
Submittal Procedures

1.04 QUALITY REQUIREMENTS
Reference Standards and Regulatory Requirements

1.02 PAYMENT PROCEDURES

A. Schedule of Values: in accordance with Article 2 of the Standard General and Supplementary Conditions, if any.

1. Number of hardcopies: **0**

2. Submit electronically by email in PDF format.

3. Provide sufficient detail to allow for determination of the value of the Work at any degree of completion.

4. For each line item, identify number and title of Specification section in accordance with the Table of Contents.

5. The unit price breakdown included in the Unit Prices Form will constitute the preliminary Schedule of Values for this Project.

B. Payment Procedures**:** in accordance with Article 14 of Standard General and Supplementary Conditions, if any.

1. Submit Application for Payment using the form included in the Project Forms section. Utilize latest approved Schedule of Values for listing items in Application for Payment. Provide supporting documentation for items included in the Application for Payment.

   a. Number of hardcopies: 6

   b. Submit electronically by email in PDF format.

2. Payment Period: at intervals stipulated in the Agreement.

3. Submit an updated Progress Schedule with each Application for Payment.

4. Submit the following items for the Project.

   a. Copy of cashed check paid and copy of receipts for Traffic Police Details invoices paid showing: the Project name; the officers' names; location of assignment; date of assignment; hours of assignment; and number of hours being invoiced. Police details scheduled and not used by the Contractor will be back-charged to Contractor.

C. Change Procedures: in accordance with Articles 10 and 12 of Standard General and Supplementary Conditions, if any, utilizing forms included in Section 00 60 00 Project Forms.

Number of hardcopies: 6

Submit electronically by email in PDF format.

1. Field Order: as authorized by Paragraph 9.04 of the Standard General and Supplementary Conditions, if any.

2. Change Request: issued by Engineer, Owner or Contractor to request or authorize minor variations and deviations, amendments or supplements to the Contract Documents. Initiate requests for substitute items per Paragraph 6.05 of the Standard General and Supplementary Conditions, if any, using a Change Request.

   a. Include a detailed description of a proposed change with supplementary or revised Drawings and Specifications, including a change in Contract Times related to the change (with a stipulation for any overtime work required) and the period of time during which the requested price (if any) will be considered valid. Prepare and submit an estimate within 15 days.

   b. Describe the proposed change and its full effect on the Work. Describe the reason for the change and the effect on the Contract Price and Contract Time with full documentation (and a statement describing the effect on Work by separate or other contractors).

3. Work Change Directive: as defined in subparagraph 1.01.A.51 of the Standard General and Supplementary Conditions, if any.

4. Change Order: in accordance with Articles 10 and 12 of the Standard General and Supplementary Conditions, if any.

   a. *Stipulated Price Change Order*: based on Contractor's maximum price quotation or Contractor's request for a Change Order as approved by Engineer or Owner.

   b. *Unit Price Change Order*: for pre-determined unit prices and quantities and executed on a fixed unit price basis. Execute Work under a Work Change Directive for unit costs or quantities of Work not pre-determined. Changes in Contract Price and Contract Time to be computed as specified for Time and Material Change Order.

c. *Time and Material Change Order*: based on itemized account and supporting data after completion of change within time limits indicated in the Standard General and Supplementary Conditions, if any. Engineer or Owner and Contractor to determine the change allowable in Contract Price and Contract Time as provided in the Standard General and Supplementary Conditions, if any. Maintain detailed records of Work completed on this basis, provide full information for evaluation of proposed changes, and substantiate costs for changes in the Work.

5. "Or Equals" and Substitutes: Request "Or-Equal" and substitute items as a Change Request per subparagraph 1.02.C.2 above, with complete data substantiating compliance with Contract Documents.

a. Or-Equal" and substitute items will be processed in accordance with Paragraph 6.05 of the Standard General and Supplementary Conditions, if any, and subparagraph 1.03.C.6 below.

D. Measurement and Payment Procedures

1. See Section 01 20 25 Measurement and Payment.

E. Correlation of Submittals

1. Promptly revise Schedule of Values and Applications for Payment to record each authorized Change Order as a separate line item and adjust the Contract Price.

2. Promptly revise Progress Schedule to reflect any change in Contract Times and revise sub-schedules to adjust time for other items of the Work affected by the change.

3. Promptly enter changes in Project record documents.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Project Management and Coordination; Meetings

1. Contact information for Owner and other entities related to the Project and special coordination requirements and contacts during prosecution of the Work will be provided at the Preconstruction Conference and Site Mobilization Meeting.

2. Inform Owner and Engineer of the address for sending official correspondence and the address and telephone number of Contractor's representative who will be project manager and Site superintendent for the Contract.

3. During periods of construction and testing keep Owner and Engineer informed in writing with name, address, and telephone number of Contractor's representative who will be responsible and available outside of normal working hours for emergency repairs and the maintenance of safety devices.

4. Identify the 24 hour, 7 days per week emergency response telephone or cell phone number that is staffed by a person (not a passive answering machine) or provide that a phone call will be returned within one hour.

5. Identify correspondence, submittals, drawings, data and materials, packing slips or other items associated with this Contract as follows.

Brigham Street Culvert Replacement and Park Street Culvert Maintenance, Hudson, MA

6. Coordinate scheduling, submittals, and Work of the various Specifications to effectuate an efficient and orderly sequence for installing interdependent construction elements, with provisions for accommodating items installed later.

7. Preconstruction Conference and Site Mobilization Meeting

   a. Owner to schedule an initial preconstruction conference in accordance with Paragraph 2.06 of the Standard General and Supplementary Conditions, if any.

   b. Attendance required by Owner, Contractor, Engineer, Contractor's Superintendent, Project Manager, and Subcontractors as a minimum.

   c. Sample Agenda

      - Distribute Contract Documents
      - Discuss design concepts
      - Discuss preliminary Progress Schedule, Schedule of Submittals, Schedule of Values and preliminary cash flow projections.
      - Designate personnel representing each party; communication procedures
      - Procedures and processing of submittals, substitutions, applications for payments, Change Orders and Contract closeout procedures
      - Scheduling
      - Use of premises by Owner and Contractor
      - Owner's requirements and partial occupancy
      - Construction facilities and controls provided by Owner
      - Temporary utilities provided by Owner and Contractor
      - Survey and Site Layout

- Security and housekeeping procedures
- Schedules
- Procedures for testing
- Procedures for maintaining record documents
- Requirements for startup
- Inspection and acceptance of equipment put into service during construction period
- Access, laydown and coordination with others

d. Engineer will record minutes and distribute draft copies promptly after meeting to Owner and Contractor for review, then revise as required and distribute thereafter to meeting participants, with copies to Owner and Contractor, and those affected by decisions made.

8. Progress Meetings

a. Owner to schedule progress meetings beginning no later than 60 days after the Initial Conference and continue thereafter on a weekly basis throughout progress of the Work.

b. Attendance required by Contractor, Contractor's Superintendent, major Subcontractors and Suppliers, Owner and Engineer as appropriate to agenda topics for each meeting.

c. Sample Agenda

- Review minutes of previous meetings – unresolved issues
- Overall project status
- Work Completed
- Anticipated Work
- Schedule
- Pay Applications
- Change Orders
- Submittals
- Observations, problems, and decisions
- General Discussion/Comments
- Action Items
- Date and time for next meeting

d. Engineer will record minutes and distribute draft copies promptly after meeting to Owner and Contractor for review, then revise as required and distribute thereafter to meeting participants, with copies to Owner and Contractor, and those affected by decisions made.

9. Pre-installation Conference and Coordination Meetings

   a. When required, convene a pre-installation conference at Site before commencing certain Work that requires coordination or has special requirements or approval.

   b. Convene coordination meetings as may be generally required.

   c. Attendance required by parties directly affecting, or affected by, Work of the specific Specification section.

      1) For pre-installation conference, notify Owner and Engineer 5 days in advance.

      2) For coordination meetings, party requesting coordination meeting to notify other party(s).

   d. Review conditions, preparation and procedures, and coordination with related Work.

B. Documentation of Progress

1. Submit preliminary and final Progress Schedules as specified in Paragraphs 2.05 and 2.07 of the Standard General and Supplementary Conditions, if any, or as established in Notice to Proceed.

   Number of hardcopies: 3

   Submit electronically by email in PDF format.

   a. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

   b. Indicate estimated percentage of completion for each item of Work at each submission.

   c. Indicate dates for fabrication, factory testing, delivery, shipping and field testing, and material and equipment delivery dates, including those furnished by Owner. Coordinate with Schedule of Submittals.

2. Submit revised Progress Schedule on monthly basis and with each Application for Payment, identifying changes since previous version. Coordinate content with Schedule of Values, if any.

3. Documentation of Pre-Construction Conditions, Construction Progress, and Final Conditions

a. Documentation of Pre-Construction Conditions

1) Digital video record, in color, all areas of the Project Site. Ensure existing conditions that might be affected by the Work are clearly recorded.

2) Arrange for video recordings to be conducted by a professional videographer in digital videodisc (DVD) format. Include clear and concise audio descriptions of the existing Project Site conditions with date, time, orientation and Project identification.

3) Submit 1 copy of the first completed video recording to the Engineer for review of visual and audio quality. Re-record any recording furnished which, in the opinion of the Engineer, are poor quality or incomplete at no additional cost to Owner.

4) Submit 1 copy of approved videos.

5) See Note 3 on Drawing G-001 for more information.

4. Reports

a. Submit weekly Safety Reports signed by the Safety Representative.

b. Other reports to be submitted:

1) Updates to the Construction Operations Plan approved pursuant to SC 2.07 of Section 00 73 10 when it is modified

Number of hardcopies: 0

Submit electronically by email in PDF format.

C. Submittal Procedures

1. Schedule submittals to expedite the Project and coordinate with schedules required by Paragraph 1.03.B above. Deliver each submittal in the quantity and electronic form indicated to Engineer (with copy to Owner where required) at the addresses specified at the Preconstruction Conference and Site Mobilization Meeting. Coordinate submission of related items.

2. Present submittals in a clear and thorough manner, in English and using English units. Provide space for Contractor, Engineer, and Owner's review stamps. Use sheet size of not less than 8 1/2 by 11 inches and not more than 24 by 36 inches.

3. Revise and resubmit documents as required. Identify all changes made since previous submittal. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions. Submittals not requested on the submittal schedule may not be recognized or processed.

4. Submit preliminary and final Schedule of Submittals as specified in Article 2 of the Standard General and Supplementary Conditions, if any, or as established in Notice to Proceed. Include all submittals specified in the Standard General and Supplementary Conditions, if any, General Requirements, and other Specification sections.

   Number of hardcopies: 0

   Submit electronically by email in PDF format.

   a. Include description of each submittal, date by which each submittal will be delivered to Engineer and Owner date by which each submittal must be approved to maintain project schedule, and relevant section reference.

   b. Allow 10-15 days from receipt of submittal/resubmittal for Engineer review of submittals and possible resubmittal.

5. Shop Drawings and Samples: Submit in accordance with Paragraph 6.17 of the Standard General and Supplementary Conditions, if any, and as follows, and coordinate with the Schedule of Submittals required in subparagraph 4 above.

   Number of hardcopies: 0

   Submit electronically by email in PDF format.

   a. Complete a Submittal Transmittal (Form 00 62 11) as is indicated, numbering each submittal consecutively. Assign resubmittals the same Transmittal number as the original with a suffix of a sequential letter to indicate the resubmittal (e.g. the first resubmittal of submittal 25 would be number 25A.) Include only those documents previously issued under original Submittal Transmittal number in resubmittals. Do not combine new submittals with resubmittals.

b. Attach a Submittal Transmittal to each group of Shop Drawings, manufacturer's literature, equipment data and Samples submitted. Use a sufficient number of Submittal Transmittal forms so that: items on a single Submittal Transmittal form pertain to the same equipment item, Specification section or element of Work; items on a single Submittal Transmittal form are either original submittals or the same number resubmittal; and each Sample is listed on a separate Submittal Transmittal form.

c. Submittals which do not have a fully completed Submittal Transmittal form will be returned along with unreviewed attachments. Returned submittals, even though incomplete, will be counted as a submittal.

d. Submission of any Shop Drawing or Sample bearing Contractor's and Engineer's approval shall constitute a representation to Owner that the requirements of Paragraph 6.17 of the Standard General and Supplementary Conditions, if any, have been fulfilled.

e. Engineer to complete review in accordance with Paragraph 6.17.D. of the Standard General and Supplementary Conditions, if any.

6. Variations: Identify variations from Contract Documents and material and equipment or system limitations which may be detrimental to successful performance of the completed Work and identify reasons therefor in accordance with subparagraph 6.17.C.3 of the Standard General and Supplementary Conditions, if any.

   a. Clearly identify requests for “Or-Equal” and substitute items and submit per Paragraph 6.05 of Standard General and Supplementary Conditions, if any, and subparagraph 1.02.C.5 above. Substitute items will not be considered when indicated or implied on Shop Drawing or material and equipment data submittals without separate written request, or when acceptance will require revision to the Contract Documents.

7. Manufacturers' Installation Instructions and Certificates: Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.

   Number of hardcopies: 1

   Submit electronically by email in PDF format.

   a. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.

b. Submit manufacturers' certificates for recent or previous test results on material or equipment, but they must be acceptable to Engineer and Owner. Indicate material or equipment conforms to or exceeds specified requirements and provide supporting reference date, affidavits, and certifications as appropriate.

c. Submit test results, data, and reports and certifications to Engineer based on tests performed. Submit test reports and certifications for independent testing services specified.

8. Record Documents and Closeout Submittals: submit in accordance with Paragraph 6.12 of the Standard General and Supplementary Conditions, if any.

a. Legibly mark each item to record description of actual equipment and material installed and actual construction on the Drawings and approved submittals, including the following.

1) Manufacturer's name and equipment and material model and number

2) Material and equipment substitutions or alternates utilized

3) Approved changes

4) Measured depths of foundations

5) Measured horizontal and vertical locations of Underground Facilities and appurtenances, referenced to permanent surface improvements

6) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work

7) Field changes of dimension and detail

8) Details not on original Contract Documents or Shop Drawings

b. *As-Builts for Material and Equipment*

Number of prints: **1**

Electronic format: PDF & DWG

Submit electronically by email.

Indicate "As-Supplied" in revision block and sign. Show all changes and revisions to Final Completion. Include with Operation and Maintenance Data Part 2 below (if applicable).

c. *Drawings Conformed by Contractor to Construction Records*: Submit the following.

Number of prints: **1**

Electronic format: PDF & DWG

Submit electronically by email.

Indicate "Conformed by Contractor to Construction Records" in revision block and sign. Show all changes and revisions to Final Completion.

d. *Warranties and Guarantees*: Submit duplicate notarized copies of warranty documents which are executed and transferable from Subcontractors, Suppliers, and manufacturers. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of Warranty Period.

1) Submit in searchable PDF format by email.

2) Submit 0 copies in ring binders with durable plastic covers and table of contents.

e. *Operation and Maintenance Data (not used)*

1.04 QUALITY REQUIREMENTS

A. Reference Standards and Regulatory Requirements

1. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or Laws or Regulations of any governmental authority are used in accordance with Paragraph 3.02 of the Standard General and Supplementary Conditions, if any.

2. Acronyms and abbreviations used are defined in the applicable versions of the Encyclopedia of Associations published by Gale (part of Cengage Learning) generally available in large libraries and on the internet.

3. Specific requirements applicable to the Project include the following.

a. Comply with the Massachusetts Department of Transportation - Highway Division's (referred to as "MassDOT") Standard Specifications (but not including Compensation sections), Construction Details (including Standard Drawings), and Design

Guides as incorporated into the Specifications and Drawings, and as may be modified therein or superseded by the Owner's requirements through the direction of the Engineer. Specific sections of the MassDOT documents are referenced in the Specifications and Drawings. References to "Department" in the MassDOT documents shall mean Owner or Resident Project Representative for this Project. See MassDOT Highway Division website for latest documents.

https://www.mass.gov/massdot-highway-division-manuals-and-publications

b. Order of Conditions – as indicated Section 00 31 00.

END OF SECTION

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SECTION 01 20 25

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the measurement and payment for the Work to be completed under each item in Section 00 43 22 Unit Prices Form, which may also be referred to as "Pay Item".

B. Payment procedures are in accordance with the Agreement, Article 14 of the General Conditions, the Supplementary Conditions (if any), and the General Requirements.

C. Measurement: as determined, verified, or approved by Engineer or Owner in accordance with Paragraph 11.03 of the General Conditions, the Supplementary Conditions (if any), and the General Requirements, except as otherwise specified.

D. The Work described in each Pay Item shall be as described in the Specifications and shown on the Drawings and not included in other Pay Items.

1. Pay Item descriptions are general and may not specifically describe all associated Work or elements thereof, do not constitute Specifications, and do not supersede the content of the Specifications and Drawings.

2. Review the Specifications and Drawings for Work associated with each Pay Item. Claims for being unfamiliar with the content of the Specifications and Drawings will not be considered.

E. The following Work is not specifically described or designated as a Pay Item, is considered incidental to all Pay Items, and shall not be measured separately for payment.

1. Division 01 General Requirements EXCEPT those items included as separate Pay Items and in Mobilization/Demobilization.

a. Temporary traffic control and regulation; restoration of pavement markings disturbed by Work; temporary pavement ramping for steel plates, pavement edges, temporary construction fencing and gates; Health and Safety Plan; and temporary construction project signs.

2. Saw cutting asphalt, hauling and disposal of asphalt.

3. Materials, equipment, and services necessary to verify existing field conditions and the location, size, type, material, and orientation of existing pipes and utilities shown on the Drawings including test pits.

4. Restoration of all areas disturbed by the Contractor within the limits of Work.

5. Field and laboratory testing and reporting by independent laboratory, including but not limited to compaction of backfill materials; aggregate gradation; and concrete testing.

F. Payment will not be made for restoration of areas disturbed by the Contractor outside the limits of Work.

G. Payment will only be made for those utility services specifically identified for replacement on the Drawings. Relocation or replacement for the Contractor's convenience or due to breakage by the Contractor of any other utility services shown on the Drawings, or at locations which could reasonably be assumed, shall be at no cost to Owner.

H. Design, installation and removal of excavation support systems, temporary and permanent utility/structure support systems associated with a Pay Item shall be considered incidental to that Pay Item.

I. Additional dewatering and erosion control (including installation, operation, maintenance, removal and off-Site disposal of erosion control devices) associated with a Pay Item shall be considered incidental to that Pay Item.

J. Removal, storage, protection, and reinstallation of mailboxes and signs.

K. Protection of buildings, street poles, utility poles, signs, gates, fences, walls, retaining walls, shrubs, plantings, existing features to remain.

L. Pay Items identified as a Contingency Allowance will be processed per Article 11.02 of the General Conditions and Supplementary Conditions.

1.02 MEASUREMENT AND PAYMENT BASIS

ITEM 1: Mobilization/Demobilization	
Measurement	Portion of Work completed and accepted
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	50% at Project commencement 50% at Substantial Completion
Includes delivery to and removal of equipment from the Project Site, temporary utilities, facilities and controls, obtaining necessary permits including associated fees, insurance and bond costs, signage, development of pre-construction schedules and plans required by the General Conditions, Supplementary Conditions and General Requirements; necessary pre-construction investigations, verifying existing field conditions, documentation, coordination, preparation of Work and operations, and Site clean-up, restoration and closeout and all other Work and operations which must be performed from the time prior to the start of the Work to the final acceptance of Work by the Owner.	

ITEM 2: Site Preparation	
Measurement	Portion of Work completed and accepted
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress
Includes all labor, services, materials, handling, transportation, tools and equipment to clear and grub and remove and dispose all surface features and to install all erosion controls as depicted on the Drawings, tree protection, environmental protection (including material, installation, relocating, operation, maintenance, removal, and off-site disposal of: silt sacks, sediment barrier, erosion control devices, silt fence, dust control – calcium chloride, construction entrances). Item shall include the removal and disposal of, shrubs, roots and topsoil, and the razing of surface features within the limits defined on the drawings and necessary for the proposed work, including, but not limited to, the removal and disposal of trees, woody debris, and all other above ground items within the limits of work. Item shall include all other Work incidental to the satisfactory completion of the Work.	

ITEM 3: Temporary Dewatering and Water Controls	
Measurement	Portion of Work completed and accepted
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	50% after initial deployment of the Temporary Water Control 50% upon Substantial Completion
Includes all labor, materials, equipment, testing, monitoring, incidentals and mobilization/demobilization costs to provide Temporary Water Control and Treatment inherent to the Work, including temporary surface water control, temporary construction dewatering and groundwater control, treatment of all discharge water and installation, maintenance, and removal of a temporary cofferdam systems as specified in Section 01 57 05 and other incidental Work not included in separate Pay Items.	

ITEM 4: Hot Mix Asphalt Top Course	
Measurement	In place based on quantity installed
Payment	Unit price per ton
Schedule of Payment	Monthly based on quantity installed.
Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work for installation of permanent pavement surfaces at the locations and limits indicated on the Drawings, including but not limited to: Hot Mix Asphalt Top Course; rolling and compaction of materials; material testing; tack coat; spraying of bituminous emulsions; hot poured rubberized asphalt sealant applied to joints; saw cut and installation of butt joints, adjusting castings where applicable; Contractor quality control; feather grade to meet surrounding elevation, and ensure smooth transition; and all other Work incidental to the satisfactory completion of the Work.	

ITEM 5: Hot Mix Asphalt Binder Course	
Measurement	In place based on submitted weight slips
Payment	Unit price per Ton
Schedule of Payment	Monthly based on quantity installed and accepted
Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work for installation of permanent pavement surfaces at the locations and limits indicated on the Drawings, including but not limited to: Hot Mix Asphalt Binder Course; rolling and compaction of materials; material testing; prime coat; Contractor quality control; feather grade to meet surrounding elevation, and ensure smooth transition; and all other Work incidental to the satisfactory completion of the Work.	

ITEM 6A: Dense-Graded Crushed Stone for Sub-Base ITEM 6B: Gravel Borrow	
Measurement	In place based on quantity installed under paved areas
Payment	Unit price per cubic yard
Schedule of Payment	Monthly based on quantity installed.
Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work including: furnishing and installing soil materials as shown on Drawings and as specified in Section 31 00 00; importing, hauling and stockpiling of material; erosion controls for stockpiled material and maintenance of erosion controls; rolling and compaction of materials, material testing as required; and other incidental Work not included in separate Pay Items.	

ITEM 7: Bituminous Concrete Curb	
Measurement	Units installed complete in place
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on quantity installed
Material and equipment, services, installation, and construction inherent to the Work for bituminous concrete berm and other incidental Work.	

ITEM 8A: Yellow 4-Inch Pavement Markings ITEM 8B: White 4-Inch Pavement Markings	
Measurement	Per linear foot measured in place
Payment	Unit price per Linear Foot
Schedule of Payment	Completion of Work - 100%
Includes all labor, services, materials, handling, transportation, tools and equipment associated with, but not limited to, the provision of painted pavement markings indicated on the Drawings, surface cleaning and preparation; and all other Work incidental to the satisfactory completion of the Work. Removal of existing pavement markings as shown on the Drawings is incidental to this Pay Item.	

ITEM 9: Galvanized Steel Guardrail	
Measurement	Units installed complete in place
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on quantity installed.
Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing guardrail at the locations and limits indicated on the Drawings. Provide posts, post foundations, and rail and appurtenances and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another Pay Item. Includes the removal and disposal of existing guardrail regardless of depth at the location and limits indicated on the Drawings including but not limited to: guardrail; posts and post foundations; horizontal bar members, hardware and all appurtenances; filling of voids left by removed posts; concrete, grout, gravel subbase and borrow, grading and compaction of voids; and all other Work incidental to the satisfactory completion of the Work.	

ITEM 10A: 15-inch Class III Reinforced Concrete Pipe ITEM 10B: 48-inch Class III Reinforced Concrete Pipe	
Measurement	Per linear foot in place
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on total linear feet completed
Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing the drain pipe regardless of depth including: saw cutting, removing and disposing of excess materials, removing and disposing of existing culvert, hauling and disposal of materials, coffer dam, pipe connections; rubber sleeve connections and mortar sealing of pipe and structure; unclassified excavation; shoring and bracing; dewatering; installation and compaction of backfill and bedding materials; geotextile fabric; material testing; re-connection to existing pipe and/or structures (including pipe couplings, coring of new penetrations and plugging abandoned penetrations in existing structures); provision and reconfiguration of brick invert of new and existing manholes, removal and off-Site disposal of unsuitable excess soil materials, and all other Work incidental to the satisfactory completion of the Work.	

ITEM 11: Drainage Manhole (5-foot Diameter)	
Measurement	Per each in place
Payment	Unit price per each
Schedule of Payment	Monthly based on each completed
Includes all labor, services, materials, handling, transportation, tools and equipment to provide and install 5-foot diameter drainage structures regardless of depth including: anti-floatation slab; pipe connections; joint sealant; excavation, shoring and bracing; bituminous concrete pavement and concrete saw cuts; dewatering; provision, installation and compaction of backfill and bedding materials; geotextile fabric; material testing; provision & installation of brick invert; removal and off-Site disposal of unsuitable excess soil materials; drain manhole frame and cover including brick & mortar to raise manhole cover to grade, anchors, concrete collars and all other Work incidental to the satisfactory completion of the Work.	

ITEM 12: Headwalls	
Measurement	Per each in place
Payment	Unit price per each
Schedule of Payment	Monthly based on each completed
Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing headwalls including all excavating, removing and disposing of excess materials, removing and disposing of existing culvert headwalls, hauling and disposal of materials, coffer dam, dewatering, testing, shoring/bracing, blanket and backfill, compaction, testing, concrete, field stone masonry veneer, rebar, forms, and all appurtenances, and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another Pay Item.	

ITEM 13: Slope Reinforcement	
Measurement	Per square yard in place
Payment	Unit price per square yard
Schedule of Payment	Monthly based on total square yards completed
Includes all labor, services, materials, handling, transportation, tools and equipment to provide and install slope reinforcement as depicted on the Drawings including: handling, moving, spreading, installing compost erosion control blanket and lockdown netting to meet surrounding elevation and ensure smooth transitions as depicted on the Drawings and in accordance with the Manufacturer's specifications; and all other Work incidental to the satisfactory completion of the Work.	

ITEM 14: Rip-Rap	
Measurement	Per cubic yard in place
Payment	Unit price per cubic yard
Schedule of Payment	Monthly based on total square yards completed
Includes all labor, materials, equipment, services, installation, construction and testing inherent to the Work for providing riprap stone as depicted on the Drawings, including riprap stone, compaction of subgrade, geotextiles, filter stone and placement of rip-rap as shown and specified.	

ITEM 15: Stream Bed Materials	
Measurement	Per cubic yard in place
Payment	Unit price per cubic yard
Schedule of Payment	Monthly based on total square yards completed
Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work for stream restoration including: excavation of existing material to extents shown on the Drawings; furnishing and installing crushed stone beneath stream bed, cobble bed armor as shown on the Drawings; and all other incidental Work not covered in another Pay Item.	

ITEM 16: Bank Restoration	
Measurement	Per linear foot in place
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on total linear feet completed
Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing bank restoration at the locations and limits indicated on the Drawings including: preparation of slope, placement/spreading and rolling/tamping of materials, installation of jute matting, coir logs, planting of wetland plant species and seed mixes, excavation and preparation of areas for seeding and plant materials; seed spraying, limestone, fertilizers, fine grading, rolling the seeded areas, watering, clearing the weed and all else incidental thereto and necessary for healthy vegetated areas without any bare spots or areas, grading to tie into existing slope, and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another Pay Item.	

ITEM 17A: Wetland Restoration ITEM 17B: Wetland Replication	
Measurement	Portion of Work completed and accepted
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress
Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work for wetland restoration and replication including: excavation of existing material to extents shown on the Drawings; furnishing and installing hydric soils, plantings, and seeding as shown on the Drawings and as specified in Section 32 72 00; and all other incidental Work not covered in another Pay Item.	

ITEM 18: Loam and Seed	
Measurement	Per square yard in place
Payment	Unit price per square yard
Schedule of Payment	Monthly based on total square yards completed
Includes all labor, services, materials, handling, transportation, tools and equipment to provide and install loam borrow and grass seed at the locations and limits indicated on the Drawings including placement/spreading and rolling/tamping of the materials; excavation and preparation of areas for seeding and plant materials; seed spraying, limestone, fertilizers, fine grading, rolling the seeded areas, daily watering, clearing the weed and all else incidental thereto and necessary for healthy grass areas without any bare spots or areas and all other Work incidental to the satisfactory completion of the Work.	

ITEM 19: Traffic Control	
Measurement	By the lump sum
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress.
Includes all labor, services, material, handling, transportation and equipment required to develop an approved traffic management plan and furnish, install, maintain and relocated traffic control signs, barriers, barricades, cones, message boards, and detours, all work in accordance with the Contract Documents and as required by the Owner and not explicitly included in another Pay Item.	

ITEM 20: Owner's Contingency Allowance for Unforeseen Site Conditions	
Measurement	Portion of Owner's contingency allowance amount authorized per Paragraph 11.02 of the of the General and Supplementary Conditions
Payment	Percent of not to exceed contingency amount authorized by Change Order
Schedule of Payment	Monthly based on progress
Owner's contingency allowance for unforeseen Site conditions due to changes in existing conditions due to recent severe storm events, as recommended by Engineer and approved by Owner in a Change Order. Contractor shall not receive payment for any unused portion of the contingency allowance.	

ITEM 21 – Owner's Contingency Allowance for Materials Escalation Price Adjustment (Statutory)	
Measurement	Portion of Owner's contingency allowance amount authorized per Paragraph 11.02 of the General Conditions and Supplementary Conditions
Payment	Percent of not to exceed contingency amount authorized by Change Order
Schedule of Payment	Monthly as authorized by Change Order
For price adjustments for materials escalation of Liquid Asphalt, Diesel Fuel, Gasoline, and Portland Cement per statutory requirements in accordance with Section 00 73 73. Contractor shall not receive payment for any unused portion of the contingency allowance.	

1.03 ALTERNATES (IF AWARDED BY OWNER)

ALTERNATE A: Park Street Doghouse Drainage Manhole	
Measurement	Per each in place
Payment	Unit price per each
Schedule of Payment	Monthly based on each completed
Includes all labor, services, materials, handling, transportation, tools and equipment to provide and install 5-foot diameter drainage structures regardless of depth including: anti-floatation slab; pipe connections; joint sealant; excavation, shoring and bracing; bituminous concrete pavement and concrete saw cuts; dewatering; provision, installation and compaction of backfill and bedding materials; geotextile fabric; material testing; provision & installation of brick invert; removal and off-Site disposal of unsuitable excess soil materials; drain manhole frame and cover including brick & mortar to raise manhole cover to grade, anchors, concrete collars and all other Work incidental to the satisfactory completion of the Work.	

ALTERNATE B: Park Street 36-Inch Cured-In-Place Pipe (CIPP)	
Measurement	Actual number of linear feet of pipe size lined, measured from the interior walls of the headwalls
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on progress up to 90%; 10% at final warranty inspection
Material and equipment, services, installation, and construction associated with the placement of cured-in-place pipe (CIPP) as specified in Section 33 01 30.72, including removing and reconstructing the top sections of manholes as necessary to facilitate access for lining, reinstatement of service connections and other incidental Work. Additional expenses related to alternative hours worked to perform Work during low flow; pre- and post-installation CCTV inspection; pipe cleaning; the storage, testing, and disposal of any material resulting from the cleaning and inspection process; environmental controls; and bypass pumping or redirecting of existing flows shall be considered incidental to the Work and shall not be measured separately or payment. Includes excavation and trenching associated with bypass pumping. **Unit price shall include cost to provide custom CIPP liner plus or minus 5 percent from size shown on Drawings.**	

PART 2 - PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

SECTION 01 43 05

QUALIFICATION REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Meet or provide capability to meet the criteria specified below and in individual Specification sections in connection with various portions of the Work of the Contract Documents.

1.02 GENERAL REQUIREMENTS

A. Contractor shall have been regularly and actively engaged in similar Work as described in the Contract Documents, operating under the same business name and business organization structure, for the last 10 years.

B. Contractor shall have successfully completed **at least 10 projects involving construction of similar facilities in the same region as the Project covered by the Contract Documents within the last 10 years.** "Similar facilities" means similar in type, character, physical size, and complexity to that required by the Contract Documents.

C. Contractor shall have:

1. a full-time on-Site superintendent in responsible charge of the Work with at least 10 years' experience as superintendent on comparable projects; and

2. a project manager assigned full-time with at least 10 years' experience as project manager on comparable project.

1.03 SPECIAL REQUIREMENTS

A. Contractor or its Subcontractors shall have successfully completed:

1. at least 5 projects that included crossing culvert replacements across public roadways within the last 10 years; and

2. at least 5 projects that included pavement and street repair within public streets within the last 10 years.

B. Excavator operators shall obtain a Drain Layer License from the Town of Hudson and must be well versed with Hudson's rules and regulations for Roadway, Water and Sewer.

1.04 STATUTORY

A. Any Work involving the removal, containment, or encapsulation of Asbestos or material containing Asbestos may only be performed by a licensed contractor in accordance with the provisions of MGL Chapter 149, Sections 6A-6E, applicable Laws and Regulations, and requirements as may be included in the Specifications and Drawings.

B. Sheet metal work must be performed by a contractor licensed in accordance with 271 CMR 1.00, et seq. governing licensing, permitting, and sheet metal work in Massachusetts.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies temporary facilities and controls for execution of the Work put into place for use only during the period of construction, that will be removed when no longer required for construction operations. This Section applies to all Specifications and Drawings and provisions of this Section may be supplemented in other sections of Division 01.

B. Certain provisions required by Laws and Regulations may be referenced. Contractor is responsible to determine and obtain applicable Laws and Regulations and to review and interpret the full text of such Laws and Regulations.

C. Section Includes

1.02 TEMPORARY CONSTRUCTION FACILITIES
Barriers
Protection of Work
Security
Safety Facilities
Access Roads
Parking
Field Offices
Staging Area
Project Identification
Progress Cleaning and Waste Removal

1.03 TEMPORARY UTILITIES

1.04 TEMPORARY CONTROLS
Pest Control
Dust Control
Water Control and Dewatering
Erosion and Sediment Control
Noise Control
Pollution Control
Traffic Regulation

1.05 REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS

1.02 TEMPORARY CONSTRUCTION FACILITIES

A. Barriers

1. Comply with the requirements of Paragraph 6.11. of the Standard General Conditions and Supplementary Conditions, if any.

2. Furnish barriers to prevent unauthorized entry to and clear delineation of construction areas, to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations as recommended by OSHA and as otherwise required for the protection of life and property during construction.

3. Construct barricades and protective facilities in accordance with local and state regulations. Furnish and install signs, lights, reflectors, and such protection facilities as may be required.

4. Furnish barricades required by governing authorities for public rights of way.

5. Provide protection for plant life designated to remain. Replace damaged plant life.

6. Protect non owned vehicular traffic, stored materials, Site and structures from damage.

7. If required, furnish commercial grade, minimum 8 foot high chain link fence around construction Site. Equip with vehicular gates with locks.

B. Protection of Work

1. Protect Work during working and non-working hours.

2. Provide special protection where specified in Specifications or Drawings and in accordance with manufacturer recommendations.

3. Furnish temporary and removable protection for installed equipment and material. Control activity in immediate Work area to minimize damage.

4. Protect exterior areas of Work from damage. Prohibit traffic from landscaped areas.

5. Whenever gale or high winds are forecast, take measures to secure loose material, equipment or other items that could be blown and be damaged or cause damage. Do not leave such loose items unsecured at end of a working day. Particular attention shall be taken with scaffolding and items placed or stored on roofs or within a structure prior to being enclosed.

6. Provide for removal of snow and ice which may impede Work, damage the finishes or materials, be detrimental to workers, or impede trucking, delivery, or moving of materials at the Site, or prevent adequate drainage of the Site or adjoining areas.

C. Security

1. Provide protection to stored items, the Work and Owner's operations from unauthorized entry, vandalism, or theft, and against fire, storms and other losses during working and non-working hours.

2. Coordinate with Owner's security program.

D. Safety Facilities

1. Provide first aid and other safety facilities required by Laws and Regulations during working and non-working hours.

E. Parking: as designated by the Owner prior to construction.

F. Field Offices: Not required for the Project.

G. Staging Area: Owner is not providing a location for staging area. Determine and secure a location for staging area.

H. Project Identification

1. Minimum requirements for signs: exterior type plywood of sizes and thickness indicated. Provide exterior-grade acrylic-latex-base enamel for painting sign panels and applying required graphics.

2. Provide necessary signage in accordance with all applicable standards and regulations. Signage shall include but is not limited to:

a. DEP Permit File number sign

b. Pedestrian warning / traffic control signs

I. Progress Cleaning and Waste Removal

1. Comply with the requirements of Paragraph 6.11.B and C of the Standard General Conditions and Supplementary Conditions, if any.

2. Maintain areas free of waste materials, debris, and rubbish and maintain the Site in a clean and orderly condition.

3. Remove debris and rubbish from spaces and other closed or remote spaces before enclosing the space.

4. Collect and remove waste materials, debris, and rubbish from Site at least weekly and legally dispose off-Site.

1.03 TEMPORARY UTILITIES

A. Power service: Not required for the Project.

B. Telephone service and internet access to field offices: Not required for the Project.

C. Water service: Not required for the Project.

D. Furnish and maintain required sanitary facilities and enclosures. Do not use existing facilities.

E. Furnish lighting for construction operations. Furnish lighting for exterior staging and storage areas and for security purposes. Maintain lighting and provide routine repairs.

F. Furnish heat devices and heat and cooling devices as required to maintain specified conditions for construction operations.

G. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

H. Fire Protection

1. Provide temporary fire protection equipment and services during construction per NFPA and local fire code and regulations, and fire marshal's requirements.

2. Use Work procedures that minimize fire hazards to the extent practicable and materials that are fire resistant where possible. Collect and remove combustible debris and waste materials from the Site each day. Store fuels, solvents, and other volatile or flammable materials away from the construction and storage areas in well-marked, safe containers in accordance with Laws and Regulations.

1.04 TEMPORARY CONTROLS

A. Pest control: provide methods, means, and facilities to control and prevent spread of pests during construction operations. If required, provide for extermination of pests in accordance with Laws and Regulations. For extensive infestations, obtain the services of a licensed exterminator and coordinate plan with Owner and Engineer.

B. Dust control: execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere. Utilize the application of sprinkled water and calcium chloride as needed to reduce the emission of air-borne soil particulates from the Project Site.

1. Spread additional calcium chloride in response to complaints at no additional cost to Owner.

C. Water control and dewatering: provide in accordance with Section 01 57 05.

D. Erosion and Sediment Control: provided in accordance with Section 01 57 13.

1. Comply with:

a. Order of Conditions included in Section 00 31 00

b. State Laws and Regulations

E. Noise Control

1. Provide methods, means, and facilities to minimize noise from construction operations.

2. Provide noise attenuation systems capable of meeting the federal and state Department of Environmental Protection Air Quality Control Regulations.

3. Construct sound enclosures or utilize other noise reduction techniques if the equipment does not meet the noise level requirements.

4. Submit a Noise Control plan for:

a. Night work: 7 p.m. – 7 a.m.

b. Pumping operations and Work which extend beyond regular working hours.

c. Any other Work as determined by the Engineer which warrants special noise prevention measures.

F. Pollution Control: Not required for the Project.

G. Traffic Regulation: as specified below.

1. Submit traffic control plans and coordinate with Owner and local agencies. Submit plan for traffic control to Owner for review 14 days in advance of any Work within public right-of-way, street closure or detour.

a. Coordinate with Owner for police details.

2. Provide and maintain traffic control and maintenance devices in accordance with Part 6, Temporary Traffic Control, of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the U.S. Department of Transportation, Federal Highway Administration and other applicable codes and standards as specified. Operate devices 24 hours per day as required.

   a. Comply with applicable portions of the "Massachusetts Amendments to the 2009 Manual on Uniform Traffic Control Devices and the Standard Municipal Traffic Code" published by the Massachusetts Department of Transportation Highway Division.

   b. Comply with relevant provisions of Section 7.00 of the MassDOT Standard Specifications and Supplements, and the following.

      1) The intent of posting police details is to ensure public safety and protection of property through appropriate traffic control. Police personnel are not to be employed as watchmen to protect the Contractor's equipment and materials.

      2) All uniformed traffic police personnel required for traffic control for construction shall be authorized by Owner's Safety Officer and/or the Engineer.

      3) Payment will be made by Owner for uniformed traffic police only.

      4) Submit a forecast weekly for traffic police detail schedule, at least 72 hours prior to the start of the Work describing: the nature and location of the Work, the number of police personnel, the estimated number of police hours required for each location, and justification for each uniformed officer being requested. Payment to the police for work under this Contract shall be in accordance with the Massachusetts General Laws, Chapter 149, Section 34B.

      5) If uniformed police have been arranged to work, and weather or some other situation prohibits the Work, notify the Police Department Detail before 5:30 a.m. on the day of intended Work to cancel the work order. Unless the work order is canceled in time, the Contractor shall be charged at the rate of minimum four hours for each officer included in the detail and shall be fully responsible for payment of all charges thus incurred.

3. Provide for access by emergency vehicles, such as police, fire, and disaster units at all times. Contractor shall be liable for damages resulting from failure to provide such access.

4. During construction hours, traffic flow must be controlled by uniformed traffic police officers or other traffic controllers allowed by Laws and Regulations. The services of traffic controllers shall in no way relieve the Contractor of its responsibilities under the Contract.

5. The Contractor may close the road during construction, providing access for driveways and emergency vehicles only.

    a. Where detours are permitted, provide necessary barricades, flashers, flashing arrows and signs in accordance with referenced Manuals and Laws and Regulations.

    b. Provide gravel borrow and bituminous concrete to maintain temporary passable travel lane ramps, temporary bridging, steel plates, temporary pavement, wood-framed walkways, caution, safety and other necessary signs directing the pedestrian and vehicular traffic towards unblocked and safe areas.

    c. Except when road closure and road blockage permits are obtained, maintain two lanes of traffic (one in each direction) throughout construction and during non-working hours to the maximum extent possible.

6. Provide safe access/egress to businesses and abutting property owners within the Project area. In areas where the construction activity is in progress, provide directional signs in front of businesses indicating "OPEN FOR BUSINESS" or similar for guidance of customers.

    a. Certain construction operations such as utility work and roadway/sidewalk reconstruction may restrict access/egress on some roads and to businesses and abutting property owners. Under these circumstances, schedule operations during off-peak hours or late evenings with Owner approval so that a particular work activity can be completed in the shortest possible time.

    b. Provide 48 hours' notice to businesses and abutting property owners when access/egress will not be available or restrictions will exist.

7. Exercise particular care to establish and maintain such methods and procedures that will not create hazards.

   a. Remove or properly cover traffic control, safety devices and/or signs having messages that are irrelevant to normal traffic conditions at the end of each Work period. Keep signs clean at all times and provide that legends are distinctive and unmarred.

   b. Place excavated material and construction equipment so that vehicular and pedestrian traffic is maintained at all times unless road closure permit is obtained. If the Contractor's operations cause traffic hazards, implement appropriate safety measures immediately.

   c. In areas of high pedestrian and vehicular traffic volume, remove waste materials and construction equipment from the Work Site on a daily basis. Do not park construction equipment overnight on the Site or the adjacent roads unless permitted by Owner.

   d. Provide night watchmen where special hazards exist.

8. Post signage clearly stating that any vehicle impeding the progress of construction will be towed at the vehicle owner’s expense. Towing charges incurred by Owner for Contractor’s failure to post such signs will be borne by the Contractor.

1.05 REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, and facilities before Final Application for Payment inspection.

B. Remove temporary underground installations and grade Site as indicated. Clean and repair damage caused by installation or use of temporary utilities, facilities, and controls.

C. Restore existing facilities and areas used during construction to original condition. Restore permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 01 57 05

TEMPORARY DEWATERING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Design, provide, install, maintain operate and remove temporary construction dewatering systems as required to control groundwater levels during construction; dispose of pumped water; constructing, maintaining, observing, and, removing of equipment and instrumentation for control of the system except where indicated or required to remain in place.

2. Furnish, install, operate, and maintain dewatering equipment and systems as required to provide stable subgrades and dry excavations.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. Order of Conditions, to be provided when available.

2. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES)

B. Definitions

1. *Normal Dewatering* is defined as using conventional pumps installed in open excavations, ditches, or sumps to control water and allow for installation of the pipe in a dry trench.

2. *Special Dewatering* is defined as installing wellpoints, deep wells, or eductor and ejector systems to control groundwater and hydrostatic pressures to allow for installation of the work. Special dewatering includes design of the dewatering system by a Professional Engineer registered in the state where the Project is located in good standing, and conducting additional borings or subsurface explorations deemed necessary by the Contractor, and approved by the Engineer, to support design.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: per Division 01 General Requirements.

1. Coordinate dewatering work with trenching operations, support of excavation systems, and excavation.

2. Coordinate installation and operation of dewatering system within the excavation for the Project.

B. Pre-installation Conference: Conduct conference at Project site at least 30 days prior to the start of dewatering activities.

1. At a minimum, pre-installation conference shall be attended by the Owner, Engineer, Geotechnical Engineer, Contractor's Superintendent, support of excavation Installer, geotechnical instrumentation Installer, and dewatering Installer.

2. Verify availability of dewatering Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review condition of site to be dewatered including coordination with temporary erosion-control measures and temporary controls and protections.

4. Review geotechnical reports. "Geotechnical Engineering Memorandum Brigham Street Culvert and Park Street Culvert Headwall Replacement – Hudson, Massachusetts," prepared by GZA GeoEnvironmental, Inc., dated April 21, 2023 included in Section 00 31 00.

5. Review proposed site clearing and excavations. Confirm coordination with the earth support system, geotechnical instrumental monitoring, and trench excavation activities.

6. Review requirements for observation, testing, and monitoring of dewatering system.

7. NPDES Dewatering General Permit: The Contractor is responsible for engaging a licensed professional engineer to design dewatering system…." also indicate that they're responsible for performing additional subsurface exploration and obtaining the permits (be clear on what permits are required).

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Approved NPDES Dewatering General Permit (DGP)

C. Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions

D. Qualifications for Installer and designer

E. Dewatering Plan

1. Submit plan prepared, signed, and sealed by a qualified designer registered in the state where Project is located at least 14 calendar days prior to commencement of the dewatering Work.

2. Minimum contents of Dewatering Plan

a. Prepare or modify a dewatering plan, which shall minimally include identification of techniques for bypass of water around the area of alteration; and separately, identification of techniques for treatment of residual water ("seepage water") within the area of alteration. All such plans shall completely segregate bypass water from residual water. This dewatering plan shall include:

1) Plans and description of the Normal and/or Special Dewatering systems, including the number, location and depth of wells, wellpoints or sumps; designs of filters to prevent pumping of fine soil; method and location for filtering, sedimentation tanks and legal disposal of pumped water; and flow capacity of proposed system, accounting for groundwater level relative to tide cycles if applicable;

2) Identification of any regulatory "time-of-year" ("TOY") restrictions governing the proposed work [from the US Army Corps of Engineers "General Permit-Commonwealth of Massachusetts" ("MGP"); any Massachusetts Natural Heritage and Endangered Species Program directive; and any presumptive directions offered by the Massachusetts Division of Fisheries and Wildlife. The Department will require adherence to TOY restrictions unless the applicant demonstrates that compliance with them is not practicable;

3) Identification of any "Cold-water Fishery" (as defined at 310 CMR 10.04 and 314 CMR 9.02) within the subject reach where work is proposed, by reference to the Massachusetts Division of Fisheries and Wildlife "Coldwater Fishery Resources Index";

4) Use of temporary flume pipes to bypass flowing water in small rivers and intermittent streams, when flowing, and upstream and downstream temporary dams to isolate the work area and protect it from backwatering. Flume pipes shall be equipped with anti-seep collars where they pass through temporary dams, and fish screens on their upstream inverts. Flume pipes shall be sized to adequately handle at least a two-year storm event;

5) Use of cofferdams to isolate the area of alteration from flowing water in larger rivers, and in reservoirs, lakes, and ponds;

6) Use of pumps and hose lines to dewater standing water held behind cofferdams, and to dewater residual water and leaked water in isolated work areas. The rating, type, and location of all pumps and the intake and discharge positions of all hoses shall be identified and located on the site plans;

7) Use of appropriate energy dissipaters and erosion and sedimentation control best management practices at the discharge orifices of all bypass flume pipes and pump hoses;

8) Treatment of pumped residual water prior to discharge back to resource areas. Techniques such as filter bags, frac tanks, and stilling basins shall be analyzed and specifically proposed;

9) Salvage of sessile aquatic organisms (vertebrates, crayfish, freshwater mussels, etc.) stranded during dewatering;

10) Structural and nonstructural best management practices to separate stormwater from the area of alteration during work and while the site is unstable;

11) Assurance that the substrate of the area of alteration is stable prior to the re-establishment of flow within it.

b. Design calculations and analysis data demonstrating the adequacy of the proposed dewatering system and its compliance with the performance requirements specified including calculations to estimate the quantity of discharge and calculations addressing excavation base stability and uplift

c. Local Best Management Practices for the dewatering system conditions

d. Plans, elevations, sections, and details

e. Arrangement, locations, and details of sumps, well points, deep wells, ditches; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

f. Location of the discharge points and the method by which effluent will be conveyed.

g. Complete description of equipment and materials to be used, and the procedure to be followed for installation, operation, and maintenance in relation to the proposed sequence of excavation and backfilling.

h. Methods to be used for drilling, construction, and development of dewatering wells

F. Treatment System Plan

1. Submit treatment system Plan prepared, signed, and sealed, by a qualified designer registered in the state where Project is located.

2. Provide treatment system design and operating plan capable of meeting permit requirements (including NPDES DGP) prior to system installation and start-up which includes the following.

a. Layout drawings and site location plan including equipment sizes and capacities.

b. Operating plan including monitoring and maintenance schedule, screening and sampling program, and reporting schedule. The screening and sampling program shall, at a minimum, meet the sampling requirements of the NPDES DGP

c. Name of DEP-certified laboratory used for analyzing dewatering influent and effluent samples in accordance with the NPDES DGP

d. Stamps and signatures by licensed professionals for the design of the treatment system

e. Type of flow meter to measure volume of treated water discharged from the treatment system including calibration plan and methods

3. Treatment system discharge flow meter calibration records and flow readings

4. Laboratory results of dewatering influent and effluent samples

G. Field Quality Control

1. Average flow rate and time of operation of each pump used in the dewatering system on a daily basis during the period the dewatering system is in operation on form approved by the Engineer

2. Volume stored in frac tanks and volume disposed of

3. Reports of observations, field reports, including flow rate and groundwater level monitoring and daily field observation/inspection reports

H. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. Locations and depths of decommissioned wells and/or well points and other abandoned-in-place dewatering equipment for review and approval by the EOR and the Owner.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications

1. Installer: specialized in dewatering work continuously for at least 5 years in similar subsurface conditions.

2. Designer: professional civil/geotechnical engineer registered in the state where Project is located having a minimum 5 years' experience and successfully designing dewatering systems in similar conditions.

a. For Special Dewatering, retain the services of a professional engineer registered in the state where Project is located who is in good standing and experienced in design of dewatering systems, to independently evaluate the boring logs and other soils information available to determine those areas that will require special dewatering techniques and to design the required system.

b. Contractor's dewatering professional engineer shall provide sufficient on-Site inspection and supervision to ensure that the dewatering is carried out in accordance with the approved design.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

1. Review geotechnical and subsurface information provided with Contract Documents.

2. Determine if additional test borings are required and conduct other exploratory operations necessary for dewatering according to the performance requirements at no additional cost to Owner.

3. Prior to start of any construction activity jointly inspect the Site with dewatering Installer, Owner and Engineer to observe and document the preconstruction condition of the site, existing structures, and facilities.

PART 2 – PRODUCTS

2.01 DEWATERING SYSTEM

A. Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control groundwater levels and to lower, control, remove, treat, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

1. Design dewatering system(s), including comprehensive engineering analysis by a qualified professional engineer, registered in the state where Project is located, using performance requirements and criteria indicated.

2. Design dewatering system to:

a. lower groundwater level within the Work area without adversely affecting existing structures, utilities, pavements, sidewalks or wells outside of the Work area;

b. maintain groundwater levels inside the excavation at a minimum of 2 feet below the bottom of excavation and groundwater drawdown at a distance of 15 feet outside the excavation limited to no more than 5 feet. Continuously monitor groundwater levels inside and outside the excavation;

c. effectively reducing the hydrostatic pressure below excavation subgrade in the existing fills, organic peat, organic and inorganic silts/clays and sands and gravel, so that excavation bottoms are firm and dry and a factor of safety of at least 1.2 is maintained against uplift; and

d. be capable of maintaining a dry and stable subgrade until the structures, pipes, appurtenances, and drainage pipe and structure bedding to be built therein have been completed to the extent that structures, pipes, and appurtenances will not be floated or otherwise damaged.

3. Basis of Design

a. Existing groundwater levels measured at the Site as reported in the geotechnical and subsurface information.

b. Based on the variability of thicknesses and discontinuous nature of cohesive soil strata encountered, pressure relief wells may be required to prevent uplift of these cohesive strata during excavation and dewatering for installation of underground systems. Reduction of the extent of dewatering may be accomplished by installing a temporary cutoff such as steel sheet piling.

c. On-Site recharge of dewatering effluent is the preferred method for disposal. Review available geotechnical and subsurface information to identify those areas where the presence of low permeability soils may require storage in sedimentation tanks and/or transport of the dewatering effluent. Disposal of effluent within 100 feet of buildings is prohibited.

d. Locate groundwater control facilities where they will not interfere with the Work or the work of other contracts.

e. Provide for prevention of surface water from entering excavations by grading, dikes, or other means.

f. Provide for dewatering without damaging adjacent streets, utilities, existing buildings, structures, and site improvements adjacent to excavation.

g. Minimum capacity of back-up equipment for the dewatering system: equal to the primary equipment and available in operating condition continuously. Provide electrically operated dewatering equipment, powered with independent generators adequately sized to operate the dewatering system and capable of running on commercial power. Provide standby equipment independent of commercial power and provide for dewatering within 24 hours upon primary pump or power failure.

h. Materials and equipment: in compliance with accepted industry standards, in good operating condition, and able to perform satisfactorily over the required duration of construction dewatering, including pipes, well screens, filter sand, grout, pumps, meters, and controls.

B. Provide units/equipment in accordance with approved Dewatering Plan.

1. Provide electrically operated dewatering equipment, powered with dedicated generators adequately sized to operate the dewatering system and capable of running on commercial power. Provide standby equipment independent of commercial power and provide for dewatering within 24 hours upon primary pump or power failure. No work shall be performed by the Contractor below the pre-construction groundwater level during dewatering system failure.

2. Provide suitable temporary pipes, flumes or channels for water that may flow along or across the Site of the Work.

C. Provide dewatering equipment with noise attenuation systems capable of meeting the governing noise regulation requirements.

2.02 TREATMENT SYSTEM

A. Provide units/equipment in accordance with approved treatment system.

B. Include properly sized and designed fractionation tank(s) with bag filtration system.

C. Provide additional storage units to handle quantities of water in excess of treatment system capacity to allow Work to proceed without interruption.

D. Provide flow meter at discharge locations to allow accurate measurement of flow rate and cumulative flow volume.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Obtain necessary regulatory approvals and permits for operation of the dewatering system and the disposal of dewatering flows, including, among others, approval by under NPDES program for construction dewatering activities. Prepare and obtain the NPDES DGP.

B. Maintain dewatering operations to ensure erosion control, stability of excavations, prevention of uplift, prevention of flooding in excavation, and prevention of damage to subgrades and adjacent structures. Make modifications to the dewatering system and/or operations if required performance is not met at no additional cost to the Owner.

C. Do not perform Work below the pre-construction groundwater level during dewatering system failure.

D. Do not use dewatering pumps on Site without factory installed sound attenuating equipment.

E. Perform Work in accordance with approved Dewatering Plan.

3.02 INSTALLATION

A. Furnish, install, operate, and maintain dewatering equipment and systems as required to provide stable subgrades and dry excavations, including but not limited to the following.

1. Construction dewatering at all typical open-trench excavations along the drainage pipe alignments and associated drainage structures

2. Construction dewatering system within the excavation for the Project.

B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.

2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

C. Install dewatering system within limit of Work. Minimize interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction. Do not operate equipment on paved surfaces to prevent damaging these surfaces.

D. Locate dewatering facilities to prevent interference with utilities and construction work to be done by others.

E. Provide temporary grading to facilitate dewatering and control of surface water. If utilized, local sump pumps should be surrounded by 3/4-inch Crushed Stone wrapped in non-woven filter fabric to limit migration of fines.

F. Install dewatering system utilizing sumps, wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material, valves, appurtenances, water disposal, and surface-water controls as indicated on approved Dewatering Plan.

1. Space sumps, well points or wells at intervals required to provide sufficient dewatering.

2. Use filters or other means to prevent loss of fine sands or silts during dewatering activity.

G. Provide system to lower and control groundwater to permit excavation and construction in the dry for open-cut excavation and excavation inside sheeting. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of carrying pipes and casings.

H. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

I. Provide standby equipment on Site, installed, and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged utilities, structures, foundation soils, and other facilities at no additional expense to Owner.

J. Be prepared to modify the dewatering system and methods as required by actual field conditions encountered during construction, at no additional cost to the Owner.

K. Install, measure, record, and report water levels at vibrating wire piezometers.

L. Monitor quality of discharge from dewatering system to determine if soil particles are being removed from the system.

1. Encapsulate the suction end of the pump with crushed stone, filter fabric, and other materials to minimize the amount of silt discharged to the amount allowed by the construction dewatering permit.

a. For dewatering operations with relatively minor flows, direct pump discharges using filtration bag or system per erosion and sediment control requirements, or pump into hay bale sedimentation traps lined with filter fabric. Filter water through the hay bales and filter fabric prior to seepage into storm drainage or any natural water course.

b. For dewatering operations with larger flows, provide pump discharges into a steel dewatering/sedimentation basin. Use steel baffle plates to slow water velocities, to increase the contact time, and allow adequate settlement of sediment prior to discharge into waterways, storm drainage or discharge point allowed by the construction dewatering permit.

c. Utilize silt sacks in catch basins when excess silt is suspended in the discharge water per erosion and sediment control requirements. If siltation basin is used, size to effectively filter for the volume and discharge rate of water anticipated without overflow.

M. Take measures to prevent damage to adjacent buildings, structures, utility lines, and work resulting from groundwater pumping.

N. Modify system if, after installation and while in operation, it causes or threatens to cause damage to existing buildings, structures, utilities, or facilities.

O. Repair damage, disruption, or interference resulting directly or indirectly from dewatering operations as approved by its Engineer.

P. Special Dewatering

1. Use *Special Dewatering* as necessary if *Normal Dewatering* methods are inadequate to ensure dry and stable excavation subgrade conditions.

2. *Special Dewatering* techniques may consist of one- or two-stage wellpoint systems, deep wells, or eductor and ejector type systems. Design with suitable screens to prevent pumping of fines and to address specified Work Site conditions.

3. In areas requiring special dewatering, lower the groundwater level to a minimum of 2 feet below the existing fill and/or organic peat subgrades or to the excavation subgrade for organic silt/clay subgrades prior to any installation and maintain that groundwater level until excavation has been backfilled. Provide monitoring by Contractor’s dewatering professional engineer.

4. Furnish materials and install at least 2 observation wells at each excavation area at locations proposed by the Contractor’s dewatering professional engineer and reviewed and approved by Engineer.

3.03 OPERATIONS

A. Operate system continuously until proposed construction is completed and backfill materials have been placed or until dewatering is no longer required in accordance with the requirements of the Engineer and Owner and permits.

B. Monitor dewatering systems continuously.

C. Promptly repair damages to adjacent facilities caused by dewatering.

D. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of backfill materials on dry subgrades.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

2. Maintain groundwater water levels a minimum of 24 inches below bottom of excavation, inside the excavation.

3. Limit groundwater drawdown outside the excavation to no more than 5 feet from preconstruction levels at a distance of 15 feet from the excavation.

E. Maintain a sufficient volume of water in the frac tanks to prevent oil, if present, from exiting the frac tank. Take steps to remediate oil released from the frac tanks.

F. Furnish, install, operate, maintain, and remove all necessary equipment to perform pH adjustments if required to meet the pH discharge limits required under the NPDES DGP.

G. Sample and analyze the dewatering influent and effluent to meet system maintenance requirements and the NPDES DGP requirements.

H. Meet standards and requirements of the NPDES DGP.

I. Include any other items incidental to the placement on Site, operation, maintenance, disconnection, dismantling, and removal of the treatment system.

J. Report any sign of subgrade disturbance due to seepage or unaccountable change in effluent flow rate to the Engineer and steps immediately taken to correct the condition.

K. Implement additional treatment and different permits if necessary and if sheen or oil is observed in the dewatering effluent.

L. Legally dispose of water removed by dewatering to avoid endangering public health, property, and portions of Work under construction or completed and legally dispose of sediment off Site at an appropriate disposal site.

3.04 MONITORING

A. Install an adequate number of observation wells to monitor the dewatering operations for the duration of the Work.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

3.05 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

B. Promptly repair damages to adjacent facilities caused by dewatering.

3.06 DECOMMISSIONING

A. Remove dewatering system from the Project Site upon completion of dewatering.

B. Unless otherwise directed by the Engineer, remove piezometers and fill well holes with sand-cement grout and cut off wells a minimum of 24 inches below finished grade.

3.07 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.08 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide and maintain devices to control erosion, siltation, sedimentation, and dust that occur during construction operations in accordance with this Section, applicable reference standards listed in Article 1.03, as may be shown on the Drawings and as required by Laws and Regulations.

2. Attendance at Preconstruction On-Site Conference with the Town of Hudson Conservation Agent and/or a member of the Conservation Commission.

B. Related Requirements

1. Division 31 Earthwork, all sections

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. Order of Conditions, to be provided when available.

2. U.S. Composting Council (USCC)

3. Massachusetts Executive Office of Environmental Affairs, Massachusetts Erosion & Sedimentation Control Guidelines for Urban and Suburban Areas

4. MassDOT Standard Specifications and Supplements and Construction Details

a. M6.04.2 Straw Mulch

b. 767 Mulching; Seed for Erosion Control

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: per Division 01 General Requirements.

1. Prior to the commencement of any activity on Site, arrange and attend Preconstruction On-Site Conference with the Conservation Agent and/or a member of the Conservation Commission in accordance with Section 01 15 30.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Siltation fence
2. Erosion control mulch sock/tube
3. Temporary erosion control matting
4. Siltation control devices

C. Erosion and sediment control plan prior to the start of construction

D. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Conform to requirements of applicable federal, state and local permits, including the Erosion and Sedimentation Control Details shown on the “Civil Details – 1”, and the local Conservation Commission.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Composting materials: provided with a Certificate of Compliance from an USCC’s Seal of Testing Assurance (STA) Program Certified Laboratory, verifying that the compost meets the parameters listed herein and certification not older than 90 days.

1.08 SITE CONDITIONS

A. Existing Conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Siltation Fence: Mirafi Environfence or Amoco 1380 Silt Stop.

B. Mulch Sock/Compost Filter Tube

1. Type and use: as specified by the Massachusetts Erosion & Sedimentation Control Guidelines for Urban and Suburban Areas.

2. Long fibered hay, grass mowings, or straw, in dry condition and which are relatively free of weeds and foreign matter detrimental to plant life.

3. Mulch binder: asphalt emulsion mulch binder of type acceptable to the Engineer.

4. Mulch netting: plastic or nylon mesh netting with approximate openings of 1/8 inch; or other netting approved by the Engineer.

5. Color: orange or orange striped for visibility.

6. Tensile strength: minimum 202 psi per ASTM D5035 with ultra-violet exposure resistance of 100 percent at 1,000 hours per ASTM G155.

7. Stakes for installing compost filter tubes: 1-1/2 inches square hard wood stakes, trimmed to a blunt end.

8. Compost fill material for the compost filter tube: certified though the USCC's STA Program and not derived from agricultural, food, or industrial residues; bio-solids (treated sewerage sludge); yard clippings; source-separated or mixed solid waste, free from man-made foreign matter, and without objectionable odors.

C. Seeding

1. Select seed variety and applied rates based upon the date of application per the following table. Equivalent seed mixture based on suitability for use in controlling erosion of the various soil types and slopes may be used as approved by the Engineer.

Dates	Seed	Applied Rate (pounds per 1,000 feet^2)
4/1 to 7/1 8/15 to 9/15	Oats	1.8
4/1 to 7/1	Annual Ryegrass	0.9
5/15 to 8/15	Sundangrass	0.9
9/15 to 10/15	Winter Ryegrass	2.6

D. Sod: grown from certified seed of adapted varieties to produce high quality sod free of any serious thatch, weeds, insects, diseases and other pest problem, be at least 1 year old and not older than 3 years, and cut with a 1/2 inch to 1 inch layer of soil.

E. Drains: Flexible drains consisting of collapsible neoprene pipe, minimum 8 inch diameter.

F. Stone check dam: aggregate consisting of hard, durable rock, sieve analysis by weight.

Sieve Size	Percent Passing by Weight
6 inch	90 - 100
1.5 inch	0 - 40
No. 4	0 - 5

G. Hay Bales: rectangular shaped bales of hay or straw weighing at least 40 pounds per bale, free from noxious weed seeds and rough or woody materials.

H. Siltation Control Devices

1. Dirtbag or equivalent, to be used on the discharge of any excavation dewatering setup.

2. Inlet Protection (Silt Sack) Acceptable Manufacturers

a. ACF Environmental, Wilmington, MA

b. Atlantic Construction Fabrics, Inc, Richmond VA

c. ESS Brothers & Sons Inc, Loretto, MN

d. Bowhead Manufacturing Company, Seattle, WA

3. Material: woven polypropylene geotextile material with built-in high-flow relief systems (overflow weirs). Manufacture for a 24 inch by 24 inch opening under regular flow conditions and to fit the catch basin or drop inlet to which it is to be installed with capability of being removed, emptied and reinstalled.

I. Turbidity Curtain: manufactured for regular flow conditions and to fit the brook section which it is to be installed.

Parameters	Values
Floatation Element	Cylindrical, internal closed cell foam
Floatation Cover	PVC coated polyester
Ballast	5/16 in galvanized chain 1.1 lbs/ft
End Connectors	Grommeted end/tow plates and lacing grommets
Skirt Material	
Weight	6.2 oz/yd2
Tensile Strength	390-280 lb
Elongation Break	25 %
Mullen Burst	530 psi
Puncture Strength	140 lb
Tear Strength	100-80 lb
Eos US Std Sieve	210 µ 70 µ

J. Erosion Control Blanket

1. Provide erosion control blanket for slope stabilization as shown on the Drawings or as directed by the Engineer in accordance with this Specification and in compliance with the Order of Conditions.

2. Provide with soft pine wood wedges and stakes of entirely of biodegradable materials as recommended by the manufacturer.

3. Erosion control blanket (coir log): coconut fiber mats woven into a matrix complying with the following.

PROPERTY	Test Method	Parameter
Weight	ASTM D3776	17.8 oz/SY (600 g/m2)
Wide width tensile strength **Wet** Machine direction Cross direction	ASTM D4595	 910 lbs/ft (13.3 kN/m) 870 lbs/foot (12.7 kN/m)
Wide width tensile strength **Dry** Machine direction Cross direction	ASTM D4595	 1130 lbs/foot (16.5 kN/m) 1040 lbs/foot (15.2 kN/m)
Elongation at failure **Wet** Machine direction Cross direction	ASTM D4595	 32 percent 26 percent
Open area	Calculated	58 percent
Thickness	ASTM D177	0.35 inch (9 mm)
Recommended shear stress		4 lbs./sq. ft. (192 N/sq.m.)
Recommended flow		10 fps (3 m/s)
Recommend slope		2:1

K. Straw mulch: MassDOT M6.04.2, long fibered straw, 100 percent certified weed free, free from foreign matter detrimental to plant life, and in dry condition.

L. Tackifier: biodegradable and non-toxic bonding adhesive agent during hydraulic seeding or straw mulching to minimize wind and water effects.

M. Catch Basin Silt Sacks

1. Style: Silt Sack Regular Flow.

2. Test Method: ASTM D-4884 165.0 lbs./inch.

3. Silt sack seams: certified average wide width strength.

4. Meet the following ASTM D-4884 standards. Properties are Minimum Average Roll Values (MARV).

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D4632	lbs.	315x300
Grab Elongation	ASTM D4632	%	15x15
Puncture	ASTM D4833	lbs.	125
Mullen Burst	ASTM D3786	psi	650
Trapezoid Tear	ASTM D4533	lbs	120x150
UV Resistance	ASTM D4355	%	90
Apparent Opening	ASTM D4751	US Sieve	40
Flow Rate	ASTM D4491	gal/min/ft ^{2}	40
Permittivity	ASTM D4491	sec -1	0.55

PART 3 – EXECUTION

3.01 GENERAL

A. Undertake reasonable precaution to avoid erosion of soil and to prevent silting of drainage ditches, storm sewers, rivers, streams, and lakes.

B. Plan and execute construction using methods to control surface drainage from cuts and fills, from borrow and waste disposal areas and prevent erosion and sedimentation. Coordinate temporary erosion controls with permanent erosion controls to the extent practical.

C. Employ pollution prevention measures, erosion and sedimentation control, before, during and after soils are exposed. Prior to soil disturbance or soil storage, ensure measures are in place before activity occurs. Employ additional measures as the Work progresses. Implement and maintain erosion and sedimentation control measures as necessary until the Site is permanently stabilized.

D. Provide measures to control dust caused whether on or off the Project Site.

E. Keep exposure of soils on embankments, excavations, and graded areas to as short a duration as possible. Initiate mulching, seeding and other temporary erosion control practices as specified.

F. Install erosion control measures in any ditch, swale or channel before runoff is allowed to flow to the waterway.

G. Dewater trench to install materials in the dry.

H. Contain water pumped from trenches and excavations. Do not discharge trench dewatering and pipe dewatering to the waterway.

I. Employ the use of siltation control devices at all times to prevent runoff from entering waterway.

J. Stabilize disturbed areas with temporary and permanent erosion control practices as soon as practicable, but no more than 14 days after construction activity on a particular portion of the Site has temporarily or permanently ceased except where construction activities will resume on the particular portion of the Site within 21 days; and where snow cover precludes initiation of stabilization measures.

K. Perform inspections of disturbed soil areas, material storage areas exposed to precipitation, and erosion control measures with Engineer a minimum of once every 14 days and also within 24 hours after any storm event greater than 0.5-inches of rainfall. Immediately correct deficiencies in the erosion control measures identified or indicated by failures or erosion by implementing additional measures or different techniques to correct and prevent subsequent erosion at no additional cost to Owner.

L. Control dust in accordance with Division 01 General Requirements. Utilize the application of sprinkled water and calcium chloride to reduce the emission of air-borne soil particulates from the Site.

3.02 PREPARATION

A. Temporary Erosion Control Blanket

1. Conform to grades and cross sections for slopes and ditches shown on the Drawings.

2. Finish to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed.

3. Apply seed prior to placement unless otherwise directed.

4. Dewater trenches and swales to install materials in the dry.

3.03 INSTALLATION

A. Siltation Fence

1. Construct as shown on Drawings. Install parallel to contours where possible, prior to site clearing and grading activities.

2. Bury lower edge of fabric at least 6 inches below ground surface to prevent underflow.

3. Curve ends of fence uphill to prevent flow around ends.

4. Inspect frequently; repair or replace any damaged sections.

5. Remove fence only when adequate grass catch has been established.

B. Mulch Sock/Tube

1. Install compost filter tubes, also referred to as sedimentation barriers consisting of a 9 inch diameter filter tube filled with approved mulch and compost materials.

2. Undertake immediately after each area has been properly prepared.

3. Fill sedimentation barriers by truck mounted blowers with an adequate volume of material to provide a firm barrier that slumps not more than 20 percent of the height measured in place. Fill tubes of compost on or off Site. Place, fill and stake tubes in place to ensure stability against water flows and tamp to ensure good contact with soil.

4. Hay mulch should cover the ground enough to shade it, but should not be so thick that a person standing cannot see ground through the mulch.

5. Remove matted mulch or bunches.

6. Install sedimentation barriers in the locations shown on Drawings and as directed by Engineer. Install in continuous lengths not to exceed 100 feet. Shorter lengths may be used as needed to finish a line of barrier, but not be shorter than 10 feet.

7. Overlap barrier sections not less than 2 feet at section ends, with the ends pressed firmly together. Stake section ends with the fabric ends tied off.

8. Drive stakes into the existing grade not less than 1 foot, spaced at a minimum of 8 feet on center. Provide additional stakes as needed for the ends of each section and for overlapping sections.

C. Erosion Control Blanket (Matting)

1. Install erosion control blanket and straw mulch in accordance with manufacturer's instructions and the following where shown on Drawings or as directed by Engineer. Submit manufacturer's instructions to Engineer prior to installation. Place immediately following seeding.

2. Install an erosion control blanket onto slopes that have been graded, seeded, completed to required line and where grades are steeper than or equal to 3:1 as shown on the Drawings and directed by Engineer.

3. Place strips lengthwise in the direction of the flow of water.

4. Overlap ends at least 6 inches in a shingle fashion.

5. Turn down up-slope end of each strip of the matting and bury to a depth of not less than 6 inches with the soil firmly tamped against it.

6. Engineer may require that any other edge exposed to more than normal flow of water be buried in a similar manner.

7. Build check slots at right angles to the direction of the flow of water. Space so that one check slot or one end occurs within each 50 feet of slope length. Construct by placing a tight fold of the matting at least 6 inches vertically into the ground, and tamp the same as up-slope ends.

8. When ordered, spread additional seed over matting, particularly at those locations disturbed by building the slots. Press matting onto the ground with a light lawn roller or by other satisfactory means.

9. Use pine wedges to fasten coir to ground. Do not use metal staples. Pound vertically flush to the surrounding surface and shall not protrude above finished grade. Place pine wedges in the same locations as manufacturer recommended staple locations.

10. On grades 4:1 or steeper, place pine wedges in the same 3 rows, but spaced 2 feet apart.

11. On overlapping or butting edges, double the number of pine wedges, with the spacing halved; secure ends of matting and required check slots spaced every foot.

12. In combination with the erosion control blanket, apply weed free straw mulch on side slopes steeper than 3:1.

13. Place mulch according to MassDOT 767. Do not use short fibered material or material which is so wet or decayed that it cannot be properly spread. Apply tackifier as needed.

D. Sod

1. Lay sod strips on the prepared soil, perpendicular to the slope or direction of water flow, starting at the lowest elevation. Butt the edges and ends of the sod strips together and tamp or roll. Stagger joints.

2. Staple sod strips at ends and at 3-foot intervals along the center of the strip.

3. Irrigate sodded area immediately after installation.

E. Temporary Seeding

1. Seed with appropriate seeds and application rates specified in the table in Part 2 of this Section. Sow seed at the rate indicated, on the pure live seed basis.

2. Mulch areas where temporary seeding has been applied. Do not mulch seeded areas where matting will be immediately installed. If temporary seeding does not achieve adequate growth by November 1, apply an additional layer of mulch at that time.

3. Mulch temporarily or permanently seeded areas, areas which cannot be seeded within the recommended seeding dates, and any soil stockpile areas, immediately following seeding. Straw or hay mulch, wood fiber mulch, and hydromulch are recommended.

F. Topsoil Storage

1. Place topsoil which is stockpiled on the site for use in loam applications out of natural drainages, in 8 foot high piles which have side slopes of 50 percent to 70 percent.

2. Install siltation fence around the base of the pile to prevent eroding soil from washing into drainages.

3. Cover any topsoil piles which are to remain for a period of 21 days or more with temporary seed and mulch immediately following stockpiling.

G. Store Check Dam

1. Place in locations indicated on Drawings or as ordered to provide for temporary control of erosion and sedimentation.

2. Install as directed by the local Conservation Commission and Engineer.

H. Hay Bales

1. Place as ordered to provide for temporary control of erosion, and in ditches at 100 foot minimum intervals.

2. Install as shown on Drawings, and stake with required stakes.

I. Siltation Control Devices – Silt Sacks

1. Install in accordance with the Drawings and manufacturer's instructions. Install Inlet Protection (Silt Sacks) in catch basins and as required by the Engineer.

2. Keep silt sacks in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth.

3. Install prior to commencement of any excavation including but not limited to, cold planning, pavement reclamation, or unclassified excavation.

J. Silt Curtain

1. Install silt curtain filter material in accordance with the Drawings and prior to commencement of any excavation including but not limited to, cold planning, pavement reclamation, or unclassified excavation.

2. Keep silt curtain in place until removal is approved by the Engineer in accordance with water quality monitoring.

K. Other Temporary Measures

1. Provide and maintain temporary slope drains as required.

2. Employ other temporary erosion control measures as directed by the Engineer or local Conservation Commission.

3.04 FIELD QUALITY CONTROL

A. Site/Field Tests and Inspections

1. Inspect erosion control practices immediately after each rainfall and at least daily during prolonged rainfall or snowmelt for damage. Make appropriate repairs or replacement at no additional cost to the Owner, until acceptance by Engineer.

3.01 MAINTENANCE

A. Maintain areas mulched or matted, at no additional cost to the Owner, until Project acceptance.

B. Maintain detention basins by removing silt that reaches a depth of over 1 foot, at no additional cost to the Owner, until Project acceptance.

C. Maintain sedimentation barrier and periodically inspect barrier lines during construction. Remove accumulated sediment higher than 1/2 the height of the barrier, or before a major storm event and as directed by the Engineer.

D. Remove silt from siltation fence when it has reached one-half the fence height, or prior to expected heavy runoff or siltation.

E. Repair matting if any pine anchors become loosened or raised, or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.

F. Inspect filter tubes after each rainfall and at least daily during prolonged rainfall. Immediately correct deficiencies, including, but not limited, to washout, overtopping, clogging due to sediment, and erosion. Review location of tubes in areas where construction activity causes drainage runoff to ensure that the tubes are properly located for effectiveness. Maintain the functional integrity of filter tubes in sound condition at all times. Where deficiencies exist, such as overtopping or wash-out, install additional staking or compost material as directed by the Engineer. Remove sediment deposits as necessary to maintain the filters in working condition. Repair or replace filter tubes that are decomposing, cut, or otherwise compromised.

G. Inspect condition of silt sacks after each rainstorm and during major rain events and clean periodically to remove accumulated sediment and debris. Handle and dispose of debris accumulated in silt sacks. Repair or replace damaged silt sacks.

H. Periodically inspect and empty the silt curtain and as directed. Dispose of removed material off Site. Inspect the condition of silt curtain after each rainstorm and during major rain events. Repair and replace damaged silt curtain at no additional cost to Owner.

3.02 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

B. Remove temporary materials and devices when permanent soil stabilization has been achieved. Re-use materials in good condition if approved by the Engineer.

C. Remove filter fabric from the Site at completion of the Project.

D. Remove sedimentation barrier including removal of sediment accumulated at the barrier line, stakes and the barrier and the compost fill. Do not remove before a major storm event or as directed by Engineer. Finish final grade below and around the sedimentation barrier to match the existing grade.

E. Level and grade to the extent required to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

F. Remove and legally dispose of unsuitable materials from Site.

END OF SECTION

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SECTION 01 57 32

TEMPORARY STORMWATER DRAINAGE BYPASS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish, install and maintain temporary measures for storm drain bypass, including but not limited to, temporary bypass piping, plugs, and pumping.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: in accordance with Division 01 General Requirements.

1.04 SUBMITTALS

A. Submit in accordance with the Division 01 General Requirements.

B. Bypass Pumping Plan for **each** bypass location to Engineer and Owner 2 weeks prior to bypassing stamped by a professional engineer registered in the state where Project is located.

C. Bypass Pumping Plan must contain at a minimum:

1. Standard Operating Procedure: Describe the normal sequence of events to be followed while setting up, pumping, and breaking down pumping equipment. Plan must address strategies and safeguards to ensure that public safety and environmental health is constantly maintained, the possibility of property damage and wetlands impacts, and overall level of inconvenience is minimized.

2. A bypass routing diagram including pump location for **each** Work zone,

3. Calculations: estimates of anticipated peak flows, pump rates, pump curves, and other relevant design.

4. List of the equipment that will be used during normal pumping operation.

5. Emergency Response Plan: Describe the intended means of handling the following situations, include both response and clean-up measures. List equipment to be used and where it will be stored in case of emergency:

   a. Break or failure of bypass line (pipe)

   b. Failure of bypass pump

   c. Overflow

   d. Back up into dwelling or onto private property

   e. Failure of bypass pumping system to accommodate flow.

D. Shop Drawings for equipment and materials including, but not limited to:

1. Pumps

2. Pipe or hose

3. Joints/couplings

4. Plugs and/or bladders

1.05 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 PUMPS, PIPES & FITTINGS

A. Pump: suitable for usage with storm drainage and capable of conveying the volume of flow anticipated with a sufficient margin of safety. Provide for 100 percent redundancy (two pumps shall be provided at the Site for every one pump required) if flow cannot be returned to the storm drain at any time if pumping system failure occurs. Redundant pump: include suction and discharge piping and quick connect couplings to facilitate change out of pumps.

B. Pipe and fittings: constructed of carbon steel, or fused high-density polyethylene pipe or approved equal. Fittings shall be quick-disconnect type.

C. Lay flat hose: extra heavy duty, highly abrasion resistant and fitted with gasketed couplings. Hose shall be rated for 150 percent of working pressure.

D. Provide a temporary enclosure for the bypass pumping system for sound attenuation operating outside of regular working hours meeting state and local Laws and Regulations for noise requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Adequately bypass flow around the affected section of the Work, even instantaneous peak flows, without damage or overflow. Be aware of potential large instantaneous flow contributors connected to the storm drain under repair.

B. Allow for passage of traffic. Protect bypass piping at driveway and street crossings.

C. Maintain roadway drainage system during precipitation events to prevent flooding of public right-of-way and adjacent properties.

1. Protect against surcharging of the existing system upstream during dry weather and wet weather flows.

2. Protect Site from flooding. Provide measures to adequately isolate the Site from backflow of adjacent waterways to provide dry working conditions.

D. Continuously monitor bypass operations regardless of duration or timing of bypassing.

E. Coordinate bypassing with low-flow times, to the extent feasible. Ensure no overflows or backups occur.

F. Temporary damming of waterways is not allowed.

G. If it is determined that bypass pumping is not required at a location due to lack of flow or that a Work item does not require bypass pumping to be performed, and the decision is agreed upon by the Engineer, provide protection of flows from any construction debris and ensure that no debris enters the storm drain system.

H. Bypass Pumping

1. Bypass storm drain pumping: a typical manhole to manhole or catch basin to manhole bypass pumping setup.

2. Submit a bypass plan to Engineer prior to implementation of such Work and prior to the start of construction.

I. Restore normal service to entire system at the end of normal working hours every day or post an attendant on Site.

J. Repair any damage that occurs to existing pipes and structures to the satisfaction of the Engineer.

K. Temporary Bypass will be considered incidental to the Work to be performed, unless otherwise indicated.

3.02 FLOW DATA

A. Active storm drains exist in the entire Project area. Therefore, flows and flow data are variable depending on location, weather conditions and tides. Visiting areas of the Site prior to Work to visually inspect flow conditions is encouraged. Maintain flows as specified under all flow conditions.

3.03 TEMPORARY POWER

A. Provide fuel and/or power to run pumps associated with the bypass at no additional cost to the Owner. Include emergency backup power or backup fuel storage as part of the Bypass Pumping Plan.

3.04 PIPING

A. Lay temporary piping along the general lines of the street in a manner that causes the minimum amount of disruption and is least likely to be damaged. Make provisions at driveways, provisions to permit property owners to drive over the temporary pipe by use of temporary bituminous pavement, cold patch, or other approved material to form a ramp on each side of the pipe to the satisfaction of the Engineer or by depressing the pipe as directed by the Engineer.

3.05 OPERATION AND MAINTENANCE

A. Constantly attend the bypass system. Provide an attendant if bypass pumping must continue beyond working hours.

END OF SECTION

SECTION 01 57 35

TEMPORARY STREAM BYPASS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish, install, and maintain temporary measures for the Unnamed Streamflow bypass, including, but not limited to, cofferdams, sandbags, temporary bypass piping, and pumping.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: in accordance with Division 01 General Requirements.

1.04 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

1. Bypass Pumping Plan for each bypass location to Engineer and Owner 2 weeks prior to bypassing stamped by a professional engineer registered in the state where Project is located.

2. Minimum Contents of Bypass Pumping Plan

   a. Standard Operating Procedure - Describe normal sequence of events to be followed while setting up, pumping, and breaking down pumping equipment. Plan must address strategies and safeguards to ensure that public safety and environmental health is constantly maintained, the possibility of property damage and wetlands impacts, and overall level of inconvenience is minimized.

   b. Bypass routing diagram including pump location for each Work zone

   c. Calculations including estimates of anticipated peak flows, pump rates, pump curves, and other relevant design. Determine bypass pumping capacity for individual pipe section replacement.

3. Provide design and maintenance of the cofferdam. Submit cofferdam design as part of the dewatering plan as needed.

4. List of the equipment to be used during normal pumping operation

5. Emergency Response Plan: Describe the intended means of handling the following situations, include both response and clean-up measures. List equipment to be used and where it will be stored in case of emergency:

   a. Break or failure of bypass line (pipe)

   b. Failure of bypass pump

   c. Overflow

   d. Back up into dwelling or onto private property

   e. Failure of bypass pumping system to accommodate flow.

B. Shop Drawings

1. Pumps

2. Pipe or hose

3. Joints/couplings

4. Plugs and/or bladders

1.05 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 PUMPS, PIPES & FITTINGS

A. Pump: suitable for usage with storm drainage and capable of conveying the volume of flow anticipated with a sufficient margin of safety. Provide for 100 percent redundancy (provide 2 pumps for every 1 pump required) if flow cannot be returned to the storm drain at any time if pumping system failure occurs. Include suction and discharge piping and quick connect couplings to facilitate change out of pumps.

B. Pipe and fittings: constructed of carbon steel, or fused high-density polyethylene pipe or approved equal. Fittings shall be quick-disconnect type.

C. Lay flat hose: extra heavy duty, highly abrasion resistant and fitted with gasketed couplings. Hose rating: 150 percent of working pressure.

D. Provide a temporary enclosure for the bypass pumping system for sound attenuation operating outside of regular working hours meeting state and local Laws and Regulations for noise requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Adequately bypass flow around the affected section of the Work, even instantaneous peak flows, without damage or overflow. Be aware of potential large instantaneous flow contributors connected to the storm drain under repair.

B. Continuously monitor bypass operations regardless of duration or timing of bypassing.

C. Monitor ongoing and future weather conditions for the duration of construction and adjust and/or remove the bypass measures as needed to avoid property damage, wetland impacts and risks to public health and safety.

D. Coordinate bypassing with low-flow times, to the extent feasible. Ensure no overflows or backups occur.

E. Temporary damming of waterways is not allowed.

F. If it is determined that bypass pumping is not required at a location due to lack of flow or that a Work item does not require bypass pumping to be performed, and the decision is agreed upon by the Engineer, provide protection of flows from any construction debris and ensure that no debris enters the storm drain system.

G. Bypass Pumping

1. Bypass storm drain pumping: a typical manhole to manhole or catch basin to manhole bypass pumping setup.

2. Submit a bypass plan to Engineer prior to implementation of such Work and prior to the start of construction.

H. Restore normal service to entire system at the end of normal working hours every day or post an attendant on Site.

I. Repair any damage that occurs to existing pipes and structures to the satisfaction of the Engineer.

J. Temporary Bypass will be considered incidental to the Work to be performed, unless otherwise indicated.

3.02 FLOW DATA

A. Flows and flow data are variable depending on location, weather conditions and tides. Visiting areas of the Site prior to Work to visually inspect flow conditions is encouraged. Maintain flows as specified under all flow conditions.

B. Portions of the Project area are subject to groundwater inflow. Account for groundwater infiltration in the planning and conducting the Work.

3.03 TEMPORARY POWER

A. Provide fuel and/or power to run pumps associated with the bypass at no additional cost to the Owner. Include emergency backup power or backup fuel storage as part of the Bypass Pumping Plan.

3.04 PIPING

A. Lay temporary piping along the general lines of the street in a manner that causes the minimum amount of disruption and is least likely to be damaged. Make provisions at driveways, provisions to permit property owners to drive over the temporary pipe by use of temporary bituminous pavement, cold patch, or other approved material to form a ramp on each side of the pipe to the satisfaction of the Engineer or by depressing the pipe as directed by the Engineer.

3.05 OPERATION AND MAINTENANCE

A. Constantly attend the bypass system. Provide an attendant if bypass pumping must continue beyond working hours.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies general requirements for products, materials and equipment. This Section applies to all Specifications and Drawings and provisions of this Section may be supplemented in other sections of Division 01.

B. Certain provisions required by Laws and Regulations may be referenced. Contractor is responsible to determine and obtain applicable Laws and Regulations and to review and interpret the full text of such Laws and Regulations.

C. Section Includes

1.02 SOURCE QUALITY CONTROL
General
Independent Testing Agency Certification
Factory Testing

1.03 PRODUCT REQUIREMENTS
General
Transportation and Handling
Storage and Protection

1.04 WARRANTIES

1.02 SOURCE QUALITY CONTROL

A. General

1. Subject material and equipment furnished under the Contract Documents to a complete factory testing program as specified.

2. Shop Drawings and submittals: reviewed by Engineer before initiating testing program.

3. Perform checks and tests in accordance with manufacturer's recommendations and referenced standards.

4. Evaluate test results and advise Owner immediately of any discrepancy between test results and test limits or the failure of any device or system under test. Include test limits for acceptability applicable to each test on the certified test records.

5. Record test information, including the evaluation of testing results, on forms approved by Owner and Engineer.

B. Independent Testing Agency Certification

1. If specified, furnish certificates from an independent testing agency.

2. Independent testing agency to certify that material and equipment components have been examined and tested and are in conformance with the requirements specified in the Contract Documents.

3. Take Samples in accordance with the requirements specified in the Contract Documents, as selected by Owner or independent testing agency. Furnish and ship at no additional cost to Owner.

C. Factory Testing

1. Provide 14 days prior written notice of factory inspections and tests to Owner and Engineer.

2. If failure to give proper written notice results in material and equipment being assembled or covered before a factory inspection or test, make material and equipment ready for inspection or test and reassemble or recover at no additional cost to Owner.

3. Owner may inspect any portion of material and equipment furnished at any reasonable time during manufacture and may witness testing of any portion of material and equipment wherever located. Owner and Engineer to witness tests only.

4. Furnish, set up and operate test equipment and facilities.

5. If facilities for conducting required tests are unavailable to the manufacturer, conduct tests elsewhere or have them performed by an independent agency approved by Owner.

6. Protect material and equipment after testing and checking to provide that subsequent testing of other equipment or systems does not disturb, damage or otherwise interfere with functional capability of material and equipment.

7. Assume responsibility for protection of material and equipment and safety of all personnel during factory testing program.

8. Grounds for rejection: failure to withstand tests; failure to meet ratings; failure to meet applicable standards.

9. In the event of failure

   a. Submit revisions of documents requiring approval for changes required for rectification.

   b. Obtain Owner's and Engineer's approval before making such changes.

   c. Provide written details of any changes to be made not requiring approval.

   d. Notify Owner and Engineer in writing before retesting.

   e. Furnish new material and equipment which meets requirements of the Specifications if rejected material and equipment cannot be rectified to satisfaction of Owner and Engineer.

   f. Retest after rectification in presence of Owner or Engineer.

10. Assume responsibility for all costs, including, but not limited to: loss or damage to materials and equipment resulting from testing; retesting; rectification; new material and equipment to replace damaged or non-rectifiable material and equipment; removal, furnishing, transportation, unloading, and installation of replacement material and equipment; and witness of testing by Owner and Engineer including travel, lodging, meals, and payroll.

11. Submit certified test reports which define tests, list results, and are signed by Contractor's representative, and copies of raw data collected during tests. Submission of certified test reports does not relieve Contractor of responsibility for material and equipment meeting requirements of the Contract Documents after installation.

1.03 PRODUCT REQUIREMENTS

A. General

1. Products include new material and equipment incorporated into the Work and may also include existing material and equipment required for reuse. This does not include machinery and equipment used for preparation, fabrication, conveying, installation and erection of the Work.

2. Do not use materials and equipment removed from existing Work Site, except as specifically permitted.

3. Provide complete with accessories, trim, finished, safety guards, and other devices and details need for a complete installation and for the intended use or effect.

4. Provide standard products which have been produced and used successfully on other similar projects for similar applications. Provide products which are likely to be available to Owner in the future for items required for maintenance and repair or replacement Work.

5. Furnish interchangeable components of the same manufacturer, for similar components.

B. Transportation and Handling

1. Transport and handle material and equipment in accordance with manufacturer's instructions.

2. Notify Engineer and Owner in writing upon acceptance of a shipment.

3. Promptly inspect shipments to assure that material and equipment comply with requirements, quantities are correct, and material and equipment are undamaged.

4. Furnish equipment and personnel to handle material and equipment by methods to prevent soiling, disfigurement, or damage.

5. Uncrate equipment and dispose of packing material properly.

C. Storage and Protection

1. Store and protect material and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive material and equipment in weather tight, climate controlled enclosures.

2. For exterior storage of fabricated material and equipment, place on sloped supports, above ground.

3. Provide for bonded off Site storage and protection when Site does not permit on Site storage or protection.

4. Cover material and equipment subject to deterioration with impervious sheet covering. Furnish ventilation to avoid condensation or potential degradation of material and equipment.

5. Store loose granular materials on solid flat surfaces in a well-drained area. Avoid mixing with foreign matter.

6. Furnish equipment and personnel to store material and equipment by methods to prevent soiling, disfigurement, or damage.

7. Arrange storage of material and equipment to permit access for inspection. Periodically inspect to assure material and equipment are undamaged and are maintained in acceptable conditions.

8. After receipt of material and equipment, assume responsibility for loss and damage including but not limited to breakage, corrosion, weather damage, and distortion.

1.04 WARRANTIES

A. Provide warranties for equipment and material in accordance with Paragraphs 6.19 and 14.03 of the Standard General and Supplementary Conditions, if any.

B. Provide extended or special warranties as indicated in individual Specification sections.

END OF SECTION

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SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies general execution requirements and startup/commissioning and performance testing for closeout of the Work. This Section applies to all Specifications and Drawings and provisions of this Section may be supplemented in other sections of Division 01.

B. Certain provisions required by Laws and Regulations may be referenced. Contractor is responsible to determine and obtain applicable Laws and Regulations and to review and interpret the full text of such Laws and Regulations.

C. Section Includes

1.02 OVERALL EXECUTION REQUIREMENTS
Coordination
Existing Conditions
Field Engineering
Cutting and Patching
Electrolytic Corrosion Prevention
Quality Assurance and Control of Installation
Manufacturers' Field Services
Independent Testing
Record Documents

1.03 CLOSEOUT REQUIREMENTS

1.02 OVERALL EXECUTION REQUIREMENTS

A. Coordination

1. Conduct preconstruction and pre-installation meetings before commencing certain Work that requires coordination or has special requirements or approvals.

2. Comply with the required Work sequence and coordination as may be specified in Summary of Work and reflect in the Project scheduling.

   a. Comply with working hours specified in Section 00 73 10.

3. Coordinate Work such that Work is completed with minimum disruption to residents and businesses.

4. Coordinate space requirements and installation of Work. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and repairs.

5. Coordinate Work of the various Specifications with interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

6. Coordinate related Work at the Site in accordance with Article 7 of the Standard General and Supplementary Conditions, if any.

7. Coordinate completion and cleanup of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

8. After Owner occupancy of premises, coordinate access to Site for correction of defective Work and/or incomplete Work to minimize disruption of Owner's activities.

9. Specific requirements applicable to the Project include the following.

   a. Coordinate with the Conservation Commission prior to start of Work per the Order of Conditions included as in Section 00 31 00.

B. Existing Conditions

1. Paragraph 4.01 of the Standard General and Supplementary Conditions, if any, covers Availability of Lands.

2. Paragraph 4.02 of the Standard General and Supplementary Conditions, if any, covers Subsurface and Physical Conditions.

3. Pursuant to Paragraph 4.04 of the Standard General and Supplementary Conditions, if any, existence and location of Underground Facilities and other utilities and construction indicated as existing are not guaranteed. Before beginning Work investigate and verify the existence and location of Underground Facilities and other utilities and construction.

   a. Contact DIGSAFE at www.digsafe.com or by dialing 811.

4. Paragraph 4.05 of the Standard General and Supplementary Conditions, if any, covers Reference Points.

5. Paragraph 4.06 of the Standard General and Supplementary Conditions, if any, covers Hazardous Environmental Conditions at Site.

C. Field Engineering: as specified below.

1. Prior to initiating construction, engage an independent professional land surveyor registered in the state where the Project is located to provide surveys and permanent reference points for all bounds and property markers along the line of the Work that may be disturbed during construction. Submit copies of all ties to the bounds and property markers to the Engineer prior to excavation at the Site(s).

2. Maintain surveyor's log of control and other survey work. Keep log available for reference.

3. Verify layout information shown on the Drawings in relation to existing benchmarks before lay out of the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

4. Promptly report lost or destroyed reference points, benchmarks, or control points. Promptly report requirements relocate reference and control points due to changes in grades. Promptly replace lost or destroyed bounds or markers and control points based on the original survey control points utilizing the services of a professional land surveyor registered in the state where the Project is located. The cost of replacing markers disturbed by the Contractor's operations shall be at the Contractor's expense.

D. Cutting and Patching

1. Employ skilled and experienced personnel to perform cutting and patching.

2. Submit written request in advance of cutting or alteration which affects:

   a. structural integrity of any element of Project;

   b. integrity of weather exposed or moisture resistant elements;

   c. efficiency, maintenance, or safety element;

   d. safety, traffic, or hazard barriers;

   e. visual qualities of sight exposed elements; and

   f. work of Owner or separate contractor.

3. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:

   a. fit materials together, to integrate with other work;

   b. uncover Work to install ill-timed Work;

   c. remove and replace defective or non-conforming Work;

   d. remove Samples of installed Work for testing when requested; and

   e. provide openings in element of Work for penetration of mechanical and electrical work.

4. Execute Work by methods to avoid damage to other work and which will provide appropriate surfaces to receive patching and finishing.

5. Provide adequate temporary support for Work to be cut.

6. Restore Work with new materials in accordance with requirements of Contract Documents. Use materials identical with original materials where recognized that satisfactory results can be produced.

7. Provide protection from elements for areas which may be exposed by uncovering work.

8. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained adjoining Work in a manner, which will eliminate evidence of patching.

9. Identify any Hazardous Waste, Hazardous Environmental Condition, or hazardous substance exposed during the Work to Owner for decision or remedy in accordance with Paragraph 4.06 of the Standard General and Supplementary Conditions, if any.

10. Cut work by methods least likely to damage Work to be retained and work adjoining. Cut Work with sawing and grinding tools, not with hammering, chopping, or burning tools. Cut masonry and concrete materials with masonry saw or core drill. Do not use pneumatic tools without prior approval. Core drill openings through concrete Work. Adhere to mandatory cutback requirements when saw cutting concrete and roadway openings.

11. Do not cut and patch structural Work in a manner resulting in reduction of load-carrying capacity or load/ deflection ratio.

12. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Maintain supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage and seal voids. For interior work at penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire resistant material, to full thickness of the penetrated element.

13. Do not cut and patch operational or safety-related components that reduce capacities to perform in manner intended. Do not cut and patch Work that reduces visual qualities. Remove and replace unsatisfactory cutting patching as directed by Engineer or Owner.

E. Electrolytic Corrosion Prevention

1. Prevent galvanic action, bimetallic corrosion, anodic or cathodic action, and electrolysis at all electrical grounds and for all galvanic scale (electromotive series or table of oxidation potentials). Do not allow contact of dissimilar metals further apart than 0.35 on the galvanic scale (electromotive series or table of oxidation potentials). The electrode potential of common metals is listed below.

	Electrode Potential Volts (Relative to Hydrogen)
Magnesium	+2.37
Aluminum	+1.70
Zinc+	+0.76
Chromium	+0.56
Iron and Steel	+0.44
Cadmium	+0.40
Nickel	+0.25
Tin	+0.14
Lead	+0.13
Copper	-0.34

2. Unless otherwise indicated, provide dielectric insulators between ferrous and nonferrous pipe and equipment.

F. Quality Assurance and Control of Installation

1. Monitor quality control of Subcontractors, Suppliers, manufacturers, material, equipment, services, Site conditions, and workmanship, to produce Work of specified quality. Conduct field quality control and testing specified.

2. Comply fully with manufacturers' installation instructions, including each step in sequence. If manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

3. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

4. Perform Work using persons qualified to produce workmanship of specified quality.

5. Install field Samples and mockups at the Site as required in Specifications for review. Acceptable Samples and mockups represent a quality level for the Work. Where field Sample or mockup is specified to be removed, clear area after field Sample or mockup has been accepted by Engineer or after Work is complete when mockup is to serve as a control reference.

6. Protect adjacent construction in accordance with Paragraph 6.13 of the Standard General and Supplementary Conditions, if any.

G. Manufacturers' Field Services

1. If required in the Specifications, arrange and pay for material or equipment Suppliers or manufacturers to provide qualified staff personnel (field representative) to perform the following services and services specified. Submit reports of activities, actions taken and test results to Engineer within 10 days of completion.

   a. Observe Site conditions, conditions of surfaces and installation, quality of workmanship.

   b. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

   c. Assist with field assembly as required.

   d. Furnish, setup, and operate required test equipment and facilities.

   e. Perform and record results of manufacturer recommended inspections and tests, and tests specified for material and equipment.

   f. Be responsible for protection of material and equipment and safety of all personnel during testing.

   g. Perform any other services normally provided by field representative's company.

   h. Instruct operating personnel in proper use of material and equipment.

   i. Instruct and supervise field repairs before acceptance by Owner.

H. Independent Testing

1. Employ and pay for specified services of an independent firm in accordance with Paragraph 13.03 of the Standard General and Supplementary Conditions to perform inspection and testing as may be specified except where responsibility for a specific inspection or test is expressly allocated to Owner in the Specifications or by Laws and Regulations.

2. Reports will be submitted by the independent firm to Owner, in duplicate indicating observations and results of tests and indicating compliance or noncompliance with Contract Documents.

3. Inspection, testing, and source quality control may occur on or off the Project Site.

4. Cooperate with independent firm. Furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

5. Notify Owner and independent firm 24 hours before expected time for operations requiring services.

6. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

7. Retesting required because of nonconformance to specified requirements will be performed by the same independent firm if instructed by Owner. Payment for retesting will be charged to Contractor by deducting inspection or testing charges from the Contract Price.

8. Testing or inspecting does not relieve Contractor from performing Work in accordance with requirements of the Contract Documents.

I. Record Documents

1. Provide record documents in accordance with Paragraph 6.12 of the Standard General and Supplementary Conditions, if any, and in accordance with Section 01 15 30.

1.03 CLOSEOUT REQUIREMENTS

A. Substantial Completion shall have been achieved when the following has been completed and the requirements of Paragraph 14.04 of the Standard General and Supplementary Conditions, if any, have been met.

1. Work is complete, systems are successfully operating, and final testing has been successfully completed.

2. The Site has been restored to the satisfaction of the Owner.

3. An inspection of the Work has been completed by the Engineer and the Owner.

4. An updated Punch List is provided.

5. The Contractor's written warranty and guarantee has been submitted as required by Paragraph 6.19.D. of the Standard General and Supplementary Conditions, if any.

6. A Certificate of Substantial Completion has been provided in accordance with Paragraph 14.04.C. of the Standard General and Supplementary Conditions, if any.

B. The Contractor shall have sole care, custody, and control of the Work until achievement of Substantial Completion. During the period between Substantial Completion and the date for Final Completion, Contractor shall be given access to correct items on the Punch List and achieve Final Completion.

C. The date of achieving Substantial Completion is the date set forth in the Certificate of Substantial Completion that is accepted and signed by the Owner.

D. Final Completion shall have been achieved when the Work is complete, the requirements of Paragraphs 14.06 and 14.07 of the Standard General and Supplementary Conditions, if any, have been met, and when the following is complete.

1. Substantial Completion has been achieved and liquidated damages for failure to meet Substantial Completion Date have been paid.

2. All Work including Punch List Items has been completed.

3. Final cleaning has been conducted and Contractor equipment and supplies including waste materials have been removed from the Site and legally disposed of.

4. A full set of record documents have been submitted as specified in subparagraph 1.02.I. above and Contractor's written warranty and guarantee has been resubmitted if adjusted.

5. Inspections required by Laws and Regulations are complete. Certificates and permits to occupy and operate have been issued if required.

6. Spare parts, maintenance and extra materials have been delivered in quantities specified to Project Site and stored as directed.

7. A request for final inspection in accordance with Paragraph 14.06 of the Standard General and Supplementary Conditions, if any, has been submitted to the Engineer and the inspection has been completed and the results accepted by the Owner.

8. A Final Application for Payment has been submitted to the Engineer identifying total adjusted Contract Price, previous payments, and balance due along with required documentation in accordance with Paragraph 14.07.A. of the Standard General and Supplementary Conditions, if any.

END OF SECTION

SECTION 02 41 14

SELECTIVE SITE DEMOLITION AND RESTORATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide Site demolition including clearing, stripping or ordinary excavation of existing bituminous or cement concrete pavements, soils, foundations, bituminous or cement concrete curbs, bituminous or cement concrete sidewalks, grassed areas, demolition, dismantling, replacement and restoration Work, stacking of reusable and disposal of waste and surplus materials and tree protection and removal in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 31 00 00 – Earthwork
2. Section 31 10 00 – Site Clearing
3. Section 32 12 16 – Asphalt Paving
4. Section 32 90 00 – Planting
5. Section 32 92 19 – Seeding

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing Conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Perform selective Site demolition in accordance with MassDOT Section 100.

B. Comply with General Requirements for temporary construction controls, protections, and waste disposal.

1. Ensure against damage or injury to buildings, occupants, and adjacent property from falling debris or other causes. Avoid damage to adjacent areas, facilities, and appurtenances.

2. Maintain free and safe passage to and from Site.

3. Legally dispose of waste, surplus and unsatisfactory materials including bituminous or cement concrete, debris, rails and ties, common excavation, cold planing, and reclamation immediately as it accumulates during clearing, grubbing, stripping, demolition, and other Site preparation. Burying is not allowed.

3.02 SITE DEMOLITION

A. Clear Site of construction debris and waste materials, including grass, bushes, trees, broken concrete, fencing, pipes, lumber and steel pieces, rags and plastics, within limits of Work as shown on Drawings or as directed.

B. Strip or excavate existing bituminous or cement concrete pavements, soils, foundations, bituminous or cement concrete curbs, bituminous or cement concrete sidewalks, and grassed areas.

C. Remove and stack fencing, lamp posts, letter boxes, signs, guardrails, bike racks, poles and other usable materials to be reinstalled.

D. Demolish and remove existing bituminous pavement, bituminous and concrete walkways, curbing, grass borders and landscaping, bushes, shrubs and vegetation as necessary. Remove existing obstructions and debris, cut trees, bushes, root stumps, waste stones, wood, lumber, metal, plastic, and other unsuitable materials, above, at, or below grade that may interfere with or obstruct the Work, whether or not shown on Drawings.

E. Remove and stockpile top soil, curb stones, utility castings and other materials for reuse as shown or directed by Engineer.

F. Stockpile recovered materials acceptable to Engineer to be reused on Project and protect against damage or deterioration.

G. Do not cut, remove, destroy, or trim trees and shrubs unless specifically marked or permitted. Do not remove tree branches using excavating equipment. Provide that required trimming is performed by an arborist licensed in the state where the Project is located.

1. Protect trees or vegetation outside limits of Work area.

2. Tree Removal (4-48 inches in diameter)

a. Cut existing trees and expose by excavation, remove or cut, as required, tree stumps and root systems as shown on Drawings and as directed. Remove and legally dispose of tree stumps, roots, organic matter and unsuitable materials.

b. Excavation around tree not to exceed width of sidewalk.

c. Depth of excavation for stump removal not to exceed 5 feet.

d. Depth of excavation for removal of tree root system not to exceed 2 feet.

e. Cut clean and remove root system encountered within limits of sidewalk width as determined by Engineer. Paint cut surfaces of remaining detached roots with stump rot. Clean and paint tree roots still attached to trunk with 2 coats of approved chemical root guard.

f. Transport and stack existing tree grates in good condition, not needed for Project, or legally dispose of as directed by Engineer.

H. Protect integrity of remaining structures, appurtenances and equipment during demolition, removal and alteration to existing structures, appurtenances, utility pipes, castings, fences, walkways, posts, stairs and other physical features.

I. Maintain slopes longitudinally and laterally to ensure proper and continuous drainage. Field adjust sidewalk and roadway gutter grades at driveways and side street intersections to be consistent with existing drainage pattern and provide for an appropriate transition between new and existing side streets and driveway pavement surfaces at intersections.

J. If cobblestones are encountered, carefully stack excavated cobblestone.

K. Leave abandoned underground piping in place, plug or cap and fill with flowable control density fill. Remove or cut abandoned underground piping castings a minimum 12 inches below finished surface and area backfilled.

L. Cut sections of piping to be removed to nearest solid support or provide appropriate new supports and cap remaining ends before backfilling, unless noted on Drawings or directed by Engineer.

M. Cut openings in existing masonry Work to provide for a suitable bond. Clean, square and plumb openings for installation of new Work. Thoroughly clean cut surfaces of loosened materials.

3.03 SAWCUTS IN EXISTING PAVEMENTS AND SIDEWALKS

A. Neatly saw cut edges of excavations in existing pavements and sidewalks along either a straight line or design curved line as shown in Drawings. Ragged, uneven edges are not acceptable.

B. Saw cut existing pavement through its full depth or to elevation of abutting pavement subgrade, whichever is less, at joints between existing and proposed pavements, and at utility trenches through existing remaining pavement. Provide a uniform, vertical surface for pavement joint with existing pavement.

C. Neatly saw cut edges that become broken, ragged or undermined with minimum disturbance to remaining pavements or sidewalks, prior to placement of abutting pavement.

D. In areas where existing concrete sidewalk abuts a building, wall or storefront, and sidewalk is to be reconstructed or removed, saw cut existing sidewalk a minimum of 6 inches from building wall or storefront, unless otherwise directed by Engineer.

E. Spray or paint saw cut surfaces with a uniform thin coat of RS-1 asphalt emulsion immediately before placement of hot mix asphalt material against surface.

3.04 REPAIR, REPLACEMENT AND RESTORATION

A. Match materials of repair or restoration to existing adjacent surfaces in finish and texture as closely as possible. Make joints between new and existing Work inconspicuous.

B. Replace or restore items damaged, dislocated or dismantled such as field stone masonry walls, fences, lamp posts, letter boxes, masonry boundary walls, City signs, poles, bollards, curb stones, markers, trees, bushes, grassed areas, walkways, stairs, steps, benches, outside lighting and other amenities and physical features designated to remain, to original condition.

3.05 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.06 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 03 41 26

PRECAST CONCRETE STRUCTURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide materials, tools, and equipment to manufacture, install and test precast concrete and precast concrete structures in accordance with this Section and applicable reference standards listed in Article 1.03 and as shown on Drawings.

2. Field verify dimensions prior to fabrication.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)

a. AASHTO HB-17 Standard Specifications for Highway Bridges

b. AASHTO T 111 Standard Method of Test for Mineral Matter or Ash in Asphalt Materials

2. ASTM International (ASTM)

a. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

b. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

c. ASTM C33 Standard Specification for Concrete Aggregates

d. ASTM C144 Standard Specification for Aggregate for Masonry Mortar

e. ASTM C150 Standard Specification for Portland Cement

f. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes

g. ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete

h. ASTM C494 Standard Specification for Chemical Admixtures for Concrete

i. ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

j. ASTM D113 Standard Test Method for Ductility of Asphalt Materials

k. ASTM D1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing

l. ASTM D217 Standard Test Methods for Cone Penetration of Lubricating Grease

m. ASTM D4 Standard Test Method for Bitumen Content

n. ASTM D6 Loss on Heating of Oil and Asphaltic Compounds

o. ASTM D71 Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)

3. Federal Specifications (FED)

a. FED SS-S-210A Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints

4. Related Requirements

a. Section 01 57 05 – Temporary Dewatering

b. Section 31 00 00 – Earthwork

c. Section 33 42 13 – Stormwater Culverts

d. Section 33 49 00 – Stormwater Structures

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Shop Drawings

1. Precast Concrete Structures, including construction details, dimensions, reinforcement, rebar placement, openings, wing walls/head walls, anchoring, etc. Drawings to show critical field dimensions identified by the manufacturer. Drawings to show locations and sizes of penetrations and related appurtenances.

C. Product Data

1. Provide manufacturer's descriptive data, technical literature, and catalog cuts. Product data shall also include catalog cut sheets and dimensional data for all precast structures and accessories. Include product data on joint sealants, anchorage hardware and related appurtenances.

2. Joint Sealant

3. Any other appurtenant data.

D. Design Data

1. Structural design calculations sealed by licensed engineer in the state where the Project is located, and submitted a minimum of 2 weeks prior to scheduled manufacture. These will be reviewed for consistency with Project intent.

2. Buoyancy calculations sealed by a licensed engineer in the state where the Project is located, and submitted a minimum of 2 weeks prior to scheduled manufacture. These will be reviewed for consistency with Project intent.

E. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Materials are intended to be standard materials of proven ability manufactured by reputable concerns. Materials to be designed and constructed in accordance with Industry Practice and installed according to manufacturer's recommendations.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Ship, store and handle products in a manner consistent with manufacturer recommendations to not degrade quality, serviceability, and/or appearance. Remove any unit found to be defective, either before or after installation, from the Project Site and replace with a sound unit.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 PRECAST CONCRETE STRUCTURES

A. General

1. Provide precast structures with exterior dimensions shown on Drawings.

2. The quality of materials, the process of manufacture and the finished sections shall be subject to inspection by the Engineer.

3. Where required, preformed joint filler shall be glued to the concrete surface by means of an adhesive in accordance with the manufacturer's recommendations. The adhesive shall be in accordance with AASHTO-M220.

4. Make areas to be grouted indicated in Drawings with a non-shrinking, nonmetallic grout. Clean and roughen concrete surface; and keep continuously moist for 24 hours immediately prior to the application of grout to prevent flash setting. Grout shall be kept moist for a period of 7 days.

B. Precast Concrete

1. Concrete compressive strength shall be 5,000 psi (minimum) after 28 days.

2. Minimum concrete thickness shall be 6 inches.

3. Portland cement shall be Type II conforming to ASTM C150.

4. Fine aggregate shall consist of natural sand conforming to ASTM C33.

5. Coarse aggregate shall consist of 1/2-inch maximum, well-graded crushed stone conforming to ASTM C33.

6. Air entrainment admixture shall conform to ASTM C260. The air-entrained content shall be not less than 4 percent or greater than 7 percent.

7. A super plasticizer shall be used and shall conform to ASTM C494 Type F. Concrete shall be placed at a slump of between 5 and 8 inches.

C. Reinforcement

1. Wire fabric shall conform to the requirements of ASTM A1064.

2. Reinforcing bars shall be new billet steel, deformed, conforming to the requirements of ASTM A615, Grade 60.

3. Minimum clear concrete cover to reinforcement shall be 1-1/2 inches.

D. Design Loads

1. Vehicle Loads

a. Except as otherwise specified, the design shall meet the requirements of AASHTO HB-17, including a HL-93 vehicle load.

b. A lateral vehicle surcharge load of 125 psf shall be applied.

2. Lateral Pressure

a. The equivalent lateral fluid pressure shall be 100 psf/lf below flood or design groundwater elevation, and 60 psf/lf above such elevation. The specified lateral vehicle surcharge load shall be added to this

3. Utility Structures Design Load

a. Except where higher loads are specified, utility structures shall be designed for the loads prescribed in ASTM C857.

E. Joints

1. Concrete sections shall be provided with bell and spigot, or tongue-in-groove ends to ensure proper connection of the joints.

2. Each joint shall be sealed with a minimum of two rows of butyl rubber sealant. A compatible primer shall be applied as recommended by the manufacturer. Sealant shall be Conseal CS-102 (CS-202 when the temperature during installation is less than 30 degrees F) by Concrete Sealants, Inc., Kent Seal #2 by Hamilton Kent, Inc., Pro-Stik by Press-Seal Gasket Corporation, or approved equal, and shall be applied in accordance with the manufacturer's recommendations. Sealant properties shall be as follows

a. Hydrocarbon Blend Content: 50 percent (minimum), per ASTM D4

b. Inert Mineral Filler: 30 percent (minimum) by weight, per AASHTO T 111

c. Volatile Matter: 2 percent (maximum) by weight, per ASTM D6

d. Specific Gravity: 1.15-1.50, per ASTM D71

e. Ductility: 5.0 (minimum), per ASTM D113

f. Penetration Cone: 50-100 mm, per ASTM D217 at 77 degrees F, 150 gm. 5 Sec.

g. FED SS-S-210A: No deterioration, no cracking and no swelling after 30 days immersion in 5% solutions of HCl, H_2SO_4, NaOH, KOH, and H_2S

F. Finish

1. Where noted on the Drawings, exposed vertical faces of precast concrete walls shall be finished with an architectural surface treatment reviewed and approved by the Owner.

2.02 DAMPPROOFING

A. Provide a two-coat bituminous damp-proofing (water sealing) system for all precast structures. All exterior coatings shall conform to ASTM D1227 and ASTM D1187 standards. Concrete sealants shall be designed for use both above and below grade. Dampproofing shall be Hydrocide 700 Mastic as made by Sonneborn, Karnak 920 Anti Hydro Mastic Emulsion, or approved equal, conforming to ASTM D1227.

2.03 PIPE CONNECTIONS

A. Pre-molded elastomeric sealed joints shall be used at the joints between the pipe and precast sections. Pre-molded elastomeric sealed joints shall be A-Lok, Res-Seal, Press-Wedge II, Lock Joints Flexible Manhole Sleeve, Kor-N-Seal Joint Sleeve, or equal.

2.04 MORTAR

A. Mortar shall be composed of one part portland cement and 2 parts sand with 20 percent hydrated lime.

B. Portland cement shall conform to ASTM C150. Sand shall conform to ASTM C144. Hydrated lime shall conform to ASTM C207.

2.05 ANCHORAGE HARDWARE

A. Hardware for fastening the precast structure to fasten precast segments together for buoyancy shall be stainless steel.

2.06 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 PRECAST STRUCTURES

1. Precast structures shall be installed as shown on Drawings. Precast sections shall be installed so that the entire structure is vertically plumb and aligned, and when not so, shall be removed and reset. All erection holes and/or lift pin holds shall be filled solid with non-shrink grout. Furnish and use suitable slings, hooks, and cables for the proper handling of the sections. All anchoring and fastening devices shall be provided by the manufacturer for the proper and satisfactory installation of the units.

2. Manufacturer to supply all specific lifting devices for each piece to the successful installation contractor if needed on a temporary basis. The specific lifting devices shall be returned with the manufacturer's representative that oversees the installation work for compliance.

3. No cracked, warped, or broken units, or units in the opinion of Owner or Engineer, that show defects that might adversely affect the serviceability of the units, may be used in the Work. Remove defective units from the Site and replace with new and sound units at no additional expense to Owner. Any additional costs associated with replacement of units as described in this section shall be the manufacturer's responsibility to pay all costs associated with replacement of said units.

4. Joints between precast sections and units shall be made in an approved manner to guarantee a leak-proof, watertight joint. Joint designs incorporating O-rings and cement grout will not be accepted. Joint filler shall be provided as required and joint sealant shall be installed on both the interior and exterior sides of the joints. The joints between all units shall be covered with a preformed sheet membrane, in accordance with Section M9.08.0 of the MHD Standard Specifications.

5. Where patching is permitted by the Owner and Engineer, the patches shall be made using the same material as used in the unit being patched and using a 2-part epoxy compound of a type to produce a proper bonding of the patch to the units.

6. Patching required due to damage during offloading staging or installation.

7. Patching of imperfections at the plant by the manufacturer requires Owner's and Engineer's approval before unit is shipped from manufacturer's plant.

8. The engineer reserves the right to reject any precast sections and the rejected units shall be tagged and removed from the Site immediately. Engineer may also require testing of concrete.

9. Packing, Shipping, Handling, and Unloading

    1) Provide that each shipment of precast concrete headwall includes manufacturers' Certificate of Conformance.

    2) Inspect upon delivery and reject pipe immediately that does not conform to the specified requirements or has been damaged beyond repair and immediately remove from Site.

10. The manufacturer shall furnish at no additional expense to Owner, the services of the respective manufacturer's representatives of the precast concrete units, for such lengths of time as may be necessary to properly instruct personnel in the proper handling, installation, and jointing of the precast concrete units in accordance with the printed recommendations of the manufacturer. The manufacturer shall witness the complete installation of the headwalls and certify they have been installed in accordance with the manufactures recommendations for the supplied products and ancillary items.

11. Store, handle, protect and deliver precast concrete units by manufacturer to be installed and unloaded. The manufacturer shall be present to verify that all supplied units are installed in accordance with the printed recommendations of the manufacturer and in a manner to prevent overstressing, marring or damaging of the units. The manufacturer shall provide a written affidavit that they witnessed and approved the installation means and methods according to the manufactures recommendations.

12. Repair damage to existing utilities and properties adjacent to the proposed headwalls to satisfaction of Engineer.

13. The precast concrete headwall sections shall be shipped, handled, and installed in accordance with the manufacturer's recommendations. Unless otherwise directed by the Engineer, all precast concrete sections shall be installed in bedding material in accordance with the details as shown in the plans and in conformance with these specifications. The precast concrete headwalls shall be placed in the dry.

3.02 APPLICATION OF DAMPPROOFING

A. Apply dampproofing in accordance with manufacturer's recommendations.

B. Application is not permitted in spaces exposed to inclement weather or when air temperatures are below 40 degrees F, or are expected to go below 40 degrees F within 24 hours after application. Damp proofing can be applied to "green" or slightly damp surfaces only if permitted by the manufacturer.

C. Apply dampproofing at a rate of 4 to 6 gallons per 100 square feet. If applying 2 coats, each coat shall be 2 to 3 gallons per 100 square feet. First coat must be allowed to dry prior to the application of the second coat. Coating must be continuous and free from breaks and pinholes. The coating shall provide a water tight sealing surface.

3.03 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 31 00 00

EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Excavating, filling, backfilling, stockpiling, bedding, compacting, grading, hauling, disposal of on-Site soils, processing of on-Site soils for reuse, testing of soils, engaging an independent geotechnical testing agency to perform required quality assurance/quality control inspection and testing, protection and other Work necessary for construction of pipelines, structures, subsurface structures, foundations, pavements, earthen embankments and appurtenant Work in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 01 50 00 – Temporary Facilities and Controls
2. Section 01 57 05 – Temporary Dewatering
3. Section 01 57 35 – Temporary Stream Bypass
4. Section 31 05 19.13 – Geotextiles for Earthwork
5. Section 01 57 13 – Temporary Erosion and Sedimentation Controls
6. Section 31 10 00 – Site Clearing
7. Section 31 14 13.16 – Soil Stockpiling
8. Section 31 05 19.13 – Geotextiles for Earthwork
9. Section 31 25 00 – Erosion and Sedimentation Controls
10. Section 31 50 00 – Excavation Support and Protection

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)

   a. AASHTO M85 Standard Specification for Portland Cement

   b. AASHTO M295 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

   c. AASHTO T11 Standard Specification for Materials Finer Than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing

   d. AASHTO T27 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

   e. AASHTO T96 Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

2. ASTM International (ASTM)

   a. ASTM C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

   b. ASTM D422 Standard Test Method for Particle-Size Analysis of Soils

   c. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3))

   d. ASTM D1556 Density and Unit Weight of Soil in Place by the Sand-Cone Method

   e. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

   f. ASTM D2167 Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

   g. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

h. ASTM D2922 Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

i. ASTM D2937 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method

j. ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

k. ASTM D3740 Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

l. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

m. ASTM E329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

n. ASTM C131 / AASHTO T-96 (Los Angeles Abrasion Test)

3. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

B. Definitions

1. Unsuitable material: soft clay or silt, organic clays or silts, peats, debris, concrete, pavement, stones or boulders over 6 inches in diameter, wet or frozen material, and material deemed unsuitable by Owner or Engineer that will not provide suitable foundation or structural support for pipe and associated drainage structures, buildings, or other structures, and is unsuitable for use in backfill.

2. On-Site material: suitable material from on-Site excavation.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1. Pre-installation conference: conduct at Project Site at least 30 days prior to start of Work.

a. Required attendees: Owner and Engineer, Owner's independent testing firm and geotechnical consultant, Contractor's Superintendent, Support of Excavation (SOE) Installer, Dewatering Installer and Contractor's independent testing firm

b. Review methods and procedures related to earthmoving including, but not limited to, the following.

1) Work hours

2) Personnel and equipment needed to maintain proposed construction schedule and avoid delays

3) Work procedures

4) Establishing detour routes for local traffic and maintaining Site access

5) Coordination of Work with utility locator service

6) Stockpiling area and temporary access points

7) Site logistics for hauling and stockpiling

8) Coordination of Work and equipment movement with support of excavation systems installation

9) Construction phasing, anticipated daily and weekly progress and conformance to construction schedule

10) Methodology for field quality control

2. Make provisions for observations and testing of Work by Owner's independent testing and inspection agency and geotechnical consultant.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Provide for each on-Site and borrow soil material or aggregate

a. Name of each material Supplier, specific type and source of each material

b. Bills of Lading documenting materials source, including Supplier name and relationship to source, location where materials were obtained; including street, town, lot and block, country and state. Include present and past usage of source Site.

c. Supplier's statement that material is not contaminated and is free of extraneous debris or solid waste, and description of steps taken to confirm

d. Product weight shipping tickets certified by Supplier

C. Samples and Mockups: as specified in Article 1.06.

D. Certificates

1. Certification stating materials are virgin materials from a commercial or non-commercial source.

E. Design Data/Submittals

1. Materials gradation

F. Source and Field Quality Control Submittals

1. Field compaction testing

2. Material testing reports for each on-Site and borrow soil material proposed for fill and backfill in accordance with ASTM D2487

3. Laboratory compaction curve in accordance with ASTM D1557

4. Backfill moisture-density relationships

5. Submit daily field reports documenting earthwork activity and field-testing for each day. At minimum, reports shall include

a. Description of day's activities

b. Results of in-place density testing including in-place dry density, moisture content, percent compaction, elevation of test and description of soil

c. Sketch indicating extent of each day's Work and location of testing

6. Daily records of over-excavated volumes including

a. Beginning and end station of over-excavation

b. Proposed elevation of subgrade

c. Actual elevation of subgrade

d. Calculated volume of additional excavation in bank cubic yards (BCY)

G. Qualification Statements

1. Contractor's independent testing agency, qualified for testing specified in ASTM E329 and ASTM D3740.

H. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements and as follows for geotechnical testing.

1. Geotechnical testing agency to monitor earthwork: qualified per ASTM E329 and ASTM D3740.

C. Independent Testing

1. Minimum of 50 pounds of material in an airtight container to testing laboratory.

D. Samples

1. Each type of soil or aggregate proposed for use on Project, a minimum of 14 days prior to Work.

2. Submit additional material Samples at least every 500 cubic yards throughout course of Work, if requested by Engineer to evaluate consistency of source or process.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Waste Management and Disposal

1. Legally dispose of excess or unsuitable material.

2. Existing fill and excavated clay should not be used as backfill behind the proposed wingwalls and headwalls or over the proposed culvert to reduce proposed settlements. Excavated soil that cannot be reused in these areas should be regraded elsewhere on site as specified by the civil engineer and as permitted by local environmental permits or removed from the site and disposed in accordance with applicable local, state and federal regulations.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General

1. Obtain approval of Owner and Engineer for changes in material sources.

2. Identify off-Site sources of materials and testing of materials to verify compliance with Specifications. Material may be inspected by Owner.

B. Crushed stone: 3/4-inch sized, durable, clean angular rock fragments obtained by breaking and crushing rock material meeting MassDOT M2.01.4 criteria, free of ice, snow, sand, silt, clay, loam, shale, or other deleterious matter.

Sieve analysis by weight

Sieve Size	Percent Passing by Weight
1-inch	100
3/4-inch	90-100
1/2-inch	10- 50
3/8-inch	0- 20
#4	0-5

C. Sand: clean inert, hard, durable grains of quartz or other hard durable rock, free from loam or clay, surface coatings and deleterious materials.

Sieve analysis by weight

Sieve Size	Percent Passing by Weight
3/8-inch	100
#4	95-100
#16	50-85
#50	10-30
#100	2-10
#200	0-3

D. Suitable backfill: well-graded granular material. Retain at least 25 percent by weight on #4 sieve and contain less than 35 percent finer than a #200 sieve by weight, predominantly free from organic matter, man-made materials, ice, snow or other deleterious material.

E. Gravel borrow for trench backfill: hard, durable stone and course sand inert material, free from loam and clay, surface coatings and deleterious material, MassDOT Division III, subsection M1.03.0, Type b. Gradation requirements: AASHTO T11 and T27.

Sieve analysis by weight

Sieve Size	Percent Passing by Weight
1/2 inch	50-85
#4	40-75
#50	8-28
#200	0-10

Type b: maximum stone size = 3-inches in largest dimension

F. Gravel borrow for roadway subbase: processed gravel for backfill per MassDOT Section M1.03.1, consisting of hard, durable stone and course sand inert material, free from loam and clay, surface coatings and deleterious materials. Coarse aggregate percentage of wear: maximum 50 by ASTM C131 and AASHTO T 96.

Sieve analysis by weight

Sieve Size	Percent Passing by Weight
3 inch	100
1-1/2 inch	70-100
3/4 inch	50-85
#4	30-60
#200	0-10

G. Dense graded crushed stone: crusher-run coarse aggregates of crushed stone and fine aggregates of natural sand or stone screenings, uniformly pre-mixed with a predetermined quantity of water per MassDOT M2.01.7.

Sieve analysis by weight

Sieve Size	Percent Passing by Weight
2 inch	100
1-1/2 inch	70-100
3/4 inch	50-85
#4	30-55
#50	8-24
#200	3-10

H. Refill material: 3/4-inch crushed stone for below grade or rock excavation unless otherwise directed.

I. Common fill: friable material with no objects greater than 6 inches in diameter, no more than 30 percent by weight finer than No. 200 sieve, free from ice, snow, roots, sod, rubbish, other deleterious or organic matter, and observable contamination. Excavated material from on-Site sources meeting these Specifications may be used for common fill.

J. Select backfill: as specified for gravel borrow with stones maximum 3 inches in diameter.

K. Compacted structural fill: suitable bank run sand and gravel, free of clay, organic material, snow, ice, or other unsuitable materials, well-graded.

Sieve Designation	Percent Passing by Weight
3 inch	100
#4	30-90
#40	10-50
#200	0-8

L. Drainage stone: 1-1/2-inch crushed stone per MassDOT Section M2.01.1 of durable, clean angular rock fragments obtained by breaking and crushing rock material.

Sieve Size	Percent Passing by Weight
2 inch	100
1-1/2 inch	95 - 100
1 inch	35 - 70
3/4 inch	0 - 25

M. Controlled density fill (CDF): excavatable and used to limit settlement, lateral movement, undermining, washout and other hazards created by earthwork operations as shown on Drawings and when excavating around structures, utilities, sidewalks, pavements, and other facilities. Batch CDF at concrete plant.

1. Portland cement: AASHTO M85.

2. Fly ash: AASHTO M295. Class F

3. Sand: MassDOT M4.02.02.

4. Water: MassDOT M4.02.04.

5. Air entraining admixture: MassDOT M4.02.05.

6. Compressive strength: 28 day = 30-80 psi, 90 day = 100 psi.

7. Slump: 10 - 12 inches.

N. Riverstone: shall meet the requirements of Dump Riprap, in accordance with Section M2.02.2 of the MassDOT Standard Specifications for Highways and Bridges. Rounded stone or boulders will require Engineer's approval.

O. Riprap stone: sound, durable rock that will not disintegrate due to exposure to water or weather, angular in shape such as rough, unhewn quarry stone or fragments obtained by blasting, breaking or crushing natural rock. Do not use rounded boulders or cobbles; flat, platy stones; shale or slate rock with its largest length dimension 3 times greater than its shortest dimension.

P. Riprap gradation: stone size corresponding to inch dimension indicated on Drawings. D_{50} stone size represents 50 percent of stone passing D_{50} dimension sieve screen. D_{20} stone size, 20 percent passing: 1/2 D_{50} dimension. Maximum size limit: D_{100}: twice the D_{50} stone size dimension.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verification of Conditions

1. Check and verify governing dimensions and elevations before starting Work. Survey condition of adjoining properties with Engineer. Take digital video recording of any prior settlement or cracking of structures, pavements and other improvements. Provide list of damages, verified and signed by Contractor and Engineer.

2. Coordinate survey. Establish exact elevations at fixed points to act as benchmarks. Identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations so it will not be affected by excavation operations.

3. Review geotechnical report and information for the Project. Review available logs of borings and test pits, records of explorations and other pertinent data for the Site. After obtaining Owner's permission, obtain additional subsurface explorations deemed necessary at no expense to the Owner.

4. Verify subsurface utilities have been marked prior to performing excavation or earthwork and provide sufficient notification to the local Dig Safe agency.

3.02 PROTECTION

A. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost. Remove temporary protection before continuing Work.

D. Prevent surface water and groundwater from entering excavations, ponding on prepared subgrades, and flooding Project Site and surrounding area.

E. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Excavation will occur below water level. Complete Work in-the-dry to maintain undisturbed condition of bearing soil.

2. Reroute surface water runoff away from excavated area. Do not allow water to accumulate in excavations to ensure bottoms and sides of excavations remain firm and stable throughout construction operations. Do not use excavated trenches as temporary drainage ditches.

3. Install a dewatering system in accordance with Section 01 57 05 to keep subgrades dry and convey groundwater away from excavations. Maintain until dewatering is no longer required.

4. Recharge water from excavations on-Site avoiding injury to public health, public and private property, existing Work, Work to be completed or in progress, roads, walks and streets, or causing any interference with the public.

5. Do not place concrete or fill in excavations containing free water.

3.03 GENERAL EXCAVATION

A. Ensure sequence of excavation operations provides efficient use of excavated materials into embankments and minimum use of borrow.

B. Dispose of excavated materials including unsatisfactory soil materials, cobbles, boulders, and obstructions and replace with suitable backfill materials. Urban fill may be screened to remove unsatisfactory material and used requirements of suitable backfill are met.

C. Remove and legally dispose of pavements, curbing and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation. Legally dispose of surplus materials resulting from excavation not needed for use on Project as determined by Engineer. Obtain necessary permits for legal disposal of surplus material.

D. Unclassified excavation: excavating to subgrade elevations regardless of surface and subsurface conditions.

E. Classified excavation: excavating to subgrade elevations. Material excavated: classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Engineer.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions.

a. 24 inches outside of concrete forms other than at footings

b. 12 inches outside of concrete forms at footings

c. 6 inches outside of minimum required dimensions of concrete cast against grade

d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments

1) 6 inches beneath bottom of concrete slabs-on-grade

2) 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide

F. Remove materials encountered to limits shown on Drawings, as specified or required.

G. Do not perform excavation below normal grade to remove and replace unsuitable materials until approved by Engineer.

H. Unauthorized excavation: removal of materials beyond indicated subgrade elevations or dimensions without specific direction.

1. Refilling Unauthorized Excavation

a. Trenches: use 3/4-inch crushed stone or compacted structural fill and stabilization fabric as separator material as directed.

b. Backfill and compact unauthorized excavations as specified for authorized excavations, of same classification, unless otherwise directed.

c. Excavation below normal grade

1) Notify Engineer to observe conditions when excavation has reached required subgrade elevations. Carry excavations deeper and replace excavated material with compacted structural fill or crushed stone if unsuitable materials are encountered at required subgrade elevations as directed.

2. Excavation Above Normal Grade

a. Remove from Site and dispose of legally if unsuitable materials are encountered above normal grade. Do not use unsuitable materials as backfill on any portion of Project unless approved.

b. Use approved suitable stockpiled material to replace unsuitable material to backfill trenches to dimensions for pipe and structure bedding and backfill as shown on Drawings. Use gravel borrow to complete trench backfills to elevation shown for pipe and structure backfill if suitable stockpile material is not sufficient to backfill trenches to required dimensions.

I. Site Clearing

1. Clear Site in accordance with Section 31 10 00.

J. Material Storage

1. Stockpile and maintain suitable surplus excavated materials for re-use as specified in Section 31 14 13.16.

3.04 EXCAVATION IN ASPHALT PAVEMENT AREAS

A. Saw cut or mill to full depth through existing pavement for pipe or structure placement prior to excavation. Minimize disturbance of remaining pavement.

B. Use shoring and bracing where sides of excavation will not stand without undermining pavement.

C. Remove and legally dispose of existing pavements during course of Work. Avoid mixing existing pavement material with excavation material intended for backfill.

3.05 EXCAVATION FOR TRENCHES

A. Excavate to widths shown on Drawings.

B. Produce an evenly graded flat trench bottom at subgrade elevation required for installation of pipe and bedding material.

C. Load excavated material directly into trucks unless otherwise approved.

D. Place backfill material directly into trench or excavation. Do not stockpile material to be used as backfill in traffic areas.

3.06 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within tolerance of plus or minus 1 inch. Extend excavations sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and inspections.

1. Excavate footings, foundations, and structures to final grade by hand just before concrete reinforcement placement. Do not disturb bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive other Work.

2. Do not excavate to final subgrade level until geotextile and compacted structural fill or crushed stone layer can be placed immediately to avoid softening or deterioration of formation. Leave a minimum depth of 3 feet overlying the final subgrade level in place where geotextile and compacted structural fill or crushed stone layer are not immediately placed.

3. Do not allow trafficking on final subgrade or upper surface of crushed stone layer without prior placement of approved sacrificial haulage layer.

B. Approval of Subgrade

1. Notify Engineer when excavations have reached required subgrade. Remove last 6 inches just prior to inspection.

2. Clear subgrade of soft, spongy or other material unsuitable for founding. Continue excavation and replace with compacted structural fill as directed if independent inspection and testing agency or geotechnical consultant determines presence of unsatisfactory soil.

3. Finished subgrade tolerance: plus or minus 1 inch.

4. Seal subgrade and protect from degradation.

5. Re-compact exposed surfaces prior to placing compacted structural fill or constructing foundations in accordance with Section 3.11, with a minimum 4 passes with double-drum vibratory roller compactor following excavation to foundation bearing levels in natural soils, using Bomag BW 60S or equivalent. Engineer may waive re-compaction if integrity of subgrade soils is compromised. Do not proof-roll wet or saturated subgrades.

6. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water or construction activities affecting final subgrade.

7. Seal formations within 4 hours of inspection with specified geotextile and compacted structural or crushed stone fill.

8. Install geotextiles in accordance with Section 31 05 19.13.

9. Protect formations from loosening by traffic or resulting from high groundwater table.

C. Provide monitoring of geotechnical instrumentation against predefined target performance values.

3.07 PROCESSING OF ON-SITE URBAN FILL USED FOR BACKFILL

A. Excavate urban fill where encountered in Work to designated depths and stockpile until processed.

B. Pass on-Site cohesionless soils excavated from trench through mechanical screen to remove particles larger than 3 inches.

C. Reuse only processed urban fill containing maximum of 5 percent by dry weight of roots, plants, sod, clay lumps or other organic or cohesive soils.

3.08 ROCK EXCAVATION

A. Notify Engineer immediately of change in classification. Expose bedrock surface to allow Engineer to perform an elevation survey and take cross-sectional measurements if bedrock is encountered above trench bottom grade or above subgrade elevation.

B. Perform rock excavation by mechanical methods only. Do not blast.

C. Remove or partially remove boulders exposed on sides or bottom of excavations as directed. Remove boulders to:

1. minimum 2 feet outside structure walls;

2. minimum 12 inches outside footings;

3. minimum 6 inches below under-slab subgrade;

4. minimum lateral trench width line limits indicated; and

5. minimum 12 inches below underside of pipes.

D. Refill depressions resulting from removal of boulders and rock with approved compacted bedding.

E. Refill unauthorized rock excavations, or excavations made beyond or below indicated or directed excavation limits, with compacted bedding.

F. Remove and legally dispose of unused rock and boulders off-Site.

G. Remove and legally dispose of residual solids to limits shown on Drawings, as specified, or needed to complete Project in accordance with Laws and Regulations.

3.09 SHORING AND BRACING

A. Provide in accordance with Section 31 50 00.

3.10 BACKFILL AND FILL

A. General

1. Suspend operations when weather conditions are unsatisfactory for placing backfill and avoid disturbing placed material and approved excavations.

2. Remove and replace excavation or material previously placed that have softened or eroded, soft and yielding material, or other unsuitable or damaged areas with compacted backfill as specified.

3. Do not backfill excavations and trenches until new utilities and structures have been inspected and tested satisfactorily for conformance with Drawings and Specifications unless directed. Place soil material in layers to required elevations as shown on Drawings or specified. Fill, backfill, and compact in accordance with this Section to produce minimum subsequent settlement of material. Provide support for surface treatment or structure to be placed on material. Place material in approximately horizontal layers beginning at lowest area, maintaining drainage. Replace frozen or saturated fill in stockpiles with suitable off-Site fill.

B. Provide compacted structural fill or backfill for structure, placed beneath the structures' foundations and slabs-on-grade where unsuitable soil has been over excavated below design subgrades, and against below grade walls.

C. Do not reuse excess excavated on-Site soils as compacted structural fill below foundations.

D. Ground Surface Preparation

1. Remove asphalt and concrete pavements, granular base course, existing sandy and gravelly fills, existing organic silty clay soils, organic peat, vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface to excavation subgrade prior to placement of fills.

2. When existing ground surface has a density less than specified for a particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

E. Placement

1. Place backfill and fill materials in layers of maximum 6 inches in loose depth for material compacted by heavy compaction equipment or hand-operated tampers. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

2. Place backfill and fill materials evenly, adjacent to structures, to required elevations. Prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

3. Do not allow heavy machinery within 5 feet of structure during backfilling and compacting.

F. Backfilling Excavations

1. Backfill excavations promptly as Work permits and after completion of the following.

a. Inspection and recording locations of underground utilities and structures

b. Removal of concrete formwork

c. Removal of shoring and bracing, and backfilling of voids with satisfactory materials

d. Removal of trash and debris

2. Backfill under existing utility pipes crossed by new utility pipes with CDF. Extend CDF continuously from bedding of new pipe to utility pipe crossed, including a 6-inch thick envelope around existing utility pipes.

3. Backfill with CDF when clearance between proposed structure and existing structure is 18 inches or less and sufficient clearance is not provided to obtain suitable compaction.

4. Backfill with CDF for trenches within impervious surfaces with pipes containing less than 3 feet of cover.

5. Provide that 3/4 inch crushed stone backfill stands at its own angle of repose. Do not haunch or form with common fill.

G. Backfilling Trenches

1. Place pipe and structure bedding, and gravel bedding to extent and dimensions shown on Drawings so pipes and structures have complete and uniform bearing.

2. Grade, compact, and shape pipe and structure bedding so full length of pipe barrel has complete and uniform bearing. Dig bell holes and depressions for joints after bedding has been graded and compacted, at proper clearance for jointing pipes.

3. Carefully hand place and compact additional approved bedding to limits shown on Drawings following inspection and approval of pipe installation by Engineer. Perform hand or mechanical tamping on sides of pipe.

4. Place 6 inches of suitable backfill (having stones maximum 3 inches in diameter) in trenches above pipe crown; 6 inches above crown of highest pipe around structures and up to underside of pavement. Spread in layers of maximum 6 inches in loose thickness and compact as specified and compact each layer by minimum 4 passes using approved vibratory compactor. Avoid disturbance of Work and existing structures. Adjust moisture content of backfill for proper compaction.

5. Bed pipe in 3/4-inch crushed stone pipe and structure bedding as shown on Drawings. Remaining trench backfill: as shown on Drawings.

6. Restore surface of trenches in cross-country runs to pre-existing conditions as shown on Drawings, mounding trench 6 inches above existing grade or as directed.

H. Backfilling Headwalls

1. Backfill as described in the Geotechnical Report and per the manufacturer recommendations.

I. Earthen Embankment Fill

1. Strip organic topsoil, trees, shrubs and roots of other vegetation along length and breadth of areas having fill material placed on top. Fill depressions left by grubbing and stripping with same type material and compact to a density at least equal to surrounding foundation material.

2. Replace unsuitable soil with compacted fill material identified by independent inspection and testing agency or Engineer.

3. Proof roll subgrades as directed prior to placement of fill. Excavate soft areas and replace with appropriate compacted fill.

4. Do not place embankment over porous, wet, frozen, or spongy subgrade or previous embankment surfaces. Excavate and remove unsuitable material prior to placing additional fill.

5. Dewater to maintain groundwater levels a minimum of 1 foot below bottom of excavations or subgrades. Place fill in-the-dry.

6. Bench existing slopes prior to placing horizontal fill layers on existing slopes greater than 6H:1V.

7. Place materials in continuous horizontal layers in loose lift thickness of maximum 8 inches.

8. Compact soil materials in accordance with as specified and in accordance with ASTM D1557, with water content of plus or minus 2 percent moisture content. Remove and replace with drier fill if wet fill cannot be compacted as specified.

9. Uniformly water fill that is too dry for proper compaction with sufficient water to allow compaction to required density.

10. Compact impervious and semi pervious materials with more than 15 percent passing the #200 sieve, with a tamping sheep-foot roller or rubber-tired roller. Scarify surface before placement of next lift if compaction results in smooth surface on top of lift.

11. Remove and replace fill that is disturbed after compaction and re-compact to specified degree of compaction.

12. Place and compact soil material on embankment in a direction parallel to embankment top.

3.11 COMPACTION

A. Use approved methods that produce required degree of compaction throughout entire depth of material placed without damage to new or existing facilities. Adjust moisture content of soil as required. Remove and replace material that is too wet to compact to required density. Compact each layer as Work progresses.

B. Place compacted crushed stone for support of footings and foundations and against below grade walls in loose lift thicknesses not exceeding 12 inches. Compact to minimum 95 percent maximum dry density in accordance with ASTM D1557 and Sections 150 and M of the Massachusetts Department of Transportation's Standard Specifications for Highways and Bridges.

C. Place backfill in open areas with self-propelled vibratory rollers, and hand-guided equipment in confined areas. Loose lift thickness: maximum 6 inches.

D. Perform a minimum 4 systematic passes to compact each lift with specified compaction equipment.

E. Place backfill and fill soil materials evenly on sides of structures to required elevations, and uniformly along full length of each structure.

Compaction Method	Maximum Stone Size	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Pavement	Less Critical Areas	Below Pavement	Less Critical Areas
Hand-operated vibratory plate or light roller in confined areas	4 inches	6 inches	8	4	4
Hand-operated vibratory drum rollers weighing at least 1,000 pounds in confined areas	6 inches	10 inches	12 inches	4	4
Light vibratory drum roller minimum weight at drum 5,000 pounds, minimum compaction force 10,000 pounds	8 inches	6 inches	18 inches	4	4
Medium vibratory drum roller min. weight at drum 10,000 pounds, minimum compaction force 20,000 pounds	8 inches	6 inches	24 inches	6	6

F. Degree of Compaction

Fill and Backfill Location	Minimum Density
Top 3 feet under pavement grade	95 percent of maximum
Below slabs and foundations	95 percent of maximum
Below top 3 feet under pavement grade	92 percent of maximum
Pipe Bedding	92 percent of maximum
Beside structure foundation walls	95 percent of maximum
Maximum density	ASTM D698, modified
Field density tests	ASTM D1556 (sand cone) or ASTM D6938 (nuclear methods)

G. Disc harrow or dry fill material that is too wet for compaction to specified moisture content and to required density. Remove and replace with drier fill that cannot be dried within 48 hours of placement.

3.12 GRADING

A. Uniformly grade areas, including adjacent transition areas. Smooth finished surface within specified tolerances. Compact with uniform levels or slopes between points where elevations are shown, or between points where elevations are shown and existing grades.

B. Grade areas adjacent to structure lines to drain away from structures and prevent ponding.

C. Finish surfaces: free from irregular surface changes and as follows.

1. Finish lawn or other unpaved areas to receive topsoil to within a maximum 0.10 feet above or below required subgrade elevations.

2. Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than plus or minus 1 inch above or below required subgrade elevation.

3.13 RIPRAP

A. Place riprap to full depth of $1.5D_{50}$ in one operation without special handwork, measured perpendicular to face of slope to obtain uniform appearance true to line and grade. Place larger stones at bottom of slope. Place stones in close contact with interlocking of face stones and backing stones. Fill openings between stones with smaller stones. Embed, re-orient or discard loose stones or excessively large stones projecting above surface.

3.14 EROSION CONTROL

A. Provide erosion control measures in accordance with Section 01 57 13 and Section 31 25 00.

3.15 PROTECTION

A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Scarify surface, re-shape, and compact to required density prior to further construction where completed compacted areas are disturbed by subsequent construction operations or adverse weather. Immediately repair any subsequent settling and provide maintenance for remainder of Work.

C. Remove soft or unsuitable material and replace with suitable backfill material prior to paving on sub-grade. Bring low sections, holes, or depressions to required grade with approved material. Shape sub-grade to line, grade, and cross section, and thoroughly compact.

D. Keep roads free of debris. Use watertight vehicles for hauling wet materials over roads and streets. Promptly clean materials dropped or spread by vehicles or when directed by Engineer.

3.16 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Owner may engage a qualified special inspector to perform the following special inspections in addition to the Contractor's independent testing.

1. Confirm specified fill and backfill are used.

2. Confirm preparation of Site.

3. Observe removal of existing unsuitable foundation materials from footing and slab areas and confirm character of material encountered at bearing levels.

4. Confirm compliance of fill material and maximum lift thickness.

5. Confirm compliance of in-place density of compacted fill with required frequency.

6. Observe preparation of footing bearing surfaces.

7. Confirm suitability of excavated soils for reuse as fill, including reuse of on-Site soils as common fill.

C. Perform at least 1 test of each soil stratum at foundation subgrades to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on visual comparison of subgrade with tested subgrade when approved.

D. Engage an independent testing agency to test compaction of soils in place in accordance with ASTM D1556, ASTM D2167, ASTM D2922, and ASTM D2937.

1. Tests

a. Paved and structure areas: at subgrade and each compacted fill and backfill layer, at least 1 test for every 2,000 square feet or less of paved area or concrete slab, with minimum 3 tests.

b. Foundation walls backfill: at each compacted backfill layer, at least 1 test for every 100 feet or less of wall length, with minimum 2 tests.

c. Trench backfill: at each compacted initial and final backfill layer, at least 1 test for every 150 feet less of trench length, with minimum 2 tests.

2. Scarify and moisten or aerate, or remove and replace soil materials to depth required when testing agency reports subgrades, fills, or backfills have not achieved degree of compaction specified. Re-compact and re-test until specified compaction is obtained.

3. Determine actual in-place densities using field tests as directed.

4. Perform additional Work to obtain proper compaction if in-place densities do not meet specified densities. Retest if directed by Engineer.

5. Tests for Pipe Backfill

a. Suitable backfill: compact backfill in maximum loose lifts per table above. Conduct 1 field density test every 50 linear feet for each lift for utility lines.

b. Pavement sub-base: minimum 1 field density test of sub base for every 50 linear feet of paved area.

3.17 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 31 05 19.13

GEOTEXTILES FOR EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide and install permanent geotextile fabrics in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 31 00 00 – Earthwork

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. ASTM International (ASTM)

a. ASTM D4354 Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

b. ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus

c. ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity

d. ASTM D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles

e. ASTM D4595 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

f. ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

g. ASTM D4751 Standard Test Methods for Determining Apparent Opening Size of a Geotextile

h. ASTM D4759 Standard Practice for Determining the Specification Conformance of Geosynthetics

i. ASTM D4873 Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples

j. ASTM D4884 Standard Test Method for Strength of Sewn or Bonded Seams of Geotextiles

k. ASTM D5321 Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear

l. ASTM D6241 Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data: manufacturer's product specifications.

C. Samples and Mockups: as specified in Article 1.06.

D. Manufacturer’s instructions for storage, handling, and installation of geotextiles

E. Source and Field Quality Control Submittals: manufacturing quality control certificates for representative rolls for each lot of material delivered.

F. Qualification statements of manufacturer

G. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements and as follows.

1. Geotextile manufacturer: well-established firm with minimum 2 years’ experience in manufacture of geotextile fabrics.

C. Samples

1. Swatch of each geotextile fabrics

1.07 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Deliver and store geotextile materials in protective wrapping to protect materials from ultraviolet (UV) radiation, and other mediums that may reduce physical properties of the material.

C. Labeling, packaging, and handling: per ASTM D4873.

D. Submit manufacturing quality control certificates for representative rolls for each lot of material delivered to the Site, signed, and certified by responsible parties employed by manufacturer. Materials delivered without testing certification shall be rejected by the Engineer.

E. Store geotextiles off ground and out of direct sunlight. Protect from mud, dirt, dust, and moisture. Use unbroken opaque packaging or provide protective cover to prevent exposure of the geotextile to sunlight during storage. Comply with additional storage procedures recommended by the manufacturer at no additional cost to Owner.

F. Store rolls on a surface that does not cause distortion of roll or wraps or impedes installation.

G. Do not stack rolls higher than recommended by the manufacturer.

H. Load, unload, and move rolls with appropriate equipment as recommended by manufacturer.

1. Move rolls using structural steel insert (pipe) placed within core tube of roll. Attach lifting slings or chains to pipe only to support the roll. Prevent damage by slings and chains through use of a spreader bar. If a forklift is used to move rolls, use a single tooth pipe capable of supporting the roll in cantilever and place through roll core tube. Do not lift rolls by sliding the forks under the roll.

I. Provide a sufficient quantity of geotextile material on Site prior to start of Work to allow efficient and continuous Work without stoppage resulting from lack of materials.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 GEOTEXTILES

A. Use woven geotextile stabilization fabric as shown on Drawings and directed by the Engineer or Owner in accordance with this Specification.

B. Furnish stock materials with Minimum Average Roll Values (MARV) that meet or exceed the criteria specified in below. Strength properties specified are for the weaker principle direction.

C. Acceptable level of quality for non-woven geotextile: equivalent to – Mirafi 180N.

D. Criteria

1. Nonwoven Geotextile

PROPERTY	TEST METHOD	STANDARD	SPECIFIED VALUE
Material	--	--	Polypropylene
AOS	ASTM D4751	maximum	No. 80 U.S. Sieve
Grab Tensile Strength	ASTM D4632	MARV	205 lbs/in
CBR Puncture Strength	ASTM D6241	MARV	500 lbs.
Trapezoidal Tear Strength	ASTM D4533	MARV	80 lbs.
Permittivity	ASTM D4491	MARV	1.4 sec^{-1}

2.02 SEWING THREAD FOR SEAMING

A. Type: polyester with chemical and UV light resistance properties, equal to or greater than the fabric itself. Color: contrasting to color of fabric.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Provide for sampling and testing of geotextile by manufacturer as specified at a minimum of once every 100,000 square feet of production to demonstrate that material conforms to requirements the table.

C. Obtain quality control certificate that includes roll number identification, sampling procedures used, and results of quality control testing, including descriptions of test methods used per quality control tests specified.

D. Require manufacturer to perform additional testing at no additional cost to Owner if geotextile sample fails to meet this Specification including the following.

1. Sample and test each roll manufactured in same lot or at the same time as the failing roll.

2. Continue sampling and testing of rolls until a pattern of acceptable tests results is established.

3. Additional testing of individual rolls may be performed by manufacturer to more closely identify the non-complying rolls and to qualify individual rolls.

E. Obtain manufacturer notarized certificates indicating the material meets this Specification.

F. Require geotextile fabric be supplied in rolls and labeled at a minimum according to ASTM D4873 with the following information.

1. Manufacturer's Name

2. Product Identification (style number)

3. Roll Number

4. Roll Weight

5. Roll Dimensions

6. Geotextile Type

PART 3 – EXECUTION

3.01 PREPARATION

A. Prior to installation, Samples of geotextiles will be taken by the Engineer and sent to a laboratory for testing to ensure conformance with this Specification in accordance with ASTM D4354, Procedure A. Cost testing: by Contractor.

1. Sample size: 3 feet by full roll width exclusive of the first 3 feet of the rolls, which will be discarded. Immediately rewrap sampled rolls and return to storage.

2. One sample will be collected for every 100,000 square feet of material. At a minimum, each lot of material defined as a group of consecutively numbered rolls manufactured from the same production line, will have 1 sample collected and tested for conformance.

B. At a minimum, the following conformance tests will be performed on each sample of geotextile.

1. Grab strength: ASTM D4632.

2. Trapezoidal tear strength: ASTM D4533.

3. CBR puncture: ASTM D6241.

C. If Sample testing fails, Engineer will implement procedures outlined in ASTM D4759 which describes a method of resampling to define extent of nonconforming material.

3.02 INSTALLATION

A. Install where shown on Drawings in accordance with manufacturer's instructions.

B. Provide smooth graded surface, free of large stones, tree roots and limbs, or other debris prior to placement of geotextiles. Notify Engineer when areas are ready for placement of geotextile.

C. Deployment and Covering

1. Unroll fabric in area to be used, in down-slope direction.

2. Minimize wrinkles and folds in the geotextile. Straighten to smooth out creases or irregularities in the sections. Place geotextile in close contact with adjacent materials. Overlap adjacent fabric sides and ends minimum of 12 inches. Do not allow gaps and tears. Place overlaps so uphill panel is shingled over the downhill panel. Replace damaged geotextile.

3. Begin placement at base of slope and proceed up-slope for overlying stone. Work in direction of fabric overlap for overlying stone placement on flat areas. Ensure fabric overlap remains intact. Install in a relaxed condition and free of tension or stress upon completion. Do not stretch geotextile to fit.

D. Protection

1. Secure geotextile from wind damage during and after construction.

2. Do not allow construction equipment to travel directly over any in-place geotextiles. Maintain 1-foot minimum cover above fabrics for low ground pressure tracked vehicles (contact pressure 8-psi or less) and 3-foot minimum cover for wheeled vehicles or heavy tracked vehicles (contact pressure above 8-psi).

3. Do not allow more than 14 days to elapse between the day when reinforcing geotextile is unrolled and when a subsequent layer is placed to cover it. do not allow more than 30 days to elapse between the day when the cushioning geotextile is unrolled and when a subsequent layer is placed to cover it. Replace material exposed to sunlight or weather for longer duration.

E. Patching

1. Patch rips and tears with a minimum 3-foot overlap in each direction from perimeter of damaged area. Heat bond repair patch to underlying geotextile.

2. For damaged areas greater than half the width of fabric roll, cut out entire roll-width of damaged area and place a new section laced over the area with minimum 3-foot overlap at each end. Place up-slope end of patch under existing up-slop fabric and place down-slope end of patch over down-slope fabric.

3.03 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 31 10 00

SITE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide Site clearing and grubbing in accordance with this Section.

B. Related Requirements

1. Section 31 00 00 – Earthwork

2. Section 32 92 19 – Seeding

3. Section 32 90 00 – Planting

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Definitions

1. Clearing: cutting and disposing of trees, downed timber, stubs, brush, bushes, snags, rubbish, debris, and other objectionable matter and materials, and removal and storage of fences, signs, walks, guard rails, curbs and items to be restored.

2. Grubbing: removal and disposal of stumps, roots, duff, foundations and other objectionable matter, and materials to a minimum of 6 inches below original ground surface.

3. Topsoil: friable loam surface soil found in a depth of not less than 4 inches from original ground surface. Satisfactory topsoil: reasonably free of subsoil, clay lumps, stones, and objects over 2 inches in diameter, and free of weeds, roots, and other objectionable material.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Store trees, plants and shrubs in protected areas and provide water to keep them in thriving condition for replanting.

C. Store slate and flagstone walk sections, granite and stone curbs, fences, signs, guard rails and other items removed for reinstallation at approved locations.

D. Do not obstruct roads, driveways, sidewalks, gutters and drainage ditches, swales and channels with stored materials.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verification of Conditions

1. Verify Site conditions. Trees, plantings, vegetation, sidewalks, curbs and other living and nonliving item locations shown on Drawings were determined by actual surveys and conditions may have changed.

2. Verify limiting boundaries, such as permanent and temporary easements, property lines, rights-of-way and grading limits, have been located and marked.

3. Verify pipeline routings and other items of Work have been located and marked.

3.02 PREPARATION

A. Mark trees, plantings and other items to be removed, trimmed, cut, or removed and preserved. Inspect items with Engineer prior to start of Work. Do not remove or trim unmarked items unless approved by Engineer.

B. Protect existing trees and vegetation indicated to remain in place against cutting, breaking or skinning of roots, skinning and bruising of bark, smothering by stockpiling construction or excavated materials within drip line, excess foot or vehicular traffic, or vehicle parking within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

C. Protect existing objects. Avoid interference with use of, and passage to and from adjacent buildings, facilities, driveways, walks, drainage systems and road.

D. Remove highway signs, guard rails and other control, safety, and warning devices just prior to installation of Work.

E. Notify affected property owners at least 4 days in advance of fence removal. Do not remove fencing more than 48 hours in advance unless written permission is received from property owner.

F. Leave items affecting traffic, safety, containment of humans and animals, and essential to protection of property or operation of a business, in place until Work is ready to be installed. Restore items immediately after installation.

3.03 IMPLEMENTATION

A. General

1. Use of explosives for clearing and grubbing operations is not allowed.

2. Limit clearing and grubbing to preserve plantings and natural vegetation. Perform Work so present growth will blend with limits of construction and attain natural appearance.

3. Confine clearing and grubbing operations within grading limits as shown on Drawings, and within Owner easements and property lines.

4. Provide measures to avoid erosion.

5. Do not disturb property markers unless absolutely necessary. If necessary to disturb or remove a property marker, employ a professional land surveyor licensed in the state where the Project is located to establish property marker location; mark area, and replace property marker immediately, in compliance with Division 01 General Requirements.

B. Stripping Topsoil

1. Strip topsoil within limits indicated on Drawings, or as required to prevent mixing with underlying subsoil or objectionable material.

2. Prevent damage to main root system of trees indicated to be left standing.

3. Stockpile topsoil in areas shown on Drawings, or where directed, and provide for drainage of surface water. Protect stockpiles to prevent windblown dust and erosion.

4. Stockpile surplus material on-Site. Surplus loam and topsoil not required for completion of Work will remain on Owner's property. Maintain and protect until Work is complete.

C. Trees and Plantings

1. Remove only items marked for removal in grassed, planted and open areas.

2. Trees

a. Notify property owners 1 month in advance of tree trimming or removal to allow property owner to cut and remove trees and retain debris, unless otherwise directed.

b. Remove or trim trees in wooded areas only as required. Minimize damage to trees left standing. Immediately remove and legally dispose of debris.

c. Take possession of timber and wood removed.

d. Trim trees evenly to achieve neat appearance with least possible damage to trees.

e. Apply wet burlap to prevent drying where roots are cut or damaged.

D. Pavements, Walks, Curbs and Guard Rails

1. Remove existing pavements, walks, and curbs to limits shown on Drawings, or if not shown, to minimum extent possible to complete the work.

2. Saw-cut pavements to be removed, including highways, driveways and walks. Remove when Work is ready to be installed.

3. Remove slate and flag stone walks, granite and stone curbs, and guard rails to minimum extent possible. Terminate removals at joint or guard rail post. Store and protect for reuse.

E. Walls, Fences, and Other Obstructions

1. Remove walls, fences, signs, sheds and other obstructions and store for replacement after verification with Owner and Engineer.

2. Protect existing structures during Work.

F. Remove and legally dispose of materials not specified to be stored or reused. Do not burn debris unless approved and required permits obtained.

G. Comply with Section 32 90 00 for replanting and restoring surfaces.

H. Replace and restore items and materials removed to original conditions.

I. Replace items damaged during removal, storage or re-installation.

3.04 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.05 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 31 14 13.16

SOIL STOCKPILING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide labor, equipment and materials associated with soil stockpiling in accordance with this Section.

B. Related Requirements

1. Section 01 57 13 – Temporary Erosion and Sediment Control
2. Section 31 00 00 – Earthwork
3. Section 31 10 00 – Site Clearing
4. Section 31 50 00 – Excavation Support and Protection

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.04 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.05 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.07 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide minimum 6 mil fire retardant polyethylene sheeting.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 SOIL STOCKPILING

A. Locate soil stockpiles in area approved by Engineer. Transport soils from generation area to stockpile areas along designated transport roadways approved by Engineer, preventing soil spillage, mud and soil tracking, and release of other materials to transport roadway throughout construction.

B. Arrange location, clearing, removal and salvage of overburden soils, and other Site preparation for temporary stockpiles. Location: approved by Engineer.

C. Cover soil stockpiles with minimum 6 mil polyethylene sheeting at all times, except during active loading or removal, if directed by Engineer. Keep stockpiles in neat and well drained condition.

D. Identify stockpiles, including classification of soil or other excavated spoils. Maintain an updated inventory of all stockpiled material.

3.02 SOIL REUSE

A. Utilize on-Site soils for backfill before use of imported soil if suitable.

B. Transportation and legal disposal of surplus native soils is allowed.

3.03 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

3.05 PROTECTION

A. Protect structures, utilities, facilities and pavements from damage caused by settlement, lateral movement, washout, and hazards created by stockpiling of soil.

END OF SECTION

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SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide and install permanent devices to control erosion, siltation, and sedimentation in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. MassDEP – Massachusetts Erosion & Sedimentation Control Guidelines for Urban and Suburban Areas

2. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1) Section 767 – Mulching, Seed for Erosion Control

2) M6.04.2 Straw Mulch

3. Order of Conditions

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data: for permanent erosion control matting.

C. Manufacturer’s Instructions

D. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements

PART 2 – PRODUCTS

2.01 MATERIALS

A. Permanent Erosion Control Blanket

1. Provide as shown on Drawings or directed by Engineer in compliance with the Order of Conditions to prevent slope erosion. If sequence of operations is such that only portions of slopes have been completed, preserve those portions by seeding and installation of erosion control blanket when directed, prior to completion of remaining portions of slope.

2. Provide soft pine wood wedges and stakes of biodegradable materials as recommended by manufacturer.

3. Coir log: coconut fiber mats woven into a matrix in compliance with the following.

PROPERTY	Test Method	Parameter
Weight	ASTM D 3776	17.8 oz/SY (600 g/m2)
Wide width tensile strength **Wet** Machine direction Cross direction	ASTM D 4595	 910 lbs/ft (13.3 kN/m) 870 lbs/foot (12.7 kN/m)
Wide width tensile strength **Dry** Machine direction Cross direction	ASTM D 4595	 1130 lbs/foot (16.5 kN/m) 1040 lbs/foot (15.2 kN/m)
Elongation at failure **Wet** Machine direction Cross direction	ASTM D 4595	 32 percent 26 percent
Open area	Calculated	58 percent
Thickness	ASTM D 177	0.35 inch (9 mm)
Recommended shear stress		4 lbs./sq. ft. (192 N/sq.m.)
Recommended flow		10 fps (3 m/s)
Recommend slope		2:1

B. Straw mulch: MassDOT M6.04.2, long fibered straw, 100 percent certified weed free, free from foreign matter detrimental to plant life, and in dry condition.

C. Tackifier: biodegradable and non-toxic bonding adhesive agent during hydraulic seeding or straw mulching to minimize wind and water effects.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Prevent erosion of soil and to prevent silting of drainage ditches, storm sewers, rivers, streams, and lakes.

B. Limit duration of exposure of soils on embankments, excavations, and graded areas.

C. Install erosion control measures in any ditch, swale or channel before runoff flows to waterways.

3.02 PREPARATION

A. Protection

1. Provide pollution prevention measures, erosion and sedimentation control, before, during and after soils are exposed. Implement and maintain erosion and sedimentation control measures as necessary until Site is permanently stabilized.

2. Stabilize areas shown on Drawings with permanent erosion control practices immediately, and within 14 days after construction activity on a particular portion of Site has permanently ceased, except where construction activities will resume on the particular portion of Site within 21 days, and where snow cover precludes initiation of stabilization measures.

B. Conform to grades and cross sections for slopes and ditches shown on Drawings.

C. Finish to a smooth and even condition. Rake out and remove debris, roots, stones, and lumps.

D. Loosen soil surface to permit bedding of matting.

E. Apply seed prior to placement.

F. Dewater trenches and swales to install materials in the dry.

3.03 INSTALLATION

A. Install erosion control blanket and straw mulch in accordance with manufacturer's instructions, the following, and as shown on Drawings or directed by Engineer. Submit manufacturer's instructions to Engineer prior to installation. Place immediately following seeding.

B. Install erosion control blanket onto slopes that have been graded, seeded, completed to required line and where grades are steeper than or equal to 3:1 as shown on Drawings and directed by Engineer.

C. Place strips lengthwise in direction of flow of water.

D. Overlap ends at least 6 inches in a shingle fashion.

E. Turn down up-slope end of each strip of matting and bury to a depth of not less than 6 inches with soil firmly tamped against it.

F. Engineer may require that any edge exposed to more than normal flow of water be buried in a similar manner.

G. Build check slots at right angles to direction of flow of water. Space so one check slot or one end occurs within each 50 feet of slope length. Construct by placing a tight fold of matting at least 6 inches vertically into ground, and tamp same as up-slope ends.

H. When directed by Engineer, spread additional seed over matting, particularly at locations disturbed by building the slots. Press matting onto ground with a light lawn roller or similar means.

I. Use pine wedges to fasten coir to ground. Metal staples are not allowed. Pound vertically flush to surrounding surface, not protruding above finished grade. Place pine wedges in same locations as recommended by manufacturer for staples.

J. On grades 4:1 or steeper, place pine wedges in same 3 rows, but spaced 2 feet apart.

K. On overlapping or butting edges, double pine wedges, with spacing halved. Secure ends of matting and required check slots spaced every foot.

L. Apply weed free straw mulch in combination with erosion control blanket on side slopes steeper than 3:1.

M. Place mulch according to MassDOT Section 767. Do not use short fibered material or material so wet or decayed that it cannot be properly spread. Apply tackifier as needed.

N. Maintain areas mulched or matted, until Project acceptance.

O. Maintain swales by removing silt that reaches a depth of over one foot, until Project acceptance.

3.04 REPAIR/RESTORATION

A. Repair matting immediately if any pine anchors become loosened or raised, or if any matting becomes loose, torn, or undermined.

3.05 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Site/Field Tests and Inspections

1. Inspections of disturbed soil areas, material storage areas exposed to precipitation and erosion control measures will be conducted by both Contractor and Engineer a minimum of once every 14 days and also within 24 hours after any storm event greater than 0.5 inches of rainfall. Immediately correct deficiencies identified.

2. Inspect erosion control blanket immediately after each rainfall and at least daily during prolonged rainfall or snowmelt for damage. Make appropriate repairs or replacement until acceptance by Engineer.

3.06 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 31 50 00

EXCAVATION SUPPORT AND PROTECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide excavation support and protection in accordance with this Section and applicable reference standards listed in Article 1.03, including shoring and bracing necessary to protect existing buildings, sidewalks and streets, utilities, all existing improvements, and excavation against movement due to caving, to meet OSHA safety requirements of shoring and bracing, and to cofferdams.

   a. Installation of shoring and bracing

   b. Maintenance of shoring and bracing

   c. Removal of shoring and bracing, as required

2. Shoring and bracing systems include permanent and temporary measures.

B. Related Requirements

1. Section 31 00 00 - Earthwork

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Institute of Steel Construction (AISC)

   a. Steel Construction Manual

2. ASTM International (ASTM)

   a. ASTM A36 Standard Specification for Carbon Structural Steel

   b. ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength

   c. ASTM A328 Standard Specification for Steel Sheet Piling

   d. ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

   e. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

   f. ASTM A690 Standard Specification for High-Strength Low-Alloy Nickel, Copper, Phosphorus Steel H-Piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments

   g. ASTM A992 Standard Specification for Structural Steel Shapes

3. American Welding Society (AWS)

   a. D1.1 - Structural Welding Code, Steel

4. MassDOT

   a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

B. Pre-installation Conference

1. Review geotechnical report, existing utilities and subsurface conditions.

2. Review coordination for interruption, shutoff, capping, and continuation of utility services.

3. Review instrumentation and monitoring program, and dewatering program. Confirm coordination with instrumentation and monitoring, and dewatering activities.

4. Review proposed excavations and equipment, monitoring of excavation support and protection system and abandonment or removal of excavation support and protection system.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

1. Do not begin excavation requiring support until submittals are approved.

B. Product Data

1. Construction details, material descriptions, performance properties, dimensions of individual components and profiles, and calculations for excavation support and protection system for each type of product

C. Shop Drawings

1. Plans, elevations, sections, and details for excavation support and protection system, by professional engineer licensed in the state where Project is located

2. Arrangement, locations, and details of soldier piles, sheet piling, lagging, tiebacks, bracing, and other components of excavation support and protection system by professional engineer licensed in the state where Project is located

3. Written plan for excavation support and protection, including sequence of construction of support and protection coordinated with progress of excavation

D. Calculations and analysis data for excavation support and protection system by professional engineer licensed in the state where Project is located.

E. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions on record documents.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements for Installer and professional engineer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

B. Review geotechnical report for applicable recommended design parameters and to determine need to perform additional test borings and conduct other exploratory operations necessary for excavation support and protection.

C. Verify dimensions and elevations before starting Work. Survey condition of adjoining properties with Engineer. Take photographs, recording any prior settlement or cracking of structures, pavements, and other improvements. Prepare list of existing damages, verified by dated photographs, signed by Contractor, Engineer and others conducting the investigation.

D. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Identify benchmarks and record existing elevations. Locate datum level where it will not be affected by excavation operations.

E. Interruption of Existing Utilities

1. Do not interrupt any utility serving facilities without Owner's written permission. Provide temporary utility if required.

2. Provide minimum 5 days' advance notice of proposed interruption of utility.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide shoring and bracing materials, in serviceable condition and adequate for intended purpose.

B. Steel sheet piling and shapes: continuous interlocking type; section modulus, type of section specified, in accordance with ASTM A328, ASTM A572, and ASTM A690, with continuous interlocks.

C. Provide movable box where shoring system is required, and where sheet piling is not specified.

D. Bracing members: wood timbers or steel members in accordance with ASTM A36.

E. Provide bolts in accordance with ASTM A307.

F. Provide structural steel in accordance with ASTM A36, ASTM A690, and ASTM A992.

G. Wood lagging: lumber, mixed hardwood, pressure-treated.

H. Provide reinforcing bars in accordance with ASTM A 615, Grade 60, deformed.

2.02 DESIGN CRITERIA

A. Provide services by professional engineer licensed in the state where Project is located, including preparation of Shop Drawings.

B. Design excavation support system in accordance with earth pressures and other criteria indicated, for construction of permanent structures without excessive movement or settlement of adjacent buildings, roadways, structures, or utilities, as shown on Drawings and as specified. Include analysis by professional engineer licensed in the state where Project is located.

C. Earth support design: coordinated dewatering design incorporating lowest anticipated excavation depths and full differential water head during dewatering.

D. Consult official records of both surface and subsurface existing utilities and connections to verity existing conditions and limitations as they apply to this Work and its relation to other construction work. Proceed with caution in areas of utility facilities. Excavate by hand, or other methods acceptable to utility owner. Protect existing utilities to remain within and adjacent to Work area in accordance with requirements of authorities having jurisdiction.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Anchor and brace system to resist earth and hydrostatic pressures, including surcharges from surface loads. Support excavation to prevent undermining or disturbance to foundations of existing structures and utilities, or of ongoing or previously completed Work. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or adjacent occupied or used facilities without approval. Provide alternate routes around closed or obstructed traffic ways if required.

2. Timber components of support systems should not be utilized in locations where their removal could jeopardize the stability of the proposed culvert, retaining walls, utilities, or other facilities to remain.

C. Maintain shoring and bracing while excavation is open.

D. Check base stability.

E. Prevent surface water from entering excavations.

3.02 STEEL SHEET PILING

A. Install 1-piece sheet piling lengths and interlock vertical edges to form a continuous barrier before starting excavation.

B. Place piling using templates and guide frame unless otherwise specified by sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line, and not more than 1:120 out of vertical alignment.

C. Cut off sheet piling to be left in place at least 5 feet below finish grade. Indicate location of sheet piling cut off and left in place on record documents.

D. Remove steel sheet piling following completion of Work where shown on Drawings or directed by Engineer. Obtain approval for steel sheet piling to be left in place.

3.03 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent Work. Install new bracing before removing original brace if moved. Do not place bracing where it will be cast into permanent concrete Work unless approved by Engineer.

B. Install internal bracing if required to prevent spreading or distortion of braced frames.

C. Maintain bracing until structural elements are supported by other bracing, or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.04 REPAIR/RESTORATION

A. Remove excavation support and protection systems in stages to avoid disturbing underlying soils and rock, or damaging structures, pavements, facilities, and utilities.

B. Steel elements of the support system may be left in place above bottom of structure footings, provided they are cut off at least 5 feet below the roadway grade. If used, all timber should be removed and replaced with approved compacted Structural Fill or Controlled Density Fill (MassDOT M.4.08.0) in confined areas when removing the earth support system.

C. Fill voids immediately with approved backfill compacted to density specified in accordance with Section 31 00 00.

D. Repair or replace adjacent Work damaged or displaced by removing excavation support and protection systems.

3.05 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Resurvey benchmarks twice weekly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Owner if changes in elevations or positions occur, or if cracks, sags, or other damage is evident in adjacent construction.

C. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

D. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.06 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 32 12 16

ASPHALT PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Furnish and install tack prime coat, hot mix asphalt pavement base and surface courses, temporary trench paving, permanent trench paving, pavement reclamation, structure protection and adjustments, sidewalks, driveways, hot mix asphalt berm and curb, and miscellaneous patching in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 32 17 23 – Pavement Markings

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)

a. AASHTO M320 Standard Specifications for Performance-Graded Asphalt Binder

b. AASHTO T166 Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens

c. AASHTO T209 Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Hot Mix Asphalt (HMA)

d. AASHTO TP 68 Standard Method of Test for Density of In-Place Hot-Mix Asphalt (HMA) Pavement by Electronic Surface Contact Devices

2. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Certificates: manufacturer's certificate verifying conformance.

C. Mix design: for each grade of pavement used, at least 20 days prior to start of paving.

D. Source and field quality control submittals

1. Certified weigh slips for each truck load of bituminous material.

E. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Comply with road opening permits.

C. Establish and control pavement (aggregate or asphalt base course and asphalt surface course) alignments, grades, elevations, and cross sections to match existing and prevent ponding.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 BITUMEN FOR TACK PRIME COAT

A. Provide in accordance with MassDOT Section 460, M3.03.0.

2.02 HOT POURED RUBBERIZED ASPHALT SEALANT

A. Provide in accordance with MassDOT Section 460.

2.03 HOT MIX ASPHALT SURFACE COURSE STANDARD TOP

A. Provide in accordance with MassDOT Section 460, M3.06.0.

2.04 HOT MIX ASPHALT BASE COURSE

A. Provide in accordance with MassDOT Section 420, M3.06.0.

2.05 HOT MIX ASPHALT BERM

A. Provide in accordance with MassDOT Section 470, M3.07.0.

2.06 HOT MIX ASPHALT FOR MISCELLANEOUS WORK

A. Provide in accordance with MassDOT Section 472.

2.07 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Minimize area of pavement removed to suitable width for installation of Work. Legally dispose of existing pavements.

B. Place hot mix asphalt between April 1 and November 15, unless otherwise specified by Owner.

C. Do not place hot mix asphalt mixture unless breakdown and intermediate rolling can be completed by time material has cooled to 175 degrees F, and provided density of completed pavement attains at least 92.5 percent of maximum theoretical density as determined by AASHTO T209.

D. Do not place mix on wet or damp surfaces, or when ambient temperature is 40 degrees F and falling, unless otherwise specified by Owner.

E. When air temperature falls below 50 degrees F, take extra precaution drying aggregates, controlling temperatures of materials, placing, and compacting mixtures.

F. Use straightedge to check compacted surfaces and obtain Engineer's approval.

G. Utilize approved dial type thermometer and infrared pistol thermometer for each paving machine. Retain thermometer upon completion of Project.

1. Fahrenheit or Celsius selectable

2. Portable and battery operated

3. Repeatability: plus or minus 5 degrees F.

4. LCD display: to nearest 1 degree.

5. Accuracy: plus or minus 2 percent.

6. Emissivity: present at 0.95.

7. Temperature operation range: 0 degrees F to 750 degrees F.

3.02 INSTALLATION

A. Place hot mix asphalt base and top courses on roadways, sidewalks and other areas to maintain traffic access and egress to properties abutting Work, and for safe passage of pedestrian and vehicular traffic in accordance with MassDOT Section 460 and Construction Standard Details.

1. Provide minimum compacted thickness depth of hot mix asphalt base course indicated on Drawings or as directed by Engineer to achieve necessary base course grade in support of finish grade pavement elevations.

2. Apply bitumen for prime and tack coat at a rate of 0.07 gallons per square yard over milled areas immediately prior to installation of top course, as shown on Drawings or directed by Engineer. Clean surface of sand and foreign matter, and dry before applying prime coat.

3. Apply bitumen for prime and tack coat at a rate of 0.05 gallons per square yard over hot mix asphalt base course immediately prior to installation of top course, as shown on Drawings or directed by Engineer. Clean surface of sand and foreign matter, and dry before applying prime coat.

4. Provide minimum compacted thickness depth of hot mix asphalt surface course indicated on Drawings or as directed by Engineer to achieve finish grades.

5. Apply hot poured rubberized asphalt sealant to longitudinal and transverse joints.

6. Remove and replace defective mix not conforming to specified mix formula within stipulated tolerances on basis of testing. Samples of mixture in use will be taken as many times daily as necessary, and mixtures maintained uniform as specified. Owner may suspend further approval of plant mixtures in related Work if mixtures are not uniformly furnished as specified, until necessary changes have been made so mixtures conform to specified requirements.

7. Irregularities which may develop before completion of rolling, and while material is still workable, may be remedied by loosening surface mixture and removing or adding material as necessary. If irregularities or surface defects remain after final compaction, defective Work will be corrected by minor surface projections, joints, and minor honeycombed surfaces ironed out smoothly to grade, and as directed.

8. If any soft, imperfect places or spots develop on surface before final acceptance of Work, remove and replace with new materials and compact until edges of new Work seamlessly connect with old Work.

B. Install hot poured rubberized asphalt sealer on roadway cracks less than or equal to 1-inch width. Clean and dry crack to minimum depth of twice the crack width with a high-pressure air blast prior to placing sealer. Apply sealer according to manufacturer's recommendations.

C. Install hot mix asphalt by handwork on roadway surfaces in locations where irregularities, inaccessibility or other unavoidable obstacles prevent mechanical spreading and finishing.

D. Maintain safe passage of vehicular and pedestrian traffic and access and egress.

E. Set manhole covers and valve boxes flush with finish grade of top course.

F. Do not permit vehicular traffic or loads on newly completed pavement until adequate stability has been attained and material has cooled sufficiently to prevent distortion or loss of fines. If climate or other conditions warrant, the time-period for opening to traffic may be extended, at discretion of Owner.

3.03 RECLAMATION OF ROADWAY WITH PAVING

A. Locate and protect existing drainage and utility structures, underground pipes, culverts, conduits and other appurtenances prior to scarifying and pulverizing existing pavement. If upper sections of utilities are removed, immediately cover remaining part of structure with steel plate capable of withstanding 36.5-ton truckload with impact. Protect, remove or replace existing utility structures and boxes as part of Work.

B. Reclamation of paving in accordance with MassDOT Section 403 includes scarifying and pulverizing in-place pavement and underlying material, mixing or blending material in depths specified on Drawings, followed by placing SSC 12.5mm 75 Gyration Binder course in depths specified on Drawings and SSC 75 Gyration top course in depths specified on Drawings.

C. Remove unsuitable material in sub-grade to lines and depths established by Owner and dispose of legally. Replace with gravel borrow in accordance with MassDOT M1.03.0.

D. Placement: within limits of Work shown on Drawings.

3.04 TEMPORARY TRENCH PAVEMENT

A. Comply with the construction method requirements of MassDOT Section 420, MassDOT Section 460 and the Drawings.

1. Comply with Hudson Rules and Regulations.

B. Grade gravel base to the depths required for installation of temporary trench pavement and compact gravel base prior to installing pavement.

C. Install temporary trench pavement over gravel base to the limits and thickness shown on the Drawings. Compact temporary trench pavement in accordance with MassDOT Section 460.

D. Unless otherwise directed by Owner, temporary trench pavement shall remain in place for one winter season. Maintain temporary pavement and repair settlement or failures until permanent pavement is installed at no additional cost to the Owner.

E. No more than 1,000 linear feet of unpaved trenches shall be permitted at any time. The Owner reserves the right to further limit the length of unpaved trenches with no additional compensation to the Contractor.

F. Provide temporary trench paving for each trench excavated, excluding plated areas, unless otherwise approved by Owner. Bring any trench excavated and left unpaved at the end of each workday, excluding plated areas, to uniform grade with gravel borrow or gravel base course. Provide that unpaved trench is level and smooth with surrounding pavement to minimize traffic impacts. Unpaved trenches during holidays or over weekends are not be permitted.

3.05 PERMANENT TRENCH PAVEMENT

A. Comply with the construction method requirements of MassDOT Section 420 and MassDOT Section 460.

1. Comply with Hudson Rules and Regulations.

B. Remove temporary trench pavement to the depths and limits shown on the Drawings. Provide neat, straight cuts and square, vertical edges. Seal seams and joints with rubberized asphalt joint sealant.

C. Clean sand, dirt, debris and other foreign materials from surfaces before applying tack coat. Apply bituminous tack coat to clean, dry vertical edges and existing paved surfaces to bond existing and new pavement.

D. Provide necessary protection for roadway castings to prevent damage to castings and vehicles and ensure pedestrian safety.

E. Install hot mix asphalt base and top courses to the limits and lift depths required on the Drawings. Compact each lift in accordance with MassDOT Section 460. Match existing grades and install permanent trench pavement to maintain or improve existing drainage patterns.

3.06 HOT MIX ASPHALT BERM

A. Replace existing hot-mix asphalt berms damaged by the Work in kind. Provide foundation for hot-mix asphalt berms in accordance with the Drawings or as directed by Engineer, conforming to requirements for type of berm.

B. Place mixture and compact with machine approved by Owner for type of berm required.

3.07 PAVEMENT MARKINGS

A. Provide in accordance with Section 32 17 23.

3.08 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.09 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

3.10 MAINTENANCE

A. Maintain trench width pavement during the 1 year Warranty Period. Refill areas that have settled or are unsatisfactory for traffic.

END OF SECTION

SECTION 32 16 13

CURBS AND GUTTERS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide curbs and gutters in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. References Standards

1. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

2. ASTM International (ASTM)

a. ASTM C615 Standard Specification for Granite Dimension Stone

b. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Certificates: manufacturer's certification that products meet Specification requirements

C. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Bituminous asphalt curb: Provide in accordance with MassDOT Section 501. Construction shall meet the Construction Standard Details for Type 3 (MassDOT Item No. 570.3)

2.02 JOINT PAD

A. Bituminous fiber joint filler: preformed strips of composition below, complying with ASTM D1751.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 INSPECTION

A. Verify that earthwork is completed to correct line and grade.

B. Check that subgrade is smooth, compacted, and free of frost or excessive moisture.

C. Do not commence Work until conditions are satisfactory.

3.02 INSTALLATION

A. Comply with material requirements of the Standard Specifications for Highways and Bridges, The Commonwealth of Massachusetts, Department of Transportation – Highway Division (MassDOT).

3.03 BACKFILLING

A. Provide in accordance with requirements of the Standard Specifications for Highways and Bridges, The Commonwealth of Massachusetts, Department of Transportation – Highway Division (MassDOT).

3.04 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.05 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide pavement markings in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

1. Product Data

2. Manufacturer Instructions

3. Certification that material does not exude fumes which are toxic or injurious to persons or property upon heating to application temperature

B. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 PAINTED MARKINGS

A. Provide in accordance with MassDOT Section M7.

B. Type: reflectorized White paint conforming to M7.01.05 for 4-inch traffic lines.

C. Type: reflectorized Yellow paint conforming to M7.01.06 for 4-inch traffic lines.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 PREPARATION

A. Sweep or air blast dirty pavements. Remove and dispose of dirt piles. Remove oil, grease, and similar adherent matter by washing with a suitable solvent. Wipe excess solvent from pavement and allow time for evaporation before applying pavement marking material.

3.02 INSTALLATION

A. Apply markings after approval by Engineer and install pavement markings in accordance with MassDOT Subsection 860, the MUTCD and Mass Amendments, and the Drawings.

B. Remove and replace unsatisfactory markings, resulting from the presence of dirt, oil, grease, scale, moisture, or other foreign substances, and pavement markings rejected by Engineer at no additional cost to Owner.

3.03 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 32 31 65

STEEL GUARDRAILS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide steel guardrails in accordance with this Section, the Drawings, and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 31 00 00 – Earthwork

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product data: manufacturer's technical data, and installation instructions for steel guardrails.

C. Shop Drawings showing dimensions and details of steel guardrails, including post installation.

D. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 GUARDRAIL MATERIALS

A. Provide materials in accordance with MassDOT Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details.

1. Steel beam highway guard Type TL-3 M8.07.0.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements. Comply with applicable reference standards listed in Article 1.03.

PART 3 – EXECUTION

3.01 STEEL POSTS

A. Set posts plumb in hand or mechanically dug holes, or driven, and backfill with acceptable material placed in layers and thoroughly compacted.

B. If driven, provide posts with suitable driving caps and equipment used to prevent battering or injury to posts. Remove posts damaged or distorted as a result of driving and replace with posts specified.

C. Erect guard posts to be set in areas of proposed bituminous concrete surfacing prior to laying the surrounding finished surface.

D. Space posts as shown on Drawings.

3.02 STEEL BEAM RAIL

A. Erect rail to form a smooth continuous rail conforming to the required line and grade. Splice rail element by lapping in the direction of the traffic or other approved methods. Slot the holes in the rail element nearer the posts to facilitate erection and permit expansion. The rail to make full contact at each splice. The front face of the rail should align with the limits of the roadway shoulder and should not encroach on the shoulder.

B. Draw tight bolts at expansion joints. Draw up bolts through expansion joints as tightly as possible without being too tight to prevent rail elements from sliding past one another longitudinally.

3.03 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 32 72 00

WETLANDS RESTORATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide wetland area landscaping and restoration in accordance with this Section and applicable reference standards listed in Article 1.03.

2. Construction Areas

a. Wetland restoration area of plus or minus 1,096 square feet consists of temporary impacts to the bordering vegetated wetlands that will be restored in place by re-grading upper 6 to 12 inches of soil as necessary to match existing wetland conditions, re-establishing a wetland plant community by spreading a native wetland seed mix and installing native wetland plantings as indicated on Drawings. Import additional topsoil to Site if necessary.

b. Wetland replication area of plus or minus 100 square feet will be created through excavation to a sub-grade 12 inches below existing adjacent wetland elevation. Import 12 inches of topsoil to match elevations with adjacent wetland. Replant area with native wetland vegetation.

B. Related Requirements

1. Section 31 00 00 - Earthwork

2. Section 31 25 00 - Erosion and Sedimentation Controls

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. AOAC International (AOAC)

2. Association of Official Seed Analysts (AOSA)

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: in accordance with Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Samples and Mockups: as specified in Article 1.06.

C. Source and Field Quality Control Submittals

1. Suppliers' certified analysis by a recognized laboratory in accordance with methods established by AOAC for non-standard products

2. Suppliers' certified analysis for soil amendments and fertilizer materials

3. Seed Suppliers' certified statement for each grass seed mixture required, stating botanical and common name; percentage by weight; percentages of purity germination; and weed seed for each grass seed species

4. Proposed planting schedule indicating dates for each type of landscape Work during typical seasons as specified, for Work in area of Site correlated with specified maintenance periods, to provide maintenance until Final Completion or a minimum of 180 days, whichever is longer.

5. Provide submittals at least 30 days prior to ordering materials. Do not order material until submittals are approved.

D. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Samples

1. Topsoil material from on-Site stockpile

2. Topsoil material from off-Site sources

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Deliver grass seed in original containers identifying analysis of seed mixture, percentage of pure seed, year of production, net weight, and date and location of packaging. Do not deliver damaged packages.

2. Deliver fertilizer in waterproof bags identifying weight, chemical analysis, and name of manufacturer.

3. Package certified analyses with products.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 TOPSOIL

A. Furnish new, imported topsoil, free of invasive species, consisting of mixture of organic clean leaf compost soil and clean loam mineral soil which is fertile, friable, natural loam surface soil found at a depth of not less than 4 inches from original ground surface, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, debris, and stones larger than 2 inches in any dimension.

B. Obtain topsoil from local sources or from areas having similar soil characteristics as Site. Obtain topsoil only from naturally, well-drained Sites where topsoil occurs in a depth of not less than 4 inches. Do not obtain from bogs or marshes.

1. Recommended mineral soil textures: sandy loam, fine sandy loam, silt loam or loam.

2. Have wetland specialist confirm proper ratio of mineral soil and compost mixture. Organic matter content of soil mixture: approximately 20 percent.

C. Obtain approval of soil Supplier from wetland specialist prior to ordering soil mixture.

D. Test soil sample to confirm it meets requirements specified. Obtain inspection and approval of soil mixture by wetland specialist before topsoil is placed in replication area and restoration area.

E. Furnish additional topsoil to complete landscape Work if quantity of topsoil stockpiled for reuse is insufficient. as specified, and in Section 31 10 00. This Section takes precedence over Section 31 00 00 for wetlands areas.

2.02 PLANTINGS

A. Furnish native species plantings. Do not use landscape cultivars. Furnish plants of type and quantities as shown on Drawings.

B. Contact wetland specialist prior to ordering plantings and seed mix to confirm nursery sources.

2.03 EROSION AND SEDIMENTATION CONTROL

A. Furnish 6-inch diameter biodegradable coir fiber logs or compost filled logs for stabilization of banks between wetland replication area and banks of stream, and also between wetland restoration area and stream.

B. Anti-erosion mulch: clean, seed-free threshed straw of wheat, rye, oats, or barley. Do not use hay.

C. Erosion control mesh: uniform, open-weave jute matting or flexible vinyl mat. Acceptable level of quality: equivalent to Mira Mat erosion control. Acceptable level of quality for re-vegetation mat: equivalent to TenCate Mirafi.

2.04 SOIL AMENDMENTS

A. Furnish natural limestone containing not less than 90 percent total carbonates, ground so not less than 98 percent passes a 20-mesh sieve and not less than 40 percent passes a 100-mesh sieve.

2.05 GRASS SEED

A. Furnish fresh, clean, new crop seed, complying with tolerance for purity and germination established by AOSA. Do not use wet, moldy, or damaged seed. Seed mixtures listed below are proportions by weight.

1. Germination: minimum 80 percent.

2. Purity: minimum 85 percent.

3. Weed content: maximum 1 percent.

B. Roadside Mixture

1. 50 percent Creeping Red Fescue

2. 15 percent Kentucky Bluegrass

3. 2 percent Red Top Clover

4. 25 percent Annual Ryegrass

5. 3 percent Bird's Foot Trefoil, Variety Empire

6. 5 percent White Clover

C. Ecology Mixture

1. 50 percent Creeping Red Fescue

2. 5 percent White Clover

3. 15 percent Kentucky Bluegrass

4. 2 percent Red Top Clover

5. 25 percent Annual Ryegrass

6. 3 percent Bird's Foot Trefoil, Variety Empire

D. Lawn Repair Mixture

1. 60 percent Kentucky Bluegrass

2. 20 percent Perennial Ryegrass

3. 20 percent Chewings Fescue

E. Wetlands Edge Mixture

1. 55 percent Tall Fescue

2. 10 percent Poa trivialis

3. 15 percent Kentucky Bluegrass

4. 5 percent Redtop

5. 10 percent Perennial Ryegrass

6. 5 percent Reed Canary Grass

F. New England Conservation Seed Mixture

1. Acceptable level of quality: equivalent to that manufactured by New England Wetland Plants.

2. Big Bluestem (Andropogon gerardii)

3. Switchgrass (Panicum virgatum)

4. Little Bluestem (Schizachyrium scoparium)

5. Canada Wild Rye (Elymus canadensis)

6. Fox Sedge (Carex vulpinoidea)

7. Partridge Pea (Chamaecrista fasciculata)

8. Fringed Bromegrass (Bromus ciliatus)

9. Pennsylvania Smartweed (Polygonum pensylvanicum)

10. Common Milkweed (Asclepias syriaca)

11. Showy Tick-Trefoil (Desmodium canadense)

12. New England Aster (Aster novae-angliae)

13. Flat-top Aster (Aster umbellatus)

14. Nodding Bur-Marigold (Bidens cernua)

2.06 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Install DEP sign indicating DEP File Number at entrance to Site so it can be seen from the public way prior to commencing Work. Do not place on a living tree.

B. Remove foreign materials, plants, roots, stones, and debris from Site and dispose of legally. Do not bury foreign material.

C. Do not obstruct roads, driveways, sidewalks, gutters and drainage ditches, swales and channels with excavated material.

D. Avoid damage to utilities, buildings and private property.

E. Do not disturb property markers.

F. Immediately report damage to Engineer.

G. Complete landscape Work immediately as portions of Site become available, working within seasonal limitations for each kind of landscape Work. Notify Engineer before planting if conditions detrimental to plant growth are encountered.

H. Plant or install materials during normal planting seasons for each type of landscape Work required.

I. Remove contaminated subsoil.

3.02 PREPARATION

A. Import soil to complete wetland replication area and as needed to complete wetland restoration area if existing impacted soils are not salvageable. Import approximately 12 inches of organic rich topsoil to wetlands replication area. Depth of topsoil in wetland restoration area and wetland replication area may be modified as necessary by wetland specialist. Legally dispose of excess soil.

B. Loosen subgrade of grass areas to minimum of 3 inches. Remove stones over 1-1/2 inches in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas to be planted promptly after preparation.

C. Spread top soil to minimum depth of 4 inches after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 4 inches of topsoil.

D. Prepare soil for grass planting in areas that have not been altered or disturbed by excavating, grading, or stripping operations.

1. Till to a depth of not less than 6 inches.

2. Apply soil amendments and initial fertilizer.

3. Remove high areas and fill in depressions.

4. Till soil to homogenous mixture of fine texture free of lumps, clods, stones, roots and other extraneous matter.

E. Fine grade areas to smooth even surface with loose, uniformly fine texture. Roll, rake and remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas to be planted immediately after grading. Provide positive drainage away from buildings and structures.

F. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting grass. Do not create muddy soil conditions.

G. Restore grassed areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.03 WETLANDS SPECIALIST

A. Wetland specialist shall be present to monitor construction of wetland replication area and wetland restoration area for compliance with approved Drawings and Plans, and as required by the OOC.

B. Wetland Specialist Responsibilities

1. Monitor wetland replication area and wetland restoration area in accordance with OOC and prepare monitoring reports to be submitted to Conservation Commission, and Engineer.

2. Verify proper subgrades are achieved to intercept wetland hydrology in wetland replication area.

3. Observe establishment of final grading of wetland replication area and wetland restoration area to verify final grades are similar to adjacent bordering vegetated wetlands.

4. Confirm proposed plantings have been installed properly.

C. Include photographic documentation, description of health of plantings, and recommendations for replacement plantings or modifications, if necessary, in monitoring reports. Address compliance with 310 CMR 10.55 (4)(b), which requires 75 percent or more coverage by native wetland indicator species within 2 growing seasons.

3.04 SEEDING NEW AREAS

A. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

B. Do not sow immediately following rain or when ground is too dry.

C. Seed Application Rate

1. New England Conservation Seed Mix: 1 pound per 1,750 square feet.

2. All others: 1 pound per 1,000 square feet.

D. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with a fine spray.

3.05 HYDROSEEDING NEW AREAS

A. Mix specified seed and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

B. Apply slurry using an approved machine. Seed and suitable corn fiber mulch may be applied in 1 operation. Mix materials with water in machine and agitate to keep mixture uniformly suspended. Use spraying equipment that will distribute slurry uniformly at required rates.

C. Mulch areas with anti-erosion mulch by means of mulch blower at rate of 1,200 pounds per acre on level grades, 2,000 pounds on slopes if mulch is not part of slurry immediately following hydroseeding.

D. Seed only areas that can be mulched on same day.

3.06 PROTECTION OF SEEDED SLOPES

A. Protect seeded slopes against erosion with erosion netting or other acceptable methods.

B. Spread specified mulch after completion of seeding operations to form a continuous blanket not less than 1-1/2 inches' loose measurement over seeded areas.

C. Anchor mulch by spraying with asphalt emulsion at rate of 10 to 13 gallons per 1,000 square feet. Prevent damage or staining of construction or other plantings adjacent to mulched areas.

D. Cover seeded slopes with jute matting where grade is 3:1 or greater. Roll matting down over slopes without stretching or pulling.

E. Lay matting smoothly on soil surface, burying top end of each section in narrow 6-inch trench. Leave 12-inch overlap from top roll over bottom roll. Leave 4-inch overlap over adjacent section.

F. Staple outside edges and overlaps at 36-inch intervals.

G. Lightly dress slopes with topsoil to ensure close contact between matting and soil.

H. Unroll matting in direction of flow in ditches. Overlap ends of strips 6 inches with upstream section on top.

3.07 PLANTING OF SHRUBS AND TREES

A. Plant areas during one of the local planting seasons, weather permitting. Coordinate planting periods to provide required maintenance.

B. Prune injured roots or branches to make clean-cut ends prior to planting, utilizing clean, sharp tools, removing only injured or diseased branching.

C. Remove planting containers, baskets, and non-biodegradable materials from root balls during planting. Cut natural fiber burlap from around the trunk of trees and folded down against root ball prior to backfilling.

D. Position trees and shrubs at intended locations shown on Drawings and obtain Engineer's approval prior to excavating pits, making necessary adjustments as directed.

E. Dig planting pits with level bottoms with width twice the diameter of root ball. Rest root ball on undisturbed grade. Backfill each plant pit in layers with thoroughly mixed, prepared soil; 1-part peat moss; 1-part composted cow manure by volume; 3 parts topsoil by volume.

1. Provide 21-gram planting tablets, acceptable level of quality: equivalent to Agriform.

a. 2 tablets per 1-gallon plant

b. 3 tablets per 5-gallon plant

c. 4 tablets per 15-gallon plant

d. Larger plants: 2 tablets per 1/2-inch caliper of trunk

F. Fill prepared soil around ball of plant halfway and insert plant tablets. Complete backfill, and water thoroughly.

3.08 EROSION AND SEDIMENTATION CONTROL

A. Furnish and install as indicated, and in accordance with Section 31 25 00.

B. Install coir fiber logs or compost filled logs for stabilization of banks between wetland replication area and banks of stream, and also between wetland restoration area and stream. Install logs directly on face of stream banks and anchor with earth anchors or wooden stakes.

C. Maintain erosion and sedimentation controls during construction to protect wetland resource areas. Do not remove erosion controls until up-gradient areas are fully stabilized with vegetation, or directed by Engineer.

3.09 REPAIR/RESTORATION

A. Restore pavement, sidewalks and walkways, grassed and planted areas, damaged during execution of Work, as directed by Engineer. Provide seed to re-establish grass where existing topsoil remains. Provide additional topsoil where necessary.

B. Recondition existing lawn areas damaged during execution of Work and existing lawn areas where minor re-grading is required.

C. Provide fertilizer, seed or sod, and soil amendments as specified and required for new lawns, to provide a satisfactorily reconditioned lawn. Provide new topsoil as required to fill low spots and meet new finish grades.

D. Cultivate bare and compacted areas thoroughly to provide satisfactory planting bed.

E. Remove diseased and unsatisfactory lawn areas. Do not bury into soil. Remove topsoil containing foreign materials resulting from execution of Work, and dispose of legally.

F. Water newly planted areas and keep moist until new grass is established.

3.10 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Site/Field Tests and Inspections

1. Project wetland specialist shall provide inspection to address compliance with 310 CMR 10.55 (4)(b), which requires 75 percent or more coverage by native wetland indicator species within 2 growing seasons.

3.11 CLEANING

A. Keep pavement, sidewalks, and walkways clean. Maintain protection during installation and maintenance periods.

3.12 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

3.13 MAINTENANCE

A. Provide maintenance of grass seeded areas immediately after planting.

B. Maintain grass by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish smooth, acceptable lawn areas free of eroded or bare areas.

C. Maintain grassed areas to establish acceptable lawn until Final Completion, or for a minimum of 180 days after Substantial Completion, whichever is longer.

D. If seeded in the fall season, and full 180 days of maintenance is not provided, or if not considered acceptable at that time, continue maintenance during the following spring season until acceptable lawn areas are established.

E. Replace dead plants within 1 year of initiation of Warranty Period, or as recommended by wetland specialist and Engineer.

F. Maintain trees and shrubs until Final Completion, or for a minimum of 180 days after Substantial Completion, whichever is longer.

END OF SECTION

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SECTION 32 90 00

PLANTING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide loam borrow, topsoil, seeding, and supporting materials and m planting trees, shrubs and groundcover, in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 31 00 00 – Earthwork

2. Section 31 25 00 – Erosion and Sediment Control

3. Section 32 72 00 – Wetlands Restoration

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American National Standards Institute (ANSI)

a. ANSI Z60.1 American Standard for Nursery Stock

2. AOAC International (AOAC)

3. ASTM International (ASTM)

a. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

b. ASTM D75 Standard Practice for Sampling Aggregates

c. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

4. MassDOT

    a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

5. United States Department of Agriculture (USDA)

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Seeding and planting fertilizer showing composition and analysis

    a. Fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations

    b. Receipt showing total quantity purchased for Project prior to installation

C. Samples and Mockups: as specified in Article 1.06.

D. Certificates: seeding and planting fertilizer composition and analysis.

E. Manufacturer Instructions

F. Source and Field Quality Control Submittals

1. Suppliers' certified analysis in accordance with AOAC for non-standard products.

2. Suppliers' certified analysis for soil amendments and fertilizer materials.

3. Seed Supplier's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity germination and weed seed for each grass seed species.

4. Certificates of agronomic rates from Supplier for organic matter used in loam borrow manufacturing process.

5. Supplier's certifications for peat moss, limestone, acidulants, gypsum, additives needed to amend a specific soil.

G. Provide submittals at least 30 days prior to ordering materials.

H. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Survey data of on-Site topsoil stockpiles plotted on a 20-scale plan of the Site, prepared by a registered surveyor or civil engineer

C. Samples

1. Loam borrow: 1 cubic foot representative sample per each 1,000 cubic yards of proposed stockpile of loam borrow for testing. Stockpile sampling: in accordance with ASTM D75**.**

2. On-Site stockpiles of loam borrow: 25 one cubic foot representative samples selected for testing or from loam after it has been spread and amended. Take Samples from on-Site stockpiles and from spread and amended loam borrow from locations as directed by Engineer and packaged in presence of Engineer.

3. Deliver samples to testing laboratories via overnight courier and have testing reports sent directly to Engineer.

a. Obtain testing for gradation, organic content, soil chemistry and pH by a certified laboratory.

b. Include the following tests.

1) Sieve analysis: performed and compared to USDA Soil Taxonomy, by combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM C136 after destruction of organic matter by H2O2. Provide a computer generated gradation curve from UMASS Laboratory to facilitate review and approval of sieve analysis.

2) Determine percent of organics by loss on ignition of oven dried samples. Oven dry test samples minus #10 material to a constant weight at a temperature of 450 degrees F.

3) Provide chemical analysis for nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, magnesium, extractable aluminum, lead, zinc, cadmium, copper, soluble salts, and pH and buffer pH. Use a conductivity meter to measure soluble salts in 1:2 soil/water (v/v %). Nutrient tests: for available nutrients.

4) Provide recommendations for soil additives to correct soil deficiencies, and additives necessary to complete planting work specified with soil analysis tests.

c. Provide biosolid compost testing to determine compost is mature, stable and suitable for use in a growing medium by Woods End Research Laboratory, Mt. Vernon, ME.

d. Provide analysis by recognized laboratory for other materials in accordance with AOAC, where applicable.

4. Peat moss: 1-cubic foot sample.

5. Gypsum: 2-pound sample.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Do not order or deliver material until submittals are approved.

2. Package products with manufacturers certified analysis.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 LOAM BORROW

A. Provide in accordance with MassDOT Section 751 and MassDOT Construction Details.

B. Type: MassDOT Section M1.05.0.

C. Furnish sufficient loam borrow to complete loaming operations required for Project and as directed by Engineer. Obtain loam borrow from the following sources and meet requirements specified after testing and addition of necessary soil additives.

1. Naturally well-drained areas that have never been stripped before and have a history of satisfactory vegetative growth. Comply with bylaws and Regulations regarding removal of topsoil.

2. Commercial processing facility specializing in manufacturing of loam.

2.02 TOPSOIL

A. Provide additional topsoil required to complete landscape work if quantity of stockpiled topsoil is insufficient.

B. Furnish new topsoil, which is fertile, friable, natural loam surface soil found at a depth of not less than 4 inches from original ground surface, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, debris, and stones larger than 2 inches in any dimension.

C. Obtain topsoil from local sources or from areas having similar soil characteristics as Site. Obtain topsoil only from naturally, well-drained Sites where topsoil occurs in a depth of not less than 4 inches. Do not obtain from bogs or marshes.

2.03 SEED AND SUPPORTING MATERIAL

A. Provide seed, limestone, fertilizers, plant materials, water for irrigation and soil conditioners in accordance with MassDOT Section 765.40 and MassDOT Construction Details, and ANSI Z60.1.

B. If biosolid compost (Massachusetts Department of Environmental Protection-permitted material) is used as an organic component of proposed planting soil mixture, amount of organic material used shall not exceed agronomic rates for nitrogen and phosphorus for trees and shrubs, turf or ornamental perennials.

2.04 PLANTING TREES, SHRUBS AND GROUNDCOVER

A. Furnish in accordance with MassDOT Section 771s.

B. Type: per MassDOT Section M6.06.1

2.05 GRASS SEED

A. Furnish fresh, clean, new crop seed, complying with tolerance for purity and germination established by AOSA. Do not use wet, moldy, or damaged seed. Seed mixtures listed below are proportions by weight.

1. Germination: minimum 80 percent.

2. Purity: minimum 85 percent.

3. Weed content: maximum 1 percent.

B. Roadside Mixture

1. 50 percent Creeping Red Fescue
2. 15 percent Kentucky Bluegrass
3. 2 percent Red Top Clover
4. 25 percent Annual Ryegrass
5. 3 percent Bird's Foot Trefoil, Variety Empire
6. 5 percent White Clover

C. Ecology Mixture

1. 50 percent Creeping Red Fescue
2. 5 percent White Clover
3. 15 percent Kentucky Bluegrass
4. 2 percent Red Top Clover
5. 25 percent Annual Ryegrass
6. 3 percent Bird's Foot Trefoil, Variety Empire

D. Wetlands Edge Mixture

1. 55 percent Tall Fescue
2. 10 percent Poa Trivialis
3. 15 percent Kentucky Bluegrass
4. 5 percent Redtop
5. 10 percent Perennial Ryegrass
6. 5 percent Reed Canary Grass

E. New England Wet Mix (To be applied at wet areas as directed by Engineer).

1. Lurid Sedge (Carex lurida)
2. Blunt Broom Sedge (Carex scoparia)
3. Blue Vervain (Verbena Hastata)

4. Hop Sedge (Carex lupulina)

5. Green Bulrush (Scirpus atrovirens)

6. Redtop Panic Grass (Panicum rigidulum)

7. Tufted Hairgrass (Deschampsia cespitosa)

8. Tickseed Sunflower/Bur Marigold (Bidens aristosa)

9. Creeping Spike Rush (Eleocharis palustris)

10. Soft Rush (Juncus effesus)

11. Fringed Sedge (Carex crinita)

12. Square Stemed Monkey Flower (Mimulus ringens)

13. Swamp Aster (Aster puniceus)

14. Boneset (Eupatorium perfoliatum)

15. Rattlesnake Grass (Glyceria Canadensis)

16. Swamp Milkweed (Asclepias incarnata)

17. Common Sneezewood (Helenium autumnale)

18. Ditch Stonecrop (Penthorum sedoides)

F. Lawn Repair Mixture

1. 60 percent Kentucky Bluegrass

2. 20 percent Perennial Ryegrass

3. 20 percent Chewings Fescue

G. New England Conservation Seed Mixture

1. Acceptable level of quality: equivalent to that manufactured by New England Wetland Plants.

2. Big Bluestem (Andropogon gerardii)

3. Switchgrass (Panicum virgatum)

4. Little Bluestem (Schizachyrium scoparium)

5. Canada Wild Rye (Elymus canadensis)

6. Fox Sedge (Carex vulpinoidea)

7. Partridge Pea (Chamaecrista fasciculata)

8. Fringed Bromegrass (Bromus ciliatus)

9. Pennsylvania Smartweed (Polygonum pensylvanicum)

10. Common Milkweed (Asclepias syriaca)

11. Showy Tick-Trefoil (Desmodium canadense)

12. New England Aster (Aster novae-angliae)

13. Flat-top Aster (Aster umbellatus)

14. Nodding Bur Marigold (Bidens cernua)

2.06 FERTILIZER

A. Bone meal: commercial, raw or steamed, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. Fertilizer: commercial grade complete fertilizer of neutral character, consisting of fast and slow release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition.

1. Nitrogen, phosphorous and potassium in amounts recommended in topsoil analysis reports from a qualified soil testing agency.

2. Minimum 1 pound per 1,000 square feet of actual nitrogen, 4 percent phosphorous and 2 percent potassium by weight.

2.07 EROSION AND SEDIMENTATION CONTROL

A. Anti-erosion mulch: clean, seed-free threshed straw of wheat, rye, oats, or barley. Do not use hay.

B. Erosion control mesh: uniform, open-weave jute matting or flexible vinyl mat. Acceptable level of quality: equivalent to Mira Mat erosion control.

C. Acceptable level of quality for re-vegetation mat: equivalent to TenCate Mirafi.

2.08 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Avoid damage to utilities, buildings and private property.

B. Do not disturb property markers.

C. Immediately report damage to Engineer.

D. Complete landscape work immediately as portions of Site become available, working within seasonal limitations for each kind work. Notify Engineer before planting if conditions detrimental to plant growth are encountered.

E. Plant or install materials during normal planting seasons for each type of landscape work required, and as specified in Section 32 72 00.

F. Use topsoil stockpiled for re-use as specified in Section 31 00 00.

3.02 LOAM BORROW

A. Place loam borrow at designated locations where plant material is to be installed or re-installed in accordance with MassDOT Section 751 and MassDOT Construction Details and Drawings, or as directed by Engineer.

B. Protect loam borrow delivered to Site from erosion and spread immediately. Cover material that sits on-Site for more than 24 hours with tarpaulin or other soil erosion system acceptable to Engineer, and surround with silt fence as shown on Drawings.

C. Do not handle, plant or use loam borrow if wet or frozen. Use moist loam borrow.

3.03 PLANTING TREES, SHRUBS AND GROUNDCOVER

A. Provide in accordance with MassDOT Section 771 and MassDOT Construction Details.

B. Type: per MassDOT Section M6.06.1

C. Prune injured roots or branches to make clean-cut ends prior to planting, utilizing clean, sharp tools, removing only injured or diseased branching.

D. Remove planting containers, baskets, and non-biodegradable materials from root balls during planting. Cut natural fiber burlap from around trunk of trees and folded down against root ball prior to backfilling.

E. Position trees and shrubs at intended locations shown on Drawings and obtain Engineer's approval prior to excavating pits, making necessary adjustments as directed.

F. Dig planting pits with level bottoms with width twice the diameter of root ball. Rest root ball on undisturbed grade. Backfill each plant pit in layers with thoroughly mixed, prepared soil; 1-part peat moss; 1-part composted cow manure by volume; 3 parts topsoil by volume.

1. Provide 21-gram planting tablets, acceptable level of quality: equivalent to Agriform.

a. 2 tablets per 1-gallon plant

b. 3 tablets per 5-gallon plant

c. 4 tablets per 15-gallon plant

d. Larger plants: 2 tablets per 1/2-inch caliper of trunk

G. Fill prepared soil around ball of plant halfway, and insert plant tablets. Complete backfill, and water thoroughly.

3.04 FINE GRADING

A. Clean subgrade of stones greater than 2 inches and all debris immediately prior to dumping and spreading loam borrow, and remove from Site. Do not rake to edges and bury. Obtain Engineer's approval of subgrade conditions prior to spreading loam borrow.

B. Spread and thoroughly incorporate soil additives into layer of loam borrow by harrowing or other approved methods. Incorporate the following soil additives.

1. Ground limestone or acidulants: as required by soil analysis to achieve required pH specified. Spread limestone at rate required by soil analysis up to maximum limit of 200 pounds per 1,000 square feet. Make a surface application of limestone not in excess of 50 pounds per 1,000 square feet to established planting area during the season after Final Acceptance if recommendations of soil analysis require rates of application greater than 200 pounds per 1,000 square feet.

2. Fertilize at rate and analysis recommended by soil analysis.

3. Use biosolid compost, peat moss, sand or other soil amendments as required by soil analysis.

C. Prepare loam borrow by scarifying, harrowing, or tilling loam to integrate soil additives into top 6 inches of loam after loam borrow and required additives have been spread. Remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over 1-inch in diameter from top 6 inches of loam bed from unscreened soils. Remove smaller stones in excessive quantities as directed.

D. Set sufficient grade stakes for checking finished grades. Set stakes in bottom of swales and at top of slopes. Do not deviate more than one-tenth of foot from indicated elevations. Connect contours and spot elevations with an even slope. Finish grades: smooth and continuous with no abrupt changes at top or bottom of slopes.

E. Fill depressions caused by settlement or rolling during compaction process with additional loam borrow and regrade surface and roll until finish is smooth and even corresponding to required grades.

F. Install loam borrow in successive horizontal lifts no thicker than 6 inches in turf areas and 12 inches in plant bed areas to desired compaction as indicated. Install soil at a higher level to anticipate any reduction of loam borrow volume due to compaction, settling, erosion, and decomposition during Warranty Period. Obtain full depths of loam borrow for plant beds by digging holes in loam borrow at same frequency as for compaction testing.

1. Compact loam to specified density.

2. Maximum dry density for topsoil and loam: determined in accordance with ASTM D698. Achieve the following percentages of minimum to maximum dry densities for fill materials or prepared subgrades.

    a. Fills within plant beds, tree pits and treeways: minimum 80 percent; maximum 85 percent for areas in top 18 inches of finished grade.

3. Scarify surface area of each lift by raking prior to placing next lift.

G. Compact each lift to reduce settling, but not enough to prevent movement of water and feeder roots through the soil in addition to range cited above. Loam borrow in each lift: firm underfoot and make only slight heel prints. Loam borrow at completion of installation: firm, even resistance when a soil sampling tube is inserted from lift to lift. Perform percolation tests after placement of each lift to determine if soil has been over compacted using the following percolation test procedure.

1. Dig a hole in installed soil minimum of 4 inches in diameter. Holes in 6-inch lift in turf areas: 4 inches deep. Holes in 12-inch lifts in plant beds: 8 inches deep. Do not penetrate through lift being tested.

2. Fill hole with water and let it drain completely. Immediately refill hole with water and measure rate of fall in water level.

3. Till soil to a depth required to break over compaction if water drains at a rate less than 1-inch per hour.

4. Perform a minimum of 1 soil percolation test per 10,000 square feet of turf area, and 2,500 square feet of tree and shrub planting area as directed.

H. Select equipment and phase installation of loam borrow so wheeled equipment does not travel over subsoil, placed fills or ordinary borrow, or already installed soil. Movement of tracked equipment over these soils will be reviewed and considered by Engineer for approval. If Engineer determines that wheeled equipment must travel over already installed soil, provide a written description of sequencing of Work that ensures compacted soil is loosened and uncompacted as Work progresses, or place 1-inch thick steel plate ballast or approved equivalent over length and width of any travelway to cover loam borrow to protect it from compaction.

I. Grade disturbed areas outside limit of Work, smooth and spread with minimum 6 inches of loam borrow to finished grade.

J. Maintain stockpiles of existing on-Site topsoil until final placement of existing on-Site topsoil and loam borrow is approved. Provide survey data plotted on a 20-scale plan of the Site prepared by a registered surveyor or civil engineer, showing volume of stockpiles of existing on-Site topsoil. Remove excess, unused existing on-Site topsoil from Site and legally dispose of upon approval.

3.01 SEED AND SUPPORTING MATERIAL

A. Install and apply seed and supporting materials at rates of application in accordance with MassDOT Section 765.40 and MassDOT Construction Details and the Drawings.

3.02 HYDROSEEDING NEW AREAS

A. Mix specified seed and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

B. Apply slurry using an approved machine. Seed and suitable corn fiber mulch may be applied in 1 operation. Mix materials with water in machine and agitate to keep mixture uniformly suspended. Use spraying equipment that will distribute slurry uniformly at required rates.

C. Mulch areas with anti-erosion mulch with mulch blower at rate of 1,200 pounds per acre on level grades, 2,000 pounds on slopes if mulch is not part of slurry, immediately following hydroseeding.

D. Seed only areas that can be mulched on same day.

3.03 SEEDING NEW AREAS

A. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

B. Do not sow immediately following rain or when ground is too dry.

C. Seed application rate

1. New England Conservation Seed Mix: 1 pound per 1,750 square feet.

2. All others: 1 pound per 1,000 square feet.

D. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

3.01 PROTECTION OF SEEDED SLOPES

A. Protect seeded slopes against erosion with erosion netting or other acceptable methods.

B. Spread specified mulch after completion of seeding operations to form a continuous blanket not less than 1-1/2 inches' loose measurement over seeded areas.

C. Anchor mulch by spraying with asphalt emulsion at rate of 10 to 13 gallons per 1,000 square feet. Prevent damage or staining of construction or other plantings adjacent to mulched areas.

D. Cover seeded slopes with jute matting where grade is 3:1 or greater. Roll matting down over slopes without stretching or pulling.

E. Lay matting smoothly on soil surface, burying top end of each section in narrow 6-inch trench. Leave 12-inch overlap from top roll over bottom roll. Leave 4-inch overlap over adjacent section.

F. Staple outside edges and overlaps at 36-inch intervals.

G. Lightly dress slopes with topsoil to ensure close contact between matting and soil.

H. Unroll matting in direction of flow in ditches. Overlap ends of strips 6 inches with upstream section on top.

3.02 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Replace rejected Work, and continue specified maintenance until re-inspected by Engineer and accepted. Remove rejected plants and materials promptly from Site.

3.01 CLEANING

A. Keep pavement, sidewalks, and walkways clean. Maintain protection during installation and maintenance periods.

3.02 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

3.03 MAINTENANCE

A. Provide maintenance of grass seeded areas immediately after planting.

B. Maintain grass by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish smooth, acceptable lawn areas free of eroded or bare areas.

C. Maintain grassed areas to establish acceptable lawn until Final Completion or for a minimum of 180 days, whichever is longer, by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

D. Maintain trees and shrubs until Final Completion, or for a minimum of 180 days, whichever is longer.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide seeding and landscape development in accordance with this Section and applicable reference standards listed in Article 1.03, including the following.

a. Preparation of subgrade to receive topsoil

b. Spreading topsoil

c. Seeding

d. Hydroseeding

e. Maintaining seeded areas until acceptance

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. Official Seed Analysts of North America

2. Association of Official Agriculture Chemists

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Certificates

1. Submit manufacturers or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.

2. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity germination, and weed seed for each grass seed species.

C. Samples

1. Submit Sample of topsoil material from the on-site stockpile and all off-site sources to be used for approval by Engineer.

2. Submit proposed planting schedule indicating dates for each type of landscape work during normal seasons for such Work in area of Site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

D. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Certifications

1. Package standard products with manufacturers' certified analysis.

2. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable.

2. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 TOPSOIL

A. Use topsoil stockpiled for re-use in landscape Work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil as required to complete landscape work.

B. Provide new topsoil which is fertile, friable, natural loam surface soil found at a depth of not less than 4-inches from the original ground surface, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2-inches in any dimension, and debris.

C. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at Project Site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4-inches; do not obtain from bogs or marshes.

2.02 SOIL AMENDMENTS

A. Lime: Natural limestone containing not less than 90 percent total carbonates, ground, so that not less than 98 percent passes a 20-mesh sieve and not less than 40 percent passes a 100-mesh sieve.

2.03 GRASS MATERIALS

A. Grass Seed: Fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analyst of North America. Do not use seed that has become wet, moldy, or damaged. All seed mixtures listed are proportions by weight.

1. Germination: not less than 80 percent

2. Purity: not less than 85 percent

3. Weed content: not more than 1 percent

B. New England Conservation Seed Mixture. Acceptable level of quality: equivalent to England Wetland Plants.

1. Big Bluestem (Andropogon gerardii)

2. Switchgrass (Panicum virgatum)

3. Little Bluestem (Schizachyrium scoparium)

4. Canada Wild Rye (Elymus canadensis)

5. Fox Sedge (Carex vulpinoidea)

6. Partridge Pea (Chamaecrista fasciculata)

7. Fringed Bromegrass (Bromus ciliatus)

8. Pennsylvania Smartweed (Polygonum pensylvanicum)

9. Common Milkweed (Asclepias syriaca)

10. Showy Tick-Trefoil (Desmodium canadense)

11. New England Aster (Aster novae-angliae)

12. Flat-top Aster (Aster umbellatus)

13. Nodding Bur Marigold (Bidens cernua)

2.04 MISCELLANEOUS LANDSCAPE MATERIALS

A. Erosion control mesh: uniform, open weave jute matting or flexible vinyl mat. Acceptable level of quality: equivalent to Mira Mat.

B. Acceptable level of quality of erosion control and revegetation mat: equivalent to TenCate Mirafi.

2.05 FERTILIZER

A. Bone meal: commercial, raw or steamed, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. Fertilizer: commercial grade complete fertilizer of neutral character, consisting of fast and slow release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition.

1. Nitrogen, phosphorous and potassium in amounts recommended in topsoil analysis reports from a qualified soil testing agency.

2. Minimum 1 pound per 1,000 square feet of actual nitrogen, 4 percent phosphorous and 2 percent potassium by weight.

2.06 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Proceed with, and complete landscape Work as rapidly as portions of Site become available, working within seasonal limitations for each kind of landscape work required. When conditions detrimental to plant growth are encountered, notify Engineer before planting.

B. Locate underground utilities. Perform Work in a manner that will avoid damage.

C. Plant or install materials during normal planting seasons for each type of landscape Work required.

D. Beginning Work means acceptance of existing conditions.

E. Repair grassed areas disturbed during performance of the Work. Where existing topsoil remains, provide seed to re-establish grass.

3.02 PREPARATION

A. Protect existing underground improvements from damage.

B. Remove foreign materials, plants, roots, stones, and debris from Site. Do not bury foreign material.

C. Remove contaminated subsoil.

D. Preparation for Planting Grass

1. Loosen subgrade of grass areas to a minimum of 3-inches. Remove stones over 1-l/2 inches in any dimension, sticks, roots, rubbish and other extraneous matter. Limit preparation to areas that will be planted promptly after preparation.

2. Spread top soil to minimum depth of 4-inches after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 4-inches of topsoil.

E. Where grass is to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for planting as follows: Till to a depth of not less than 6-inches; apply soil amendments and initial fertilizers as specified; remove high areas and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.

F. Fine grade areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and remove ridges, and fill depressions as required to meet finish grades. Limit fine grading to areas that can be planted immediately after grading. Assure positive drainage away from buildings.

G. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

H. Restore grassed areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.03 SEEDING NEW AREAS

A. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other. Do not sow immediately following rain or when ground is too dry.

B. Seed application rate

1. New England Conservation Seed Mix: 1 pound per 1,750 square feet.

2. All others: 1 pound per 1,000 square feet.

C. Rake seed lightly into top 1/8-inch of soil, roll lightly, and water with a fine spray.

3.04 HYDROSEEDING NEW AREAS

A. Mix specified seed and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

B. Apply slurry using an approved machine. Seed and suitable corn fiber mulch may be applied in one operation. Mix materials with water in machine and agitate to keep mixture uniformly suspended. Use spraying equipment that will distribute slurry uniformly at required rates.

C. Immediately following hydroseeding, mulch areas by means of mulch blower at rate of 1,200 pounds per acre on level grades, 2,000 pounds on slopes if mulch is not part of slurry. Do not seed area in excess of that which can be mulched on same day.

3.05 PROTECTION OF SEEDED SLOPES

A. Protect seeded slopes against erosion with erosion netting or other methods acceptable to the Engineer.

B. Spread specified lawn mulch after completion of seeding operations to form a continuous blanket not less than 1-1/2-inches loose measurement over seeded areas.

C. Anchor mulch by spraying with asphalt emulsion at the rate of 10 to 13 gallons per 1000 square feet. Take precautions to prevent damage or staining of construction or other plantings adjacent to mulched areas.

D. Cover seeded slopes where grade is 3:1 or greater, unless otherwise noted, with jute matting. Roll matting down over slopes without stretching or pulling.

E. Lay matting smoothly on soil surface, burying top end of each section in narrow 6-inch trench. Leave 12-inch overlap from top roll over bottom roll. Leave 4-inch overlap over adjacent section.

F. Staple outside edges and overlaps at 36-inch intervals.

G. Lightly dress slopes with topsoil to ensure close contact between matting and soil.

H. In ditches, unroll matting in direction of flow. Overlap ends of strips 6 inches with upstream section on top.

3.06 RECONDITIONING EXISTING GRASSED AREAS

A. Recondition existing lawn areas damaged by Contractor’s operations and existing lawn areas where minor re-grading is required.

B. Provide fertilizer, seed, or sod, and soil amendments as specified for new lawns and as required to provide a satisfactorily reconditioned lawn. Provide new topsoil as required to fill low spots and meet new finish grades.

C. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.

D. Remove diseased and unsatisfactory lawn areas. Do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor’s operations.

E. Water newly planted areas and keep moist until new grass is established.

3.07 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain grassed areas for not less than 60 days after substantial completion, and longer as required to establish an acceptable lawn.

C. If seeded in fall, and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance during the following spring until acceptable lawn is established.

D. Maintain grass by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

3.08 CLEANUP AND PROTECTION

A. Keep pavements clean. Maintain protection during installation and maintenance periods.

B. Restore pavement, grassed areas and planted areas damaged during execution of Work of this section.

3.09 INSPECTION AND ACCEPTANCE

A. Landscape work may be inspected for acceptance in parts agreeable to Engineer, provided Work offered for inspection is complete, including maintenance.

B. Replace rejected Work and continue specified maintenance until re-inspected by Engineer and found to be acceptable.

3.10 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.11 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 33 01 30.10

TELEVISION INSPECTION AND CLEANING OF SEWERS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide cleaning and closed-circuit television (CCTV) inspection of storm sewer pipes in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. National Association of Sewer Service Companies (NASSCO)

a. Jetter Code of Practice

b. Pipeline Assessment Certification Program (PACP) Standards

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product data

1. Description of system and equipment proposed for pipe cleaning

2. Description of system and equipment proposed for CCTV inspection after cleaning

3. Documentation of PACP certification for CCTV software

4. Sample test reports and evaluations

a. Sample inspection data and CCTV video of minimum 3 pipe segments to verify compatibility with Owner's PACP database.

C. Qualification statements

1. Names and qualifications of personnel or firm performing Work, including a minimum of 5 similar reference projects with equipment specified, and experience with cured-in-place pipe (CIPP) technology specified.

2. Current PACP certifications for CCTV operators

D. Source and field quality control submittals

1. Description of proposed procedures for removal of existing blockages in pipeline if encountered during cleaning process.

2. Description of proposed procedures and equipment for internally grinding laterals and anticipated equipment.

E. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. CCTV inspection data and video recordings in digital format on portable USB hard drive, and electronic copies for post-cleaning inspections, post-installation inspections, and Warranty Inspections.

2. CCTV inspection reports for inspected pipes with the following fields, in addition to mandatory PACP header fields.

a. Pipe segment reference number

b. Upstream and downstream manhole rim-to-invert depths

c. Pipe joint length

d. Total pipe length

e. Length surveyed

f. Still-capture photographs of significant defects

3. Single PACP certified access database containing report information and defect coding for inspected pipes.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements and as follows.

1. Firm with minimum 10 years' experience in cleaning and CCTV inspection.

2. PACP certification required for on-Site operators and individuals performing PACP coding if inspection videos are coded separately from actual recording.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

B. Notify Engineer immediately if Site conditions prevent access to manholes or pipes identified as part of Work.

PART 2 – PRODUCTS

2.01 EQUIPMENT

A. Manufacturer recommended equipment to protect manholes and pipes.

B. Cleaning

1. High velocity jet and mechanically powered equipment based on NASSCO's Jetter Code of Practice and field conditions.

2. Vactor truck or other mechanical means for removal of solid or semisolid material resulting from cleaning operation.

C. CCTV Inspection

1. CCTV equipment designed for pipe inspection, with high resolution color video and lighting to allow a clear picture with minimal reflective glare for entire periphery of pipe.

2. Equipment that displays and records the following minimum data.

a. Project identification

b. Date recorded

c. Company and personnel conducting inspection

d. Pipe identification

e. Size of pipe and material

f. Footage counter

g. Station and clock position of laterals

h. Location, severity and rate of observed infiltration or defects

3. Camera: remote controlled, color pan and tilt type lens with lighting system, capable of turning perpendicular to direction of flow and rotating 360 degrees while inside pipe, and capable of viewing minimum service connection length of 4 feet to determine whether connection is active or inactive.

D. Cutting Protruding Services

1. Protruding lateral removal equipment: remote controlled hydraulically driven cutters and reamers, and remotely operated robotic routers or grinders capable of cutting back concrete, vitrified clay, PVC and other pipe materials protruding into main line without damage to host pipe.

2.02 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 PREPARATION

A. Remove standing water to allow adequate cleaning and inspection. Provide pipe flow is no more than 1/4 full during cleaning, and bottom of pipe is visible during inspection.

B. Maintain sufficient flow to pass flash of storm flow in drainage ditches and prevent backwater flooding due to obstruction caused by cleaning and inspection equipment.

3.02 PIPE CLEANING

A. Perform pipe cleaning prior to CCTV inspection.

B. Qualified supervisory personnel must be on-Site during performance of services specified.

C. Review previous inspection logs if available, to identify areas that may require additional cleaning.

D. Consult with Engineer if damage is anticipated based on existing conditions and structural soundness of host pipe to determine if Work will be discontinued.

E. Maintain detailed documentation of cleaning efforts that will reduce hydraulic capacity of the pipe. Record type of debris removed from each segment of pipe.

F. Clean pipes to minimum 95 percent of carrying capacity of pipe diameter at point of debris, based on results of CCTV inspection. If results are unsatisfactory, repeat cleaning until acceptable to Engineer.

G. Remove debris from pipe, except for known pre-existing conditions, including debris washed up into service connections, drop connections, or bench wall of manholes that will reduce hydraulic capacity of pipe and limit future maintenance access of remote equipment.

H. Light cleaning: up to 4 passes.

I. Heavy cleaning: exceeds number of passes established for light cleaning.

J. Perform removal of protruding laterals Work without excavation from existing ground surface.

K. Cut or grind flush protruding break-in service connection to main pipe without scouring or damaging main pipe or service connection. Screen, collect, remove, and legally dispose of pipe cuttings.

L. Grinding of break-in service connections will be determined by Engineer based on initial survey CCTV inspection.

M. Repair or replace damages to service laterals or host pipe during removal with new materials to existing condition.

3.03 TELEVISION INSPECTION

A. Perform CCTV inspection in accordance with PACP standards.

B. Begin each inspection, where possible, at footage 0.0 by panning upwards to view pipe connection with manhole, with both manhole and pipe visible in the same frame.

C. Visually inspect pipe using remote CCTV and record inspection in digital format. Pause, pan, and visually inspect service connections, pipe ends, and maintenance or structural defects. Center camera in pipe to provide accurate distance measurements to locations of features in pipe. Record observations via audio commentary and on PACP log in NASSCO PACP format.

D. Move camera through pipe in either direction at a uniform rate, pausing when necessary to ensure proper identification of pipe condition. Use manual winches, power winches, TV cable and powered rewinds or other devices to move camera through pipe. Use appropriate speed to inspect each pipe joint, tee connection, structural deterioration, infiltration and inflow sources, and deposits, not to exceed 30 feet per minute.

E. If blockage hampers inspection of pipe in one direction, attempt to complete section by televising from another manhole to complete the section and report obstruction to Engineer.

F. Repeat survey if image quality is not adequate for post-inspection coding.

G. Deliver CCTV inspections, recording entire survey in electronic format with electronic links between data and video. Provide CCTV inspection reports within 2-feet of measured linear footage between manholes along existing pipe centerline from start to end of pipe. Enter Owner and PACP required header information on CCTV reports.

3.04 WATER AND WASTE MANAGEMENT

A. Discharge, bypass, or flooding of sewage, cleaning water, or debris to public or private property, including ground, surrounding residences, and downstream pipes is prohibited. Immediately clean and repair damage resulting from cleaning and inspection to satisfaction of Engineer.

3.05 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.06 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 33 01 30.61

PACKER INJECTION GROUTING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide grouting and pressure testing of sewer pipe joints, joints in laterals connected to manholes and lateral connections to sewer mains using the packer injection method, including inspection, monitoring and recording pressure in voids, in accordance with the Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 33 01 30.10 – Television Inspection and Cleaning of Sewers

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Standards

2. ASTM International (ASTM)

a. ASTM F2304 Standard Practice for Sealing of Sewers Using Chemical Grout

b. ASTM F2454 Standard Practice for Sealing Lateral Connections and lines from the mainline Sewer Systems by the Lateral Packer Method, Using Chemical Grout

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling per Division 01 General Requirements and as follows:

1. Provide 48-hour advance written notice to the Owner and Engineer prior to grouting Work.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Description of system, equipment, and materials proposed for grouting and pressure testing, including chemical grout materials and proposed additives

2. Manufacturer's recommended procedures for storing, mixing, testing and handling of chemical grouts

C. Qualification Statements

1. Qualifications of the firm/personnel performing the Work including at least 10 similar reference projects

D. Upon completion of each pipe segment, submit a report showing the following data for each joint and/or lateral connection tested, grouted or attempted to be grouted as required by PACP.

1. Identification of the sewer pipe section tested by assigned sewer ID (if available) and length.

2. Type of pipe material, diameter & depth of pipe to the surface at manholes.

3. Length of pipe sections between joints

4. Test pressure used and duration of test

5. Pass/fail results for each joint/connection tested

6. Location stationing of each joint/connection tested and location of any joints/connections not tested with an explanation for not testing

7. Volume of grout material used on each joint or connection

8. Gel set time used (cup test results from tanks)

9. Grout mix record of the batches mixed including amount of grout and catalyst, additives, temperature of the grout solution in tanks

10. Operator conducting testing and sealing shall be noted on the reports

11. Video recordings

a. Video recording shall include testing and sealing operations for each joint/lateral (including inflation and deflation over the joint/lateral) displaying the final air test of joints or laterals.

b. Additional final recording, if specified, shall include inspection of the pipe or lateral after all grouting work is complete

E. Closeout and maintenance material submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications

1. Provide that the Work specified be performed by a firm/personnel with a minimum of 10 years of experience performing the required services. Provide that supervisory personnel have a minimum of 5 years of experience in providing the required services and will be present at the Site when Work specified is performed.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Handle, mix, and store grouts in accordance with manufacturer's recommendations. Deliver to Site in unopened original manufacturer's containers.

C. Collect and legally dispose of cleaning materials used in cleaning of the grouting equipment.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

B. Notify Engineer immediately if Site conditions prevent access to manholes or pipes identified as part of the Work.

PART 2 – PRODUCTS

2.01 EQUIPMENT

A. Equipment for mainline pipe joints and laterals connected to the mainline: remote operated color television camera capable of pan and tilt, joint testing device (or "packer"), and test monitoring equipment.

1. Provide means for introducing air under pressure into void area created by expanded ends of packer against host pipe and means for continuously measuring, viewing and recording actual static pressure of test medium and grout within the void area only.

2. Packer: low void space construction with void volume provided by packer manufacturer, sized less than diameter of host pipe, with cables at either end to pull it through line and allow a restricted amount of sewage to flow at all times, and expandable by air pressure.

B. Testing device for lateral connections: inflatable mainline end elements and lateral grouting plug that creates a void area extending beyond the main connection.

1. Use a lateral grouting plug sized to match the diameter of the lateral being grouted with an effective sealing length of at least 2 feet.

2. Use alternate lateral grouting plug or equipment sized for capped lateral where the lateral is capped.

3. Use 4-inch lateral grouting plug where lateral transition is from 6 inches to 4 inches in diameter.

4. Notify Engineer if lateral plug does not launch due to physical restrictions.

C. Equipment for 4-inch and 6-inch laterals connected to manholes: flexible push-type packer and mini-push camera.

1. Testing device for lateral pipe connected to the manhole: capable of testing joints within 2 feet of lateral or to cleanout, whichever comes first from manhole toward building.

2. Diameters of push packer or grout lateral may be changed out using a 4-inch push packer if lateral contains a transition.

D. Transmit void pressure data from the void area to monitoring equipment or transmit video picture of pressure gauge mounted on the packer and connected to the void area.

E. Grouting equipment: packer and appropriate pumping and hosing systems capable of supplying uninterrupted flow of sealing materials to completely fill the voids. Size grout pumping system to deliver a mixed volume of grout at minimum 3 gpm and 30 gallons of uninterrupted flow within 10 minutes.

1. Provide capability of measuring and recording volume of mixed grout pumped for each grouted joint/connection in sewers where flows do not exceed 25 percent of pipe diameter unless permitted by the Engineer.

F. Connection and lateral service sealing: lateral grouting plugs and push packers specified above. Provide back-up bladders on Site for each packer during grouting procedures.

G. Provide equipment for cleaning lateral blockages while lateral grouting Work is being performed.

2.02 GROUT

A. Grout material characteristics: non-biodegradable and have capability to react/perform in presence of water (groundwater).

1. Increasing grout mix viscosity, density and gel strength: accomplished by increased concentration of constituents or the use of approved additives.

2. Residual grout: easily removed from sewer line to prevent blockage of sewage flow.

3. Cured grout: capable of withstanding submergence in water without degradation and chemically stable and resistant to organics found in sewage.

4. Resultant grout formation: homogeneous and able to prevent the passage of water (infiltration) through the pipe joint.

5. Acceptable level of quality: equivalent to Avanti products meeting specified performance requirements.

B. Chemical grouts: designed for injection into the soil surrounding the pipe to stabilize the soil and form a permanent impermeable seal called “grout/soil ring”, and into the annular space between liners and host pipes.

C. Water based chemical grouts: minimum of 10 percent acrylamide base material by weight in the total grout mix. Use higher concentration of acrylamide base material to increase strength or offset dilution during injection.

1. Viscosity: approximately 2 centipoise, increased with approved additives.

2. Controllable reaction (curing) time: from 10 seconds to 1 hour to produce a homogenous, chemically stable, non-biodegradable, firm, flexible gel with ability to tolerate some dilution and react in moving water during injection.

3. Acceptable level of quality: equivalent to Avanti AV-100, Avanti AV-118 or Picossa PC-100.

D. Acrylate base grouts: minimum of 10 percent acrylate base material by weight in the total grout mix.

1. Viscosity: approximately 1-3 centipoise, increased with approved additives.

2. Controllable reaction (curing) time: from 10 seconds to 1 hour to produce a homogenous, chemically stable, non-biodegradable, firm, flexible gel with ability to tolerate some dilution and react in moving water during injection.

3. Manufacturers: DeNeef AC-400, DeNeef Gelacryl SR, Avanti AV-160, or equal.

2.03 ADDITIVES

A. Additives: selected and used within manufacturer's recommended quantities based on field conditions.

B. Strengthening agents for joint grouting: latex or "diatomaceous earth" additive increase compressive and tensile strength. Quantity: as recommended by the manufacturer and approved by Engineer.

C. Add root inhibitor for joint and lateral connection joint grouting to control root re-growth. Quantity: as recommended by the manufacturer and approved by Engineer.

D. Add manufacturer approved water-soluble dye without trace metals to the grout tank(s) for visual confirmation if desired.

E. Use gel time extending agent as necessary in accordance with manufacturer's recommendations.

F. Use ethylene glycol or other approved additive in lines where the grouting material may be exposed to a freeze-thaw cycle to prevent chemical grout cracking once set.

G. Provide mechanical mixing devices in grout tanks to keep additives in suspension and maintain uniform solution of grout and additive when using non-soluble additives.

2.04 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Test monitoring: above ground and in a location to allow for simultaneous and continuous observation of televising monitor and test monitoring equipment.

3.02 CONTROL TESTS

A. Perform packer tests to demonstrate acceptable performance of air test prior to mainline joint testing.

1. Perform demonstration test in an above-ground 8 inch nominal diameter test cylinder suitable of containing full length of packer and sustaining void test pressure, to ensure accuracy, integrity and performance capabilities of the testing equipment. Equip test cylinder with void release valve to exercise controlled release of pressurized air from void area to test packer under both sound and leaking conditions and local pressure gauge (0-25 psi) within the void space.

    a. With void release valve sealed, inflate packer and air test void at 7-10 psi. Observed void pressure at the test cylinder pressure gauge: plus or minus 1.0 psi of the reading in the control center/studio void pressure gauge and follow both up and down pressure changes (allowing time for pressure equalization).

    b. If above test is passed, crack release valve to simulate a small leak. Equip cylinder with a void release valve to exercise a controlled release of test media with the associated pressure drop to be equally displayed at plus or minus 1.0 psi of the cylinder gauge and test monitoring equipment.

2. After entering each pipeline segment with the test equipment but prior to the commencement of joint testing, position packer on a section of sound sewer pipe between pipe joints and perform test as specified.

3. Provide that equipment holds a 7-10 psi test pressure for a period of 15 seconds with a pressure drop of less than 1 psi. Repair defective equipment and re-test to verify proper operation of equipment at no additional cost to Owner if test is failed. Performance testing maybe waived or modified as determined by Engineer if surface or porosity conditions of the barrel of sewer pipe cannot meet the joint test requirements.

4. Repair or modify air test equipment and repeat tests if air testing fails or cannot be performed. Air testing may be required at any time during joint testing Work if Engineer suspects testing equipment is malfunctioning.

B. Perform pump test prior to application of grout to determine if proper ratios are being pumped from grout component tanks at proper rates and to measure pump rates. Use separate containers to capture discharges from each grout component hose, to simulate actual volumes of each component through the interconnect hoses, hose reel, and length of grout hose, and confirm accuracy of grout pump totalizer. Take corrective action if ratios or rates are not within manufacturer's recommended standards.

C. Perform and record a grout gel test in Engineer's presence prior to application of grout by recording grout tank solution temperature, catalyst tank solution temperature, ambient air temperature in truck, and gel time of sample for following conditions.

1. At the beginning of each day when material in hoses is recycle to tanks

2. When new batches of grout are mixed

3. When temperature in tanks or ambient temperature has changed by more than plus or minus 10 degrees F from the previous gel test

3.03 PIPE PREPARATION

A. Clean sewer designated to receive chemical grouting in accordance with Section 33 01 30.10. Remove and legally dispose of debris and obstructions that will inhibit proper seating of packer.

B. Remove roots and loose debris from laterals connected to manholes for length of lateral to be tested/grouted.

C. During mainline sewer cleaning or joint testing, document lateral connections containing roots, mineral deposits or obstructive conditions that are greater than fine roots or of a nature to prevent testing and sealing of connection. For each such connection, submit a screenshot image clearly showing the extent of roots or obstructive condition to Engineer.

1. Submit images in electronic format, labeled and organized to allow easy retrieval of image for lateral connection in question. Provide list of lateral connections with roots including upstream and downstream manhole numbers and stationing.

2. After reviewing the list of lateral connections containing roots and obstructions, Engineer will identify which laterals are to be cleaned and grouted or grouted without cleaning. Lateral connections with obstructive conditions will be excluded from warranty testing or may be removed from the Work.

D. Perform post-cleaning video inspection in accordance with Section 33 01 30.10 and provide Owner with a copy in digital format for review prior to application of grout and a suitable log.

3.04 GROUT PREPARATION

A. Follow the manufacturer's recommendations for the mixing and safety procedures.

B. Adjust gel time as necessary to compensate for changes in temperature in grout component tanks or hoses. Do not add dilution water to extend gel times unless resulting base grout tank only material exceeds 20 percent by weight for solution grouts.

C. During the grouting process, provide that grouting technician monitors grout component tanks to ensure proper ratios are pumped. If unequal levels are noted in the tanks, repeat pump test as specified above and correct any defects.

D. Calculate gel times using the following formula unless experience or field conditions dictate otherwise. Alterations of gel time formula shall be approved by Engineer.

$$Gel\ Time = \left(\frac{Volume\ of\ Pipe / Packer\ Void\ Space\ (gal)}{Pumping\ Rate\ (gpm)} \right) \left(\frac{60\,\text{sec}}{1\,\text{min}} \right) + 20\,\text{sec}(+/-5\,\text{sec})$$

Where packer/pipe void is defined as the volume between inflated packer and inside pipe wall when packer is inflated per manufacturer recommendations. For example: an 8 inch pipe with a packer void space of 0.3 gallons and a 3 gpm pumping rate would provide:

$$Gel\ Time = \left(\frac{.3(gal)}{3(gpm)}\right)\left(\frac{60\,\text{sec}}{1\,\text{min}}\right) + (20\,\text{sec}) = 26\,\text{sec}(+/-5\,\text{sec})$$

3.05 TESTING AND GROUTING DEFECTS

A. Do not test or grout pipe with the following conditions or characteristics.

1. Longitudinally cracked, fractured or broken pipe

2. Brick pipe

3. Irregularly shaped / non-circular pipe

4. Pipe with diameters greater than 30 inches

5. Sections of pipe or joints in such poor structural condition that significant structural damage of pipe would occur as a result of pressure test as determined jointly by Engineer and Contractor

B. Owner will repair structurally undamaged joints that structurally fail (break) during testing and grouting that are documented on video to have been done under normal pressure conditions.

C. Grout circumferential cracks and fractures or other defects as specified or as directed. Do not test or grout any other pipe defects unless specified or shown or directed.

1. Owner will repair structurally failed pipe and joints that are grouted at Engineer's direction that further fail/break during testing and grouting and that are documented on video to have been done under normal pressure conditions.

D. Promptly repair other sewer damage caused by performance of Work at no additional cost to Owner.

3.06 JOINT TESTING PROCEDURE FOR MAINLINE SEWER AND LATERALS CONNECTED TO MANHOLES

A. Joint testing pressure: the higher of 5 psi or 0.5 psi per vertical foot of pipe depth plus 2 psi, not to exceed 10 psi without approval.

B. Test joints in laterals directly connected to manholes to edge of right-of-way where applicable. Test transition where transitions in the laterals connected to manholes exist. Use direct visual observation and measured cable lengths to position lateral packer for laterals directly connected to manholes.

C. Individually air test each sewer pipe joint at above-specified pressure (and retest after sealing) in accordance with the following.

1. Position packer within the pipe to straddle joint to be tested.

2. Expand packer ends to isolate joint from remainder of pipe and create a void area between packer and pipe joint. Expand ends of testing device against pipe per manufacturer's recommendations. If attempts to isolate joint fail, pump grout to seal leak around packer end elements.

3. Stop air flow when void pressure is observed to be equal to or greater than required test pressure. Test failure: if void pressure decays by more than 1.0 psi within 15 seconds. Seal joint and retest upon test failure.

D. Deflate packer with void pressure meter continuing to display void pressure upon completion of testing each individual joint. If void pressure meter fails to drop to 0.0, plus or minus 0.5 psi, clean test equipment of residual grout material and make necessary equipment repairs to provide for an accurate void pressure reading.

3.07 LATERAL CONNECTION TESTING PROCEDURE

A. Lateral connection joint testing pressure: the higher of 5 psi or 0.5 psi per vertical foot of pipe depth plus 2 psi, not to exceed 10 psi without approval.

B. Conduct lateral connection air testing by isolating area to be tested with lateral connection packer and applying positive pressure into the isolated void area. Use a pan and tilt camera to position lateral packer for laterals directly connected to mainline sewer. Invert lateral bladder from mainline assembly into lateral pipe and inflate, then inflate mainline elements to isolate lateral connection and portion of lateral to be tested. Use a sensing unit to monitor pressure of packer void and will accurately transmit a continuous readout of void pressure to control panel at grouting truck or to pressure gauge on packer and recorded by CCTV camera.

C. Apply controlled air pressure into each isolated void area. Slowly introduce air into void area until pressure equal to or greater than required test pressure, not to exceed 2 psi above the required test pressure, is observed on pressure monitoring equipment. Stop application of air pressure when designated pressure in isolated void is displayed on meter of control panel. Commence a 15-second waiting period and observe void pressure. Air test failure: if void pressure drop is greater than 2.0 psi within 15 seconds. Grout and retest connection upon test failure.

D. Deflate lateral packer with void pressure meter continuing to display void pressure after completing air test for each individual lateral specified. Adjust the equipment to provide a zero void pressure reading at the monitor if the void pressure does not drop to 0.0, plus or minus 0.5 psi.

3.08 GENERAL GROUTING

A. Grout joint and lateral connections that fail pressure test by injection method forcing grout through a system of pumps and hoses into and through joints of sewer from packer within the sewer pipe. Remove any thickness of grout that could cause a blockage given location, size and geometry (excess grout) from pipe and laterals. Flush or push forward to next downstream manhole, remove from sewer system, and legally dispose of excess grout.

3.09 PIPE JOINT SEALING BY PACKER INJECTION GROUTING FOR MAINLINE SEWERS AND LATERALS CONNECTED TO MANHOLES

A. Position mainline packer over joint or defect to be sealed with CCTV camera in the line. Position push/pull packer over joint or defect to be sealed by visual observation, marked push rod, or, through CCTV camera in lateral where a cleanout is available.

1. For push packers, start at most distant point to be grouted. Take accurate measurement of location of defect to be sealed using a portion of packer as a point of reference for positioning the injection area of packer over the defect. Pneumatically expand packer sleeves to create a seal against the inside periphery of pipe to form a void area at the joint now completely isolated from remainder of pipeline.

B. Pump grout materials in stages, if needed, into the isolated area to refusal or until void and surrounding soil is filled or solidified by applying 0.25 to 0.5 gallons of grout per inch-diameter per pipe joint.

C. Refusal:

1. when packer void pressure during grout pumping instantaneously rises or “spikes” by 4 to 5 psi or more above normal void pressure experienced during grout pumping operation or when pumping void pressure exceeds holding pressure of packer end elements as evidenced by “blow-by” past packer sealing end elements; or

2. when joint will not accept any more grout because it has flowed throughout the void, through any joint failure and into the surrounding soil, gelled or filled available void space, and formed a cohesive seal stopping further grout flow.

D. Joint is considered sealed upon refusal. Record the amount of grout pumped on sealing log.

E. Deflate packer to break away from ring of gel formed by packer void upon completion of the injection. Re-inflate packer and retest joint at a pressure equal to initial test pressure.

F. If void pressure meter fails to read 0.0, plus or minus 0.5 psi, clean test equipment of residual grout material and make necessary equipment repairs to provide for an accurate void pressure reading. Adjust equipment to provide a zero void pressure reading at the monitor.

G. If joint fails test, repeat grouting procedure at no additional cost to the Owner, except for additional grout used. Repeat sequence of air testing, grouting and subsequent air testing until joint is sealed or grout consumption to be too high as jointly determined by Engineer and Contractor.

H. If a mainline or lateral joints require more than 0.5 gallon of grout per inch-diameter per pipe joint, modify grouting procedure to perform stage grouting by pumping additional grout in maximum 4-gallon increments, waiting 1 gel set cycle time or 1 full minute, whichever is greater, between stages. Maximum number of stages: not to exceed two stages of 4 gallons each unless approved.

3.10 LATERAL CONNECTION SEALING FROM THE MAINLINE BY PACKER INJECTION GROUTING

A. Begin lateral connection sealing if lateral connection does not pass air test, shows evidence of leakage, has been successfully cleaned to remove roots, or where directed. Keep lateral packer in position during the pressure test to maintain isolated void. Pressure inject grout through lateral packer into the annular space between lateral grouting plug and lateral pipe.

B. Pump grout until mixed grout flows through joint failure, through annular space, and into surrounding soil; gelled or filled available void space; formed a cohesive seal stopping further grout flow; and minimum of 8 psi backpressure is achieved while pumping. Void pressure will slowly rise to a range of approximately 2 to 4 psi. Continue pumping until there is a sudden increase in void pressure, for example, when an increase from 2 to 4 psi to over 8 to 10 psi takes place in a few seconds.

C. Significant voids on outside of pipe or improper sealing of packer may be indicated if grout pumped exceeds 1 gallon per foot of lateral bladder plus 3 gallons. If it is so verified, reseal packer and modify grouting procedure to stage grouting. Pump additional grout at 1 gallon plus 0.25 gallon per foot of lateral bladder, waiting 1 full minute, and retesting, not exceeding 2 stages unless authorized.

D. Upon completion of the lateral connection sealing procedure, deflate lateral bladder, re-inflate and air test lateral connection a second time to confirm sealing of connection in accordance with the air testing procedure. If lateral connection fails air test, repeat grouting procedure at no additional cost to the Owner, except for additional grout used.

E. Confirm lateral flow after sealing of each lateral connection and clear lateral if grout blockage exists. Notify Owner is blockage exists not resulting from grouting.

F. If a thin residual grout film is present inside the lateral wall after grouting lateral connections with appropriate size lateral bladder, depending on the lateral bladder used, geometry of lateral, and positioning of packer, it will be considered normal and expected to eventually peel off sidewall of pipe.

3.11 JOINT SEALING VERIFICATION

A. Record grouting of joints in conjunction with testing of joints. Record void pressure drop continuously on video and in writing, immediately before sealing and immediately after grouting. Record visual inspection of joint on video after the packer is deflated and moved.

B. Use of standardized test and seal data sheets and PACP data codes is recommended.

3.12 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Post-Construction Inspection

1. Conduct post-construction CCTV inspection and documentation of pipe sections containing joint or lateral grouting in accordance with Section 33 01 30.10 after grouting is complete. This inspection is incidental to the Work.

3.13 WATER AND WASTE MANAGEMENT

A. Discharge, bypass, or flooding of sewage, cleaning water, or debris to public or private property, including ground, surrounding residences, and downstream sewer lines, is prohibited.

3.14 WARRANTY INSPECTION

A. Warranty Inspection must commence within 45 calendar days prior to expiration of the Warranty Period or within 10 days of receipt of notice from Owner to commence Warranty Inspection. Within 14 calendar days prior to expiration of the Warranty Period (351 days from Substantial Completion), perform CCTV inspection of 10 percent of rehabilitated pipes and lateral connections in accordance with Section 33 01 30.10 in the presence of the Engineer. Specific locations will be selected by Owner.

B. If abnormalities and defects are discovered after inspection of a portion of rehabilitated pipes and lateral connections, perform CCTV inspection of all rehabilitated pipes and lateral connections at no additional cost to Owner.

C. Repair and replace abnormalities and defects discovered during the Warranty Inspection as recommended by manufacturer and as specified.

3.15 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 33 01 30.72

CURED-IN-PLACE PIPE LINING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide cured-in-place pipe (CIPP) and CIPP short liners within existing, deteriorated gravity stormwater pipe in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Design Requirements

1. CIPP system design life and corrosion resistance to typical chemicals found in domestic sewage: minimum of 50 years.

2. Design as structurally sound, fully stand-alone pipe-within-a-pipe. Meet or exceed physical properties specified, fit tightly within existing pipe and within tolerances specified. Provide that installed CIPP withstands applicable surcharge loads, such as soil overburden and live loads, and external hydrostatic pressure, if present, for each specific installation location.

C. Related Requirements

1. Section 01 57 32 - Temporary Stormwater Drainage Bypass

2. Section 33 01 30.10 – Television Inspection and Cleaning of Sewers

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. ASTM International (ASTM)

a. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

b. ASTM D5813 Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

c. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

d. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

e. ASTM F2019 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled-in-Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

2. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) Standards

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Proposed manufacturers technology data for CIPP lining and products

2. Description of CIPP materials

3. Manufacturer of and description of fabric tube components, and certified information on void volume in fabric to be filled with resin

4. Flexible membrane coating material data

5. Raw resin data including manufacturer and description of product components

6. Manufacturer’s data on hydrophilic rubber gasket to be placed between host pipe and CIPP

7. Material Safety Data Sheets (MSDS) for materials used during preparation and installation of CIPP system

C. Design Data/Submittals

1. Engineering design calculations: performed according to ASTM F1216 for each length of liner installed including thickness of each proposed CIPP. Design for most severe line condition may be submitted and applied to line sections. Calculations: performed and certified by professional engineer licensed in the state where the Project is located. Submit design calculations for maximum allowable pulling force on liner tube for pulled in CIPP liners.

D. Manufacturer Instructions

1. Recommended patching procedure for flexible membrane material

2. Manufacturer's shipping, storage and handling recommendations for products and components of CIPP system

3. Manufacturer's recommended cure method for each diameter and thickness of CIPP to be installed, including curing medium and method of application

4. Blockage removal procedures

5. Description of methods and equipment proposed for repairs of uncured areas, defects, test sample section repairs or other deformities in completed liner pipe.

E. Source and Field Quality Control Submittals

1. Independent laboratory testing results of CIPP samples

F. Manufacturer Reports

1. Description of proposed wet-out procedure for proposed CIPP lining technology and example wet out report

G. Detailed plan for identifying active service connections and maintaining service during mainline installation to each building connected to section of pipe being lined, including temporary service if required

H. Proposed locations of inversion manholes

I. Flow handling and bypass pumping plan according to Section 01 57 32

J. Public notification plan including example notification to building occupants affected by CIPP installation

K. Description of odors anticipated as result of curing process and detailed odor control plan ensuring Project specific odors are minimized at Site and surrounding area.

L. Procedures and details on methods to obtain water if required for installation.

M. Qualification Statements

1. For firm and lead personnel in accordance with Article 1.06

N. Closeout and Maintenance Material Submittals per Division 01 General Requirements

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

A. Qualifications: per Division 01 General Requirements and as follows:

1. Company - minimum 5 years' continuous experience in cured in place pipe lining.

2. Lead personnel - minimum 5 years' total experience with proposed CIPP technology and have demonstrated competency and experience to perform resin wet-out, CIPP liner installation, liner curing and robotic service reconnections.

B. Certifications

1. Confined Space Entry certifications for Contractor's personnel entering pipeline or access structures.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packaging, Shipping, Handling and Unloading

1. Ship materials with test reports certifying material conforms to applicable ASTM standards specified.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

B. Notify Engineer immediately if Site conditions prevent access to manholes or pipes identified as part of Work.

PART 2 – PRODUCTS

2.01 PRELINER TUBE

A. Reinforced plastic sheet formed to fit host pipe being lined, continuous from manhole to manhole.

2.02 FABRIC TUBE

A. One or more layers of absorbent non-woven felt fabric, felt/fiberglass or fiberglass

B. Capable of absorbing and carrying resins, constructed to withstand installation pressures and curing temperatures, have sufficient strength to bridge missing pipe segments, and stretch to fit irregular pipe sections.

C. Provide wet-out fabric tube with uniform thickness and excess resin distribution to meet or exceed design thickness after cure when compressed at installation pressures.

D. Manufacture to size and length for tight fit to internal circumference of original pipe when installed, meeting or exceeding ASTM D5813, F1216, F1743 and F2019. Make allowance for circumferential stretching during installation and provide ability to stretch to fit irregular pipe sections and negotiate bends.

E. Determine minimum tube length necessary to effectively span designated runs between manholes. Verify lengths in field prior to ordering and prior to impregnation of tubes with resin to ensure tube will have sufficient length to extend entire length of run.

F. Coat outside and inside layer of fabric tube before inversion/pull-in, with impermeable, flexible membrane to contain resin and facilitate vacuum impregnation and monitoring of resin saturation during wet-out procedure.

G. Do not include material in fabric tube that causes de-lamination in cured CIPP. Dry and unsaturated layers visually evident by color contrast between tube fabric and activated resin containing colorant are not acceptable.

H. Provide light reflective wall color on interior pipe surface of CIPP, after installation, to ensure clear detailed examination with closed circuit television inspection equipment. Hue: dark enough to distinguish contrast between fully resin-saturated felt fabric and dry or resin lean areas.

I. Seams in fabric tube: according to ASTM D5813.

J. Mark outside of fabric tube every 5-feet with name of manufacturer or CIPP system, manufacturing lot, and production footage.

K. Installer shall determine minimum length of fabric tube to span distance from starting to terminating manhole or access point, plus mount required to run-in and run-out for installation process.

L. Construct nominal fabric tube wall thickness to minimum nearest 0.5-mm increment, rounded up from design thickness for that section of installed CIPP. Fabricate wall thickness transitions into fabric tube between installation entrance and exit access points in 0.5-mm increments or greater.

M. Impregnate sufficient quantity of resin to fill voids for nominal fabric thickness.

2.03 RESIN

A. Provide corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system to:

1. produce CIPP that will comply with or exceed structural and chemical resistance requirements specified;

2. meet ASTM F1216, ASTM F1743 or F2019 when properly cured within tube composite;

3. meet physical properties specified; and

4. meet properties utilized in design of CIPP.

B. Resin to tube ratio, by volume: as recommended by manufacturer.

2.04 CIPP SHORT LINERS

A. Impregnated with epoxy resin prior to insertion, forming hard, impervious, corrosion-resistant lining upon curing.

B. Materials: according to ASTM F1216.

2.05 HYDROPHILIC COMPRESSION GASKET

A. Acceptable level of quality: equivalent to Hydrotite from Greanstreak Group Inc. or Insignia from LMK Technologies.

2.06 STRUCTURAL REQUIREMENTS

A. Cured-in-place liner shall have sufficient structural strength to support loads imposed with assumption that existing pipe is fully deteriorated and cannot support any loading or contribute to structural integrity of liner.

B. Physical properties and characteristics of finished liner: varied and dependent on types and mixing proportions of materials used, and degree of cure executed. Control variables to provide that CIPP system meets or exceeds minimum properties specified.

1. Design according to ASTM F1216 and assume no bonding to original pipe wall.

2.07 MINIMUM PHYSICAL PROPERTIES

A. Meet following minimum physical properties.

Property	Test Method	Cured Composite per ASTM F1216	Cured Composite Per Design
Flexural Modulus of Elasticity (Short Term) (Felt Tubes) Felt/Fiberglass, Fiberglass as recommended by manufacturer	ASTM D790	250,000 psi	Contractor Value
Flexural Strength (Short Term) (Felt Tubes) Felt/Fiberglass, Fiberglass as recommended by manufacturer	ASTM D790	4,500 psi	Contractor Value

B. Provide required structural CIPP wall thickness based, at minimum, on physical properties of cured composite, according to design by Engineer, design equations contained in appendices of applicable ASTM standards, and design parameters below.

Design Safety Factor	2.0 (1.5 for pipes 36-inches or larger)
Creep Retention Factor	50 percent
Ovality Correction Factor	2 percent or as measured by field inspection
Modulus of Soil Reaction E	1,000 psi
Depth of Groundwater Above Pipe	At Ground Surface
Depth of Cover	Varies. As indicated on record drawings
Wheel Load	16,000-pounds
Specific Weight of Soil	120 pounds per cubic foot
Minimum Service Life	50 years
Design Temperature	80 degrees F
Shape Factor	6
Bedding Deflection Coefficient	0.103

2.08 MANUFACTURERS

A. Insituform Technologies

B. National Liner

C. Perma-Liner

D. Or equal

2.09 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 PREPARATION

A. Clean interior of existing host pipe prior to installation of CIPP liner according to Section 33 01 30.10. Remove debris and obstructions that will affect installation and long-term performance of CIPP.

B. Perform post-cleaning video inspection according to Section 33 01 30.10 and submit post-cleaning video and data in digital format within 1 week after post-cleaning and prior to installation of CIPP.

C. Review existing conditions data prior to commencement of construction, including CCTV logs provided by Town of Hudson DPW.

D. Verify lengths and pipe sizes in field prior to liner installation.

E. Verify all active storm sewer service locations to be reinstated as part of pre-CCTV inspection prior to the CIPP installation.

F. Confirm locations of branch service connections prior to installation of CIPP.

G. Provide bypass pumping according to Section 01 57 32.

3.02 INSTALLATION OF CIPP

A. Perform CIPP with minimal excavation or demolition of existing structures.

B. Commence CIPP operations at beginning of anticipated 3-day minimum period of dry weather.

C. Install and cure continuous and jointless CIPP liner from manhole to manhole or access point to access point, forming to internal circumference of host pipe when cured, according to manufacturers' specifications, applicable ASTM standards, and as specified.

D. Install pre-liner tube in presence of Engineer.

E. Provide for bypass pumping of existing mainline and service connection effluent around sections of pipe designated for CIPP installation. plug pipelines and connections and monitor regularly to prevent backup of storm flows. Do not allow plugs to remain overnight. Begin installation after required plugs or bypass system have been installed, and pumping facilities have been installed and tested under full operating conditions including bypass of mainline and side storm flows according to Section 01 57 32.

F. Insert CIPP tube through existing manhole. Equip winch with dynometer to record pulling forces during installation. Pull forces shall not exceed manufacturer's recommendations. Inversion heads for tubes that are inverted in place shall not exceed manufacturer's recommendations.

G. Circulate hot water, steam, ultraviolet light or other methods approved by Engineer to cure resin into hard, impermeable pipe after inversion/installation of tube.

H. Temperature Monitoring During Cure Cycle

1. Place remote temperature gauges or sensors inside host pipe prior to installation as recommended by manufacturer to monitor temperatures. Monitor, and log, liner and host pipe interface temperature during curing of liner.

2. Place temperature sensors between host pipe and liner in bottom of host pipe invert throughout its length to monitor temperature on outside of liner to verify correct curing.

3. Place temperature sensors at intervals recommended by CIPP liner and resin manufacturers. Place additional sensors where significant heat sinks are likely. Continuous temperature sensors and monitoring may be required, according to manufacturer's recommendations.

4. Monitor sensors by computer using database capable of recording temperatures at interface of liner and host pipe. Provide output report identifying each installed sensor station in length of pipe, maximum temperature achieved, sustained temperature time, minimum cool down temperature, and light train sensor readings for UV cured liners, documenting cure along entire length of installed liner.

I. Position wet-out tube in pipeline using method specified by manufacturer. Pull-in or invert through existing manhole or approved access point and fully extend to next designated manhole or termination point.

J. Use appropriate cure medium according to manufacturer's recommended cure schedule and method, taking into account liner wall thickness and existing ground conditions, with regards to temperature, moisture level, and thermal conductivity of soil, and applicable ASTM standards.

K. Adjust, according to manufacturer's recommendations for heat-cured liners, if temperature sensor or multiple sensors do not reach temperature specified by manufacturer to achieve proper curing or cooling. Use manufacturer's cure procedure for UV cured liners.

L. Cool CIPP according to manufacturers' recommendations. Cold water used to cure CIPP liner shall not be discharged into existing system without authorization from Engineer. Contractor is responsible for handling and properly disposing of cure-water.

M. Reinstate existing service connections after liner is cured-in-place. Reopen branch connections to buildings without excavation according to ASTM F1216.

N. Mitigate odors due to renewal operations immediately after notification from Engineer including use of forced-air ventilation.

3.03 REPAIR/RESTORATION

A. Installed CIPP: continuous over entire length of section and free from visual defects such as foreign inclusions, discoloration, dry/soft spots, pinholes, major wrinkles, bulges and de-lamination, and impervious and free of leakage from pipe to surrounding ground or from ground to inside lined pipe.

B. Repair defects that could affect structural integrity or impact continuous flow through pipeline according to manufacturers' recommendations.

C. Grout infiltration leaks identified between host pipe, service connections, and CIPP liner to remove observed infiltration as specified in Section 33 01 30.61.

3.04 INSTALLATION OF CIPP SHORT LINERS

A. Install and cure CIPP short liner in host pipe according to manufacturer's specifications and this section.

B. Taper edges of short liners at both ends.

C. Do not allow significant pipe volume change due to installation of short liners.

D. Install short liners to force excess resin into cracks, joints or other surface defects of existing interior pipe wall surface.

E. Minimum length: 3 linear feet. Extend short liner minimum of 1-foot beyond each end of defect. Do not allow end of short liner to correspond with location of joint or service connection. Location and length of short liners to be determined by Engineer based on results of CCTV investigation being performed by the Town of Hudson.

F. Reinstate existing service connections after short liner has been cured-in-place. Reopen branch connections to buildings without excavation according to ASTM F1216.

3.05 MANHOLE CONNECTIONS AND RECONNECTIONS OF EXISTING SERVICES

A. Apply hydrophilic compression gasket seal at manhole/wall interface according to CIPP system manufacturer's recommendations.

B. When hydrophilic compression gaskets are not feasible due to physical pipe or lateral properties, grout service connections or mainline CIPP ends according to Section 33 01 30.61 after existing service connections are reinstated. Ensure annular space between storm main and CIPP is fully sealed with grout.

C. Reinstate lateral service connections internally using CCTV camera and remote cutting device. Machined opening: between 95 and 100 percent of service connection opening. Bottom of both openings must match. Do not allow pipe fragments or liner fragments at edges of opening to avoid obstructing flow or snagging debris. Cut invert of storm connection flush with invert entering mainline pipe.

1. Determine exact locations of service laterals during internal inspection and re-verify with pre-construction inspection reports for accuracy. Repair holes or trial cuts in CIPP liner not in alignment with service lateral.

2. If service reinstatements result in openings greater than 100 percent of service connection opening, install CIPP type repair, sized to completely cover over-cut service connection.

D. Make reconnections of existing services after CIPP is installed, fully cured, and cooled down.

E. Collect coupons of pipe material resulting from service tap cutting at next manhole downstream of pipe rehabilitation operation prior to leaving site. Coupons may not be allowed to pass through system.

3.06 REPAIR/RESTORATION

A. Repairs: according to manufacturer's recommended written procedures and techniques for uncured areas, defects, test sample section repairs or other deformities in completed liner pipe.

3.07 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Site/Field Tests and Inspections

1. Verify physical properties of installed CIPP through field sampling by Contractor and testing by independent third party laboratory selected by Engineer. Furnish materials for testing to the Owner for testing by independent third party laboratory selected by Owner and recommended by the CIPP manufacture. Conduct sampling and testing per applicable ASTM test methods to confirm compliance with requirements specified.

2. Provide samples to Engineer for testing from installed CIPP liner, minimum 1 location per 1,000 linear feet of CIPP installed or as required by Engineer. Cut sample from section of cured CIPP that has been inverted or pulled through like diameter pipe and has been held in place by suitable heat sink, such as sandbags. Engineer will witness curing, cutting and identification of samples and transmit samples to testing laboratory.

    a. Engineer may require plate samples cured with CIPP or designate location in newly installed CIPP for Contractor to take sample from. Pipelines: minimum 18-inches in diameter. Repair opening produced from sample according to manufacturer's recommended procedures.

3. Laboratory results shall identify test sample location referenced to nearest manhole and station. Repair or replace CIPP if properties tested do not meet minimum physical and thickness requirements.

4. Chemical resistance requirements without plastic coating: according to ASTM D5813. Provide CIPP samples of fabric tube and resin used for construction or submit certification from manufacturer verifying chemical resistance of CIPP meets requirements.

5. Installed CIPP shall, at minimum, be equal to full flow capacity of original pipe before rehabilitation. When full capacity cannot be achieved after liner installation, Contractor shall submit request to waive this requirement, together with reasons for waiver request. Calculated capacities may be derived using commonly accepted roughness coefficient for existing pipe material taking into consideration its age and condition.

6. Post-Installation Inspection

   a. Immediately prior to conducting post-installation CCTV inspection, Contractor shall clean newly installed liner, removing debris and build-up that may have accumulated.

   b. Perform CCTV inspection per Section 33 01 30.10 in presence of Engineer after installation of CIPP liner and reinstatement of laterals.

   c. Submit unedited digital documentation of CCTV inspection within 10 working days of liner installation according to Section 33 01 30.10. Engineer may suspend Work if documentation is not submitted as specified above.

   d. Utilize bypass pumping or plugging from upstream structure to minimize flows from entering line during CCTV inspection. Clear pipe of standing water to provide continuous visibility during CCTV inspection.

   e. Leak free pipe is required for final approval of liner installation. Repair or remove liner where leakage is observed through wall of pipe as recommended by CIPP manufacturer.

   f. Final acceptance of rehabilitation work shall not be granted until defective areas are repaired to pipe lining manufacturers and Engineer's satisfaction.

7. Warranty Inspection

   a. Warranty inspection must commence within 45 calendar days prior to expiration of Warranty Period or within 10 days of receipt of notice from Engineer to commence warranty inspection. Perform CCTV inspection of 10 percent of rehabilitated pipes and laterals in accordance with Section 33 01 30.10 and in presence of Engineer, within 14 calendar days prior to expiration of Warranty Period, 351 days from Substantial Completion. Specific locations will be selected for warranty inspections by Engineer and will include all sizes of CIPP in Project.

   b. Perform CCTV inspection of entire CIPP system during Warranty Period if abnormalities or defects are discovered by Engineer after primary warranty inspection.

   c. Repair and replace abnormalities and defects discovered during warranty inspection as recommended by manufacturer or requested by Engineer, and as specified.

3.08 STARTUP AND COMMISSIONING

A. Provide in accordance with Division 01 General Requirements.

3.09 CLEANING

A. Do not discharge bypass or flood flows to public or private property, including ground, surrounding residences, and downstream structures of waters. Immediately clean and repair damage resulting from cleaning and inspection activities to satisfaction of Engineer.

B. Collect cleaning water, solids and debris generated from pipe cleaning and discharge off-Site to appropriate waste facilities. Do not discharge cleaning water and solids to public or private property.

C. Promptly remove and legally dispose of damaged materials, including but not limited to, items with gouging, abrasion, flattening, cutting, puncturing, or ultra-violet degradation.

3.10 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

3.11 ATTACHMENTS

A. Cured-In-Place Pipe Lining Installation & Service Lateral Reinstatement Form

END OF SECTION

ATTACHMENT A - CURED-IN-PLACE PIPE LINING
INSTALLATION & SERVICE LATERAL REINSTATEMENT FORM

Project Name:			
Project No.:			
Woodard & Curran Representative:		Signature:	
Lining Contractor:			
Lining Contractor Foreman:		Signature:	
Upstream Manhole:	Downstream Manhole:		Length:
Date of Install:		Weather:	
Time Onsite:		Uncured Liner Installed:	
Required Cure Time:			
Cure Started:		Cure Finished:	

Service Connection	Pre-CCTV Station	To Be Reinstated (Y/N?)	Post-CCTV Station

Service Connection	Pre-CCTV Station	To Be Reinstated (Y/N?)	Post-CCTV Station

ATTACHMENT A - CURED-IN-PLACE PIPE LINING INSTALLATION & SERVICE LATERAL REINSTATEMENT FORM

Service Connection	Pre-CCTV Station	To Be Reinstated (Y/N?)	Post-CCTV Station

Service Connection	Pre-CCTV Station	To Be Reinstated (Y/N?)	Post-CCTV Station

Comments:

SECTION 33 42 13

STORMWATER CULVERTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide culverts and headwalls in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 03 41 26 – Precast Concrete Structures

2. Section 33 49 00 – Storm Drainage Structures

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)

a. AASHTO Standard Specifications for Highway Bridges

b. AASHTO M81 Standard Specification for Cutback Asphalt (Rapid-Curing Type)

c. AASHTO M82 Standard Specification for Cutback Asphalt (Medium-Curing Type)

d. AASHTO M140 Emulsified Asphalt Analysis

e. AASHTO M 220 Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

2. American Concrete Institute (ACI)

a. ACI 350 Code Requirements for Environmental Engineering Concrete Structures

3. ASTM International (ASTM)

   a. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

   b. ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars

   c. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

   d. ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete

   e. ASTM C990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

   f. ASTM C1582 Standard Specification for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete

   g. ASTM D1187 Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal

4. MassDOT.

   a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

   b. LRFD Bridge Manual Part I and II

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Shop Drawings for Precast Concrete Structure, including construction details, dimensions, reinforcement, rebar placement, openings, wing walls/head walls, anchoring, etc. Drawings to show critical field dimensions identified by the manufacturer. Drawings to show locations and sizes of penetrations and related appurtenances.

2. Product Data: manufacturers' product data and installation instructions for water quality unit, frames, covers, grates, precast items, riser bricks, grade rings, manhole sleeves, joint sealants, damp proofing, and appurtenances.

3. Manufacturer Instructions

C. Design Data/Submittals

1. Manufacturer’s anti-floatation calculations for each structure, signed and stamped by a licensed engineer in the state of Massachusetts based on the following criteria:

a. Groundwater elevation shall be set at grade or base flood elevation above the structure, whichever is higher.

b. Factor of safety shall be 1.1; downward forces from the weight of the pipe and soils over pipe shall be 1.1 times the buoyant uplift forces.

c. The structure shall be considered empty. Calculations may not consider the weight of internal water

D. Qualification Statements

E. Source and Field Quality Control Submittals

1. Test results

2. Manufacturer concrete compression test results for 28-day strength

3. Record as-built structure information neatly in a permanently bound notebook. Provide Engineer access to records. Submit copies to Engineer on a weekly basis

F. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. Location and headwall elevations

2. Locations and invert elevations

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Provide manufacturers' certificate of conformance with each shipment of precast concrete headwalls and culverts.

2. Inspect shipment upon delivery and reject structures that do not conform to specified requirements or have been damaged beyond repair. Immediately remove from Site.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide in accordance with MassDOT Standard Specifications for Highways and Bridges Subsection 230 and as specified.

B. Culvert design: in accordance with AASHTO HL-93 live loading and MassDOT LRFD Bridge Manual Part I and II. Design sections to accommodate AASHTO HL-93 live loading in addition to utility loads and soil loading at Site location.

C. Design and fabricate units to withstand handling stresses without damage, and support loads imposed by Work of other trades which might affect construction.

2.02 MATERIALS

A. Precast Concrete

1. Culvert and Headwalls: per Section 03 41 26.

2.03 FABRICATION

A. Placement of reinforcement: 2-inch minimum clear cover of concrete over reinforcement. Assemble reinforcement using any combination of single or multiple layers of welded-wire fabric or deformed billet steel bars. Use non-coated reinforcement tie wires.

B. Monolithically cast each culvert section as a 4-sided box section with open ends, with metal or metal faced forms. Inside surfaces of culvert: smooth with 45 degree chamfered fillets monolithically cast in 4 inside corners.

C. Recess hardware into wall on inside surface of culvert and grout over after assembly to maintain a smooth, unbroken inside wall surface.

D. Provide a suitable number of reinforced lifting fixtures designed by manufacturer for 100 percent impact loading, and sufficiently ductile to ensure obvious deformation before failure to ensure safe and level handling and prevent damage.

E. Glue preformed joint filler to concrete surface with adhesive in accordance with manufacturer's recommendations and AASHTO M 220 where required.

F. Factory cure units by suitable heating moisture or steam curing until required strength for release or handling is obtained. Do not expose surfaces to direct sunlight or direct wind during curing.

G. Grout areas shown on Drawings with non-shrinking, nonmetallic grout. Clean and roughen concrete surface and keep continuously moist for 24 hours immediately prior to application to prevent flash setting. Keep moist for 7 days.

1. Mix and place grout in accordance with manufacturer’s instructions and conform to ACI minimum and maximum temperature requirements while placing grout. Remove excess grout around hole after placement to provide smooth surface.

2. Fill voids between opening in precast box culvert section and fastening systems for curtain walls and copings.

H. Bituminous Damp Proofing

1. Two coats of factory applied, UV resistant, black bituminous damp-proofing using AASHTO M81 or M82 cutback asphalt or AASHTO M140 asphalt emulsion at 5 gallons per 100 square feet minimum per coat.

2. Provide 2-coat bituminous damp-proofing, water sealing system for precast structures in accordance with ASTM D1187, designed for use both above and below grade.

I. Coat concrete with approved waterproofing.

1. Provide joints with polyolefin backed exterior joint.

2. Provide holes or inserts for lifting hardware and recessed inserts for attachments of assembly pulling irons.

J. Concrete masonry for precast culvert: in accordance with MassDOT Section 901.

1. Minimum 28-day compressive strength: 5,000 psi.

2. Maximum nominal aggregate size: 3/4-inch.

3. Use corrosion inhibiting admixtures conforming to ASTM C1582 and air entraining admixtures conforming to ASTM C260 to achieve air content between 4.5 to 7.5 percent.

4. Furnish and install dowel coupler bar splicers, inserts, lifting hardware, and other items incidental to furnishing and placing of concrete.

K. Patch imperfections at plant only before shipping unit, with Owner and Engineer approval.

1. Patches: same material used in unit being patched and 2-part epoxy compound to produce proper bonding of patch to unit.

L. Factory mark each precast concrete unit per marking and identifying procedure designated on approved Shop Drawings and setting plans.

2.04 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL

A. Perform Work in accordance with manufacturer's instructions and recommendations.

B. Coordinate with manufacturer's field representatives. Obtain written affidavit from manufacturer that installation means and methods were according to manufacturer's instructions, witnessed and approved.

C. Do not use cracked, warped, or broken units, or units with defects that might adversely affect serviceability of units. Remove and replace defective units.

3.02 INSTALLATION

A. Use lifting devices designed by manufacturer for 100 percent impact loading and sufficiently ductile to ensure obvious deformation before failure.

B. Services of Manufacturer's Field Service Representative

1. Supply anchoring and fastening devices.

2. Supply specific lifting devices for each unit on a temporary basis if required.

3. Oversee installation, verify supplied units are installed in accordance with manufacturer's instructions to prevent overstressing, marring or damaging units.

4. Perform patching required due to damage during delivery if approved by Owner.

C. Make joints between precast sections and units using method to guarantee a leak-proof, watertight joint. Do not use joint designs incorporating O-rings and cement grout.

1. Provide joint filler as required and install joint sealant on interior and exterior sides of joints. Cover joints between units with preformed sheet membrane in accordance with MassDOT M9.08.0.

D. Protect precast culverts against flotation or uplift during construction.

3.03 PATCHING

A. Use patches of same material used in unit being patched and 2-part epoxy compound to produce proper bonding of patch to unit where patching is permitted.

3.04 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.05 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 33 42 20

STORMWATER UTILITY DRAINAGE PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide storm drain systems in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)

   a. AASHTO M 170 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

   b. AASHTO M 294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

2. ASTM International (ASTM)

   a. ASTM C76 Reinforced Concrete Culvert, Storm Drain

   b. ASTM C361 Standard Specification for Reinforced Concrete Low-Head Pressure Pipe

   c. ASTM C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

   d. ASTM C1173 Standard Specification for Flexible Transition Couplings for Underground Piping Systems

   e. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics

   f. ASTM D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

g. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

h. ASTM D6226 Standard Test Method for Open Cell Content of Rigid Cellular Plastics

i. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

j. ASTM F2306 Standard Specification for 300 mm to 1500 mm [12 in. to 60 in.] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Non-Pressure Gravity-Flow Storm Sewer and Subsurface Drainage Applications

3. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Manufacturer’s data

C. Certificates

1. Manufacturer's notarized certificate certifying conformance with the Specifications to accompany shipments

D. Design Data

1. Manufacturer’s anti-floatation calculations for each pipe material and details, signed and stamped by a licensed professional engineer licensed in the state where Project is located based on the following criteria.

a. Set groundwater elevation at grade above pipe.

b. Factor of safety: 1.15. Downward forces from weight of the pipe and soils over pipe: 1.15 times the buoyant uplift forces.

c. Consider pipe empty. Do not consider weight of internal water in calculations.

E. Manufacturer Instructions

1. Manufacturer's recommendations for storage, protection, handling, and installation of the pipe, fittings, and appurtenances

F. Source and Field Quality Control Submittals

1. Test results, inspection video on DVD, and logs from inspection and testing

G. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. Video recordings of post-construction inspections.

2. Record depths and take ties to locations for Conformed to Construction Record Drawings.

a. Pipe stub capped ends

b. Locations of plugged pipes

c. Manholes and catch basins

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Inspect upon delivery and reject pipe immediately that does not conform to specified requirements or has been damaged beyond repair and immediately remove from Site.

C. Waste Management and Disposal

1. Remove damaged pipe from Site and legally dispose of.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide in accordance with MassDOT Section 230 as specified.

B. Provide fittings of same type and class of materials as pipe with single piece gasket, unless otherwise specified.

C. Minimum pipe stiffness at 5 percent deflection: 46 psi for all sizes when tested in accordance with ASTM D2412.

2.02 REINFORCED CONCRETE CULVERT PIPE, CLASS III

A. Reinforced-concrete pipe shall have an interior surface which is free from roughness, projections, indentations, offsets, or irregularities of any kind. The pipe units shall be of the classes indicated on the drawings and shall confirm to ASTM C-76 Standard Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

B. Pipe Joints: Pipe joint shall be of the rubber gasket type which the gaskets are in compression and which will permit both longitudinal and angular movement. Each unit of pipe shall be provided with proper ends made of concrete formed true to size and formed on machined rings to ensure accurate joint surface. Joints and gaskets shall be O-ring or ribbed gasket type and shall conform to the requirements of ASTM C-442 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets, or ASTM C-361 Reinforced Concrete Low-Head Pressure Pipe.

2.03 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Smooth interior corrugated polyethylene pipe in accordance with ASTM F2306.

B. Provide pipe fittings in accordance with ASTM F2306. Bell and spigot connections shall utilize inline gaskets meeting the watertight joint performance requirements of ASTM D3212.

1. To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F1417 or ASTM F2487.

C. Join pipe using a bell & spigot joint meeting ASTM F2306 requirements. The joint to be watertight according to ASTM D3212 requirements. Gaskets to meet ASTM F477 requirements. Gaskets to be installed by pipe manufacturer and covered with a removable, protective wrap to ensure gasket is free from debris. Use a joint lubricant available from the manufacturer on the gasket and bell during assembly. 12-inch through 60-inch diameter to have an exterior bell wrap installed by the manufacturer

2.04 FLEXIBLE COUPLINGS

A. Pipe to Pipe Connection Flexible Couplings: ASTM C1173.

1. Type A: non-pressure application, elastomeric sleeve or rubber sleeve incorporating stainless steel tension bands and a tightening mechanism to provide a positive seal against both infiltration and exfiltration. Stainless steel bands: 300 series stainless steel. Coupling: resilient and unaffected by soil conditions, resistant to chemicals, ultraviolet rays, and fungus growth.

2.05 MANHOLE CONNECTIONS

A. New Manholes: compression type flexible connector cast into the manhole wall or flexible boot connection per pipe manufacturer recommendations.

B. Existing Manholes: by coring and installing a boot type flexible connector.

2.06 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements. Comply with applicable reference standards listed in Article 1.03.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Lay pipe to line and grades shown on Drawings. Line and grade may be adjusted by Engineer to meet field conditions.

B. Install in accordance with manufacturer's recommendations. Do not install unsound or damaged pipe or accessories.

C. When each pipe has been properly bedded, place and compact enough of the backfill material between the pipe and the sides of the trench to hold the pipe in correct alignment.

D. Maintain flows during Work per Division 01 General Requirements.

E. Immediately lay pipe as soon as excavation is completed and the bedding material has been brought to the proper grade.

1. Insert circular rubber gasket in the gasket seat provided and apply a thin film of gasket lubricant to the inside surface of the gasket.

2. Clean spigot end of the pipe and enter into the rubber gasket in the bell, using care to keep the joint from contacting the ground.

3. Complete joint shall then be completed by forcing the plain end to the seat of the bell. Pipe which is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joint.

F. Do not lay pipe in water or when trench conditions or weather are unsuitable for such Work, except as approved by Engineer. Do not use installed pipe to remove water from Work area.

G. Make joints per pipe manufacturers' recommendations.

H. Flush pipes and remove debris per method approved by Engineer.

I. Pipe Cutting

1. Cut end of pipe square to the axis of the pipe, grind any rough edges smooth, and bevel per manufacturer's recommendations where being used for push-on joints.

J. HDPE Installation

1. Bedding and burial of pipe and fittings: ASTM D2321 and the manufacturer's recommended installation guidelines.

2. Minimum cover in traffic areas: 1 foot for 12- through 48-inch diameters; 2 feet for 60-inch diameter.

K. Reinforced Concrete Pipe Installation

1. Inspect interior of each pipe while being joined to see that the alignment is preserved and to ensure that no dirt or debris has entered the pipe after laying and partial backfilling.

2. Carefully lower pipe fittings and accessories lowered into the trench, piece by piece, by means of derrick, crane, slings and other suitable tools and equipment, in a manner such as to prevent damage to the material. Do not pass chains or slings through the inside bore of any pipe. Do not drop piping materials or dump into trench.

3.02 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements. Comply with applicable reference standards listed in Article 1.03.

B. Subject pipe to thorough inspection and tests in accordance with the methods prescribed by, and acceptance or rejections be based on, ASTM C76 Reinforced Concrete Culvert, Storm Drain, ASTM C443 Joints for Circular Concrete sewer and Culvert Pipe, Using Rubber Gaskets, Designation, and ASTM C361 Reinforced Concrete Low-Head Pressure Pipe, Designations specifications. Pipes may be rejected at Site if non-conforming or damaged regardless of prior factory acceptance.

3.03 CLEANING

A. Clean and flush piping after Work is completed and before final acceptance.

3.04 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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SECTION 33 49 00

STORMWATER STRUCTURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide storm drainage catch basins, manholes, inverts, brickwork, damp proofing, castings, and specialties in accordance with this Section and applicable reference standards listed in Article 1.03.

2. Related Requirements

a. Section 31 00 00 – Earthwork

b. Section 33 41 00 – Storm Utility Drainage Piping

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Association of State Highway Transportation Officials (AASHTO)

a. AASHTO M 81 – Standard Specification for Cutback Asphalt (Rapid-Curing Type)

b. AASHTO M 82 – Specification for Cutback Asphalt (Medium-Curing Type)

c. AASHTO M 140 – Standard Specification for Emulsified Asphalt

2. ASTM International (ASTM)

a. ASTM A48 Standard Specification for Gray Iron Castings

b. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

c. ASTM C139 Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes

d. ASTM C144 Standard Specification for Aggregate for Masonry Mortar

e. ASTM C150 Standard Specification for Portland Cement

f. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes

g. ASTM C270 Standard Specification for Mortar for Unit Masonry

h. ASTM C478 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

i. ASTM C923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

j. ASTM C990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

k. ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

l. ASTM D4101 Standard Specification for Polypropylene Injection and Extrusion Materials

3. MassDOT

a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Shop Drawings for each precast manhole, catch basin, water quality unit, and precast concrete items. Show components to be used, elevations of top of precast sections, base, intermediate levels and pipe inverts, location of pipe penetrations, cutouts and steps for each manhole. Verify finish grade elevation for each manhole location in the field.

2. Product Data: manufacturers' product data and installation instructions for water quality unit, frames, covers, grates, precast items, riser bricks, grade rings, manhole sleeves, joint sealants, damp proofing, and appurtenances.

3. Manufacturer Instructions

C. Design Data/Submittals

1. Manufacturer’s anti-floatation calculations for each structure, signed and stamped by a licensed professional engineer in the state where the Project is located based on the following criteria:

a. Groundwater elevation shall be set at grade or base flood elevation above the structure, whichever is higher.

b. Factor of safety shall be 1.15; downward forces from the weight of the pipe and soils over pipe shall be 1.15 times the buoyant uplift forces.

c. The structure shall be considered empty. Calculations may not consider the weight of internal water.

D. Qualification Statements

E. Source and Field Quality Control Submittals

1. Leakage test reports for each structure

2. Record as-built structure information neatly in a permanently bound notebook. Provide Engineer access to records. Submit copies to Engineer on a weekly basis.

F. Closeout and maintenance material submittals: per Division 01 General Requirements.

1. Location and rim elevations of precast concrete structures

2. Locations and invert elevations of pipe penetrations

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements and as follows for structure design.

1. Licensed engineer in the state where the Project is located, with 5 years’ minimum experience in design of similar structures.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Inspect structure sections upon delivery. Structure sections that do not conform to Specification requirements will be rejected and immediately removed from the Site.

2. Handle and place concrete units in accordance with manufacturer's written rigging instructions.

3. Provide slings, straps, and other devices for handling and support of manhole and catch basin sections during lifting, installing, and final positioning using lifting holes.

1.08 SITE CONDITIONS

A. Existing conditions: per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 ANTI-FLOTATION DESIGN

A. Provide precast structures with anti-flotation slabs and provide precast structures requiring anti-flotation slabs as 1 complete unit.

B. Structure Criteria

1. Factor of safety: minimum 1.15 against buoyancy with assumed flood elevation at top of structure. Do not include frictional resistance in calculation.

2. Weight of segments: same factor of safety for buoyancy (1.15), or include stainless steel mechanical connections to connect segments together where structure is composed of successive vertical segments.

3. Include positive anchorage to reinforced concrete anti-buoyancy slab of required size.

2.02 CASTINGS

A. Cast iron: in accordance with ASTM A48 Class 30.

B. Manufacturers

1. EJ Co.

2. U.S. Foundry

3. Neenah

4. Or equal

C. Storm Drain Manhole Frames and Covers

1. Acceptable level of quality: equivalent to EJ Iron, Inc. Model 00200627 cover and Model 00200811 frame.

2. Manhole cover: 30 inches in diameter labeled DRAIN in 3-inch high raised letters.

D. Catch basin frames and grates: heavy duty, bicycle safe, cascading type frame and grate. Acceptable level of quality: equivalent to Neenah Foundry products meeting specified performance requirements and sizing shown on Drawings.

E. Catch basin hood / oil and grease trap: R-3704 with vent holes, cast iron, and mounted in accordance with manufacturer specifications. Acceptable level of quality: equivalent to Neenah Foundry products.

2.03 CATCH BASINS AND DRAIN MANHOLES

A. Precast structures ASTM C478 and as shown on Drawings, capable of supporting H-20 and HL-93 loading.

B. Provide in accordance with MassDOT Section 201 and Construction Details.

C. Catch basins and manholes to be constructed of pre-cast reinforced concrete sections unless directed otherwise by Engineer.

1. Include crystalline waterproofing additive in concrete prior to casting of riser section.

2. The wall sections for 4-foot diameter manholes shall be not less than five inches thick. The wall sections for 5-foot and greater diameter manholes shall be not less than six inches thick.

3. Cone sections: precast sections of similar manufacture of varying heights to meet construction conditions.

4. Cast openings for pipes and materials to be embedded in the walls of the structures during manufacture.

5. Lift holes: maximum 2 cast or drilled in any section, with suitable rubber or concrete stopper or other approved device for plugging holes.

6. Clearly mark date of manufacture and name or trademark of manufacturer on inside of riser structure.

7. Precast Bases and Top Slabs: same construction as precast riser sections of dimensions shown on Drawings

8. Precast concrete base and first riser: monolithic.

9. Anti-floatation slab: ASTM C139 precast monolithic base unit or cast-in-place, based on manufacturer's recommendation and as approved.

10. Acceptance of the sections will be on the basis of material tests and inspection of the completed product.

D. Precast bases and top slabs: same construction as precast riser sections (define) of dimensions shown on Drawings.

1. Anti-floatation slab: ASTM C139 precast monolithic base unit or cast-in-place, based on manufacturer's recommendation and as approved.

2. Precast concrete bases and top slabs shall be of the same construction as the precast riser sections.

3. Precast concrete base and first riser shall be monolithic.

E. Joints between precast sections: watertight, shiplap-type seal with and all weather performed joint sealant made of butyl rubber material in flexible rope form. It shall meet or exceed requirements of AASHTO M 198 and ASTM C990 section 6.2.1, Butyl rubber sealants.

1. Exterior joints between precast sections and lift holes shall be grouted with waterproof cement or other approved product prior to backfill or completion of the manhole if above grade

F. Steps: manhole sections shall contain manhole steps accurately positioned and embedded in the concrete. The steps shall be manufactured from deformed 1/2-inch steel reinforcement rod complying with ASTM A615 and encased in polypropylene per ASTM D4101. Include pattern design to prevent lateral slippage off step. 12-inches on center with minimum width of 16-inches and 7-inches from wall for full height of manhole.

G. Factory applied coating: UV resistant, black bituminous damp proofing, AASHTO M81 or M82 cutback asphalt, or AASHTO M140 asphalt emulsion. Coat exterior surface of precast manhole, catch basin bases and walls at 5 gallons per 100 square feet minimum per coat.

2.04 PIPE CONNECTIONS (MANHOLES AND CATCH BASINS)

A. Compression type connector to be the sole element relied on to assure a flexible watertight seal of the pipe to the structure. The connector to consist of a single rubber gasket, be constructed solely of synthetic or natural rubber, and meet or exceed the requirements of ASTM C923.

B. Boot type connector: watertight and consist of a rubber gasket or boot, metal expansion ring and double metal take-up clamps. Rubber boots and gasket material shall meet or exceed ASTM C923.

2.05 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements

PART 3 – EXECUTION

3.01 INSTALLATION

A. Provide in accordance with MassDOT Sections 201 and 220 and the Drawings

B. Placement: set catch basin and manhole frames to finished lines and grades as specified. Set castings in bituminous concrete collars and underlay with cement concrete. Collars: minimum 9 inches deep and extend to radius of 1-foot beyond circumference of frame, as shown on Drawings.

1. Place so bottom of structure is plumb and pipe inverts are at proper elevations. Position tops of structures flush with finished grade.

2. Locate each structure and set accurate templates to required line and grade as shown on Drawings. Remove structures incorrectly and improperly located, oriented or aligned, and rebuild.

3. Establish sufficient length of proposed curb or edge of pavement adjacent to structure prior to construction of drain inlet and catch basin to ensure structure is correctly located and oriented.

4. Place foundation course on firm soil of uniform bearing. If soil below foundation course is classified as unsuitable, remove and replace with crushed stone as specified in Section 31 00 00.

5. Seal joints between precast sections with all-weather joint sealant as specified prior to backfill or completion of manhole, if above grade.

C. Touch up damp proofing in field prior to backfilling as required by Engineer.

D. Adjust existing drainage structures as specified in Drawings or as directed by Engineer. Refill excavated area with gravel and set casting into concrete collar. Engineer will determine new elevation of structure.

E. Remodeling: as specified in Drawings or as directed.

1. Provide remodeling of cone of structure where line or grade requires a change greater than 6 inches at existing drainage structures or where noted on Drawings.

2. Refill excavated area with gravel and set casting into concrete collar and overlay with 3-inch thick bituminous concrete top course when structures are in roadway. Engineer will determine new elevation of structure.

F. Existing frames and grates belonging to the Town and not needed for the Work: transported and carefully stacked at the Town DPW Yard or otherwise disposed of as directed by Engineer at no additional cost to Owner.

G. Frames and Covers

1. Set to final grade 1/2-inch below pavement grade as shown on Drawings. Provide adequate temporary covers to prevent accidental entry until final placement of frame and cover.

2. Use 2 rings of 1-inch diameter butyl rubber sealant between frame and chimney joints. Provide downward force to frame to compress joint, provide a watertight seal and prevent future settlement. Point compressed joint with butyl rubber caulk sealant.

3. Set manhole frames and covers to final grade only after pavement base course has been applied.

H. Seal drain pipe connections to catch basin/manhole structures with mortar in accordance with MassDOT M4.02.15.

I. Inverts: as indicated on Drawings.

J. Replace steps out of plumb and not to correct horizontal placement.

K. Use material removed from excavation for manholes that remain after backfilling finished structure wherever possible within location. Remove and legally dispose of material if not needed or unsuitable.

L. Backfill structures with controlled density fill as specified in Section 31 00 00 when installed with less than 18 inches of horizontal clearance from adjacent structures and pipe as directed.

M. Do not pave over any utility appurtenances or structures unless specifically directed.

N. Remove and replace defective castings with new castings as directed. Repair or replace damaged castings.

3.02 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

B. Do not pave over any of the utility appurtenances or structures unless specifically directed otherwise by Town of Hudson DPW or Engineer.

C. If a defective casting is encountered, remove it as directed by the Engineer and install a new casting. Repair or replace castings damaged by Contractor at no additional cost to Owner.

3.03 CLEANING

A. Use remaining material removed after excavation wherever possible. Remove and legally dispose of unused or unsuitable material at no additional cost to Owner.

B. Clean and flush precast structures after Work is completed and before Final Acceptance.

3.04 LEAKAGE TESTING

A. Tests to be observed by Engineer. Manholes must be complete for final test acceptance except for shelf and invert brickwork. Plug pipes and other openings in the structure walls prior to test. Test precast concrete manholes soon as they are installed, and before backfilling, to demonstrate that the work conforms to these Specifications.

B. Vacuum Tests for Manholes

1. After manhole has been constructed, and before manhole is backfilled, the Contractor shall conduct a Manhole Acceptance Test using the vacuum test procedure in ASTM C1244 except as modified.

    a. Make pipe connections prior to testing. Plug pipes and other openings in structure walls with an approved non-shrink grout prior to test.

2. Place the test head at inside of top section and inflate seal in accordance with manufacturer's recommendations.

3. Draw a vacuum of 10 inches of mercury and shut off the vacuum pump. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole, regardless of diameter, shall pass if the time is greater than:

    a. 2 min. for 0-feet to 10-feet deep manholes

    b. 2.5 min. for 10-feet to 15-feet deep manholes

    c. 3 min. for 15-feet to 25-feet deep manholes

4. If the vacuum drops in excess of the prescribed rate, the Contractor shall locate the leak, make proper repairs, and retest the manhole.

5. If the unit fails the test after repair, the unit shall be water exfiltration tested.

C. Exfiltration Test

1. Plug pipes into and out of manhole and secure plugs.

2. Lower groundwater table (GWT) to below manhole. Maintain GWT at this level throughout the test. Provide means of determining GWT level at any time throughout the test.

3. Fill manhole with water to bottom of flat slab.

4. Allow period of time for absorption (determined by Contractor).

5. Refill to bottom of flat slab.

6. Determine volume of leakage in minimum 8-hour test period and calculate rate.

7. Acceptable leakage rate: not more than 1 gallon per vertical foot of manhole section per 24 hours.

8. Grounds for rejection: any manhole with exfiltration rate exceeding 3 gallons per vertical foot per 24 hours.

9. If not satisfied with the exfiltration test, the Engineer reserves the right to require an infiltration test.

3.05 REPAIRS

A. Determine causes of leaks and repair them. Engineer shall reject any manhole with an exfiltration rate exceeding 3 gallons per vertical foot per 24-hours. If exfiltration is less than 3 gallons per vertical foot per 24-hours but more than 1 gallon per vertical foot per 24-hours, repairs may be made by approved methods as directed by the Engineer to bring the leakage within the allowable rate of one gallon per vertical foot per 24-hours. If repairs fail to reduce the leakage rate to less than one gallon per vertical foot per 24-hours after exfiltration test repairs, Engineer shall reject the manhole.

B. Perform repairs using methods and materials approved by Engineer. Remove and replace or reconstruct if necessary. Remove and replace defective sections if required.

3.06 INSPECTION

A. Make manhole accessible for inspection by Engineer prior to backfilling. Failure to notify the Engineer prior to backfilling may result in rejection of payment.

3.07 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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Woodard & Curran

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