



Town of Bedford

Department of Public Works

314 Great Road
Bedford, MA 01730

BIDDING DOCUMENTS FOR

RICHARD ROAD CULVERT REPLACEMENT PROJECT

BEDFORD, MASSACHUSETTS

This Bid to Be Opened and Read:

July 16, 2024 at 10:00 a.m.

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SECTION 00 11 16

INVITATION TO BID

Sealed Bids for the Richard Road Culvert Replacement Project will be received by the Select Board of the Town of Bedford (herein after, "Owner") at the office of the Department of Public Works, 314 Great Road, Bedford, Massachusetts 01730 until **Tuesday, July 16, 2024 at 10:00 a.m.** (prevailing time), and at that time and place will be publicly opened and read aloud. The clock in the conference room of the Department of Public Works shall be considered official. No faxed or emailed Bids shall be accepted. No conditional Bids shall be accepted. No late Bids shall be accepted.

The Project includes the removal and replacement of culverts and associated headwalls; replacement of storm drain infrastructure; replacement of sewer main and reconnection of sewer services; site restoration; and all materials and equipment, construction, and services inherent to the Work.

Bidding Documents may be examined and/or obtained beginning June 19, 2024 by registering online to download Bid documents at <https://www.bedfordma.gov/Bids.aspx>. Click to select the appropriate Bid. Please note that Bidders requesting Documents must register with valid information. Company name, address and contact information (phone and email) are required in the registration form. Please note that it is the Bidder's responsibility to make certain they have received any/all addenda relating to their Bid prior to the Bid deadline.

Bidders requesting Bidding Documents by mail shall send a non-refundable check payable to the Town of Bedford in the amount of \$20.00 per set to cover costs of handling and mailing.

PRE-BID CONFERENCE

A non-mandatory pre-Bid conference will be held on Monday, July 8, 2024 at 1:00 p.m. at the Town of Bedford Department of Public Works 2nd Floor Conference Room, 314 Great Road, Bedford, MA 01730.

Bidders are encouraged to attend and participate in the conference.

BID SUBMISSION

Each Bid shall be submitted in accordance with the Instructions to Bidders and be accompanied by a Bid Security in the amount of 5% percent of the Total Bid in the form of a Bid bond, or cash, or a certified check, or a treasurer's or cashier's check issued by, a responsible bank or trust company, payable to Owner. The Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid.

The Bid Security of the 3 lowest responsible and eligible Bidders will be returned upon the execution of the Agreement, if no award is made, upon the expiration of the time prescribed herein for making an award; except that, if any Bidder fails to perform its agreement to execute a Contract and furnish a Performance Bond and a Payment Bond if required, its Bid Security shall become and be the property of Owner, as liquidated damages; provided that the amount of the Bid Security

which becomes the property of Owner will not, in any event, exceed the difference between its Bid price and the Bid price of the next lowest responsible and eligible Bidder; and provided further that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other similar unforeseen circumstances affecting a Bidder, its Bid Security will be returned to it. The Bid Securities of Bidders other than the 3 lowest responsible and eligible Bidders will be returned following award of the Contract by Owner. Owner will not reimburse Bidders for any costs incurred in preparing Bids in response to this Invitation to Bid.

Submission of a Bid shall be conclusive evidence that the Bidder has examined the Bidding Documents and is familiar with all the conditions of the Contract. Upon finding any omissions or discrepancy in the Bidding Documents, each Bidder shall notify Owner immediately so that any necessary addenda may be issued. Failure of a Bidder to investigate completely Bidding Documents and/or to be thoroughly familiar with the Bidding Documents shall in no way relieve any such Bidder from any obligation with respect to the Bid.

By submission of a Bid, the Bidder agrees that if its Bid is accepted, then it shall enter into a Contract with Owner which incorporates all of the requirements of the Bidding Document. By submission of a Bid, the Bidder further indicates acceptance of all terms and conditions of the Bidding Documents.

CHANGES, MODIFICATIONS, WITHDRAWAL

Changes, modifications, or withdrawal of Bids shall be submitted in writing prior to the deadline and shall be contained in a sealed envelope clearly marked, as appropriate, "Correction, Modification, or Withdrawal of Sealed Bid for the Richard Road Culvert Replacement Project". No corrections, modifications, or withdrawal of Bids shall be permitted after Bids have been opened.

No Bidder may withdraw his Bid for a period of 90 calendar days after the date designated above for the opening.

SELECTION/AWARD

The Contract will be awarded, if at all, pursuant to M.G.L. c. 30, §39M, to the lowest responsible and eligible Bidder.

According to M.G.L. c. 30, §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, which may be determined by investigation beyond the submissions provided by the Bidder and by use of references; (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 ten (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 ten (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.

Nothing shall compel Owner to award any Contract pursuant to this Invitation to Bid.

QUESTIONS

Questions regarding this Project shall be submitted in writing and emailed to Kendra Robinson, P.E. at krobinson@woodardcurran.com by the close of business (4:00 P.M. Monday through Friday) **at least 5 working days prior to the stated Bid opening date**. Questions presented after this time shall not be considered. No question shall be considered which is not submitted in writing. Any questions requiring consideration shall be answered in an addendum delivered to all registered Bidders.

PERFORMANCE BOND AND PAYMENT BOND

The successful Bidder shall furnish a Performance Bond in the amount of 100% of the amount of the Contract and a Payment Bond in the amount of 100% of the amount of the Contract with a surety company which is acceptable to Owner.

MISCELLANEOUS

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, providing equal opportunity, encourages Bids from minority and women owned businesses.

Owner reserves the right to reject any or all Bids or to accept any Bid deemed by it to be in the best interest of Owner. 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.

The award of any Contract pursuant to this Invitation for Bid is subject to appropriation by Bedford Town Meeting.

SELECT BOARD BEDFORD, MASSACHUSETTS

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SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – QUALIFICATIONS OF BIDDERS

1.1. Bidders may be investigated by Owner to determine if they are qualified to perform the Work. All Bidders shall be prepared to submit within 5 days of Owner's request, written evidence of such information and data necessary to make this determination.

1.2. The investigation of a Bidder will seek to determine whether the organization is adequate in size, is authorized to do business in the jurisdiction where the Project is located, has had previous experience and whether available equipment and financial resources are adequate to assure Owner that the Work will be completed in accordance with the terms of the Contract. The amount of other work to which the Bidder is committed may also be considered.

1.3. To determine responsibility and eligibility, Owner will consider the qualifications of only those Bidders whose Bids are in compliance with the prescribed requirements.

1.4. Owner reserves the right to reject any Bid if the evidence submitted by, or the investigation of, such Bidder fails to satisfy Owner that such Bidder is properly qualified to carry out the obligations of the Contract Documents. Owner's decision or judgment on these matters will be final, conclusive, and binding. Conditional Bids will not be accepted.

ARTICLE 2 – COPIES OF CONTRACT DOCUMENTS

2.1. Complete sets of Contract Documents shall be used in preparing Bids; Owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

2.2. Owner, in making copies of Contract Documents available, does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

ARTICLE 3 – EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1. Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the Site to familiarize themselves with local conditions that may in any manner affect cost, progress or performance of the Work, (c) familiarize themselves with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study, and carefully correlate, Bidder's observations with the requirements of the Contract Documents and (e) notify Owner of all conflicts, errors or discrepancies in the Contract Documents.

3.2. Before submitting a Bid each Bidder may, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

3.3. On request, Owner will provide each Bidder access to the Site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.

3.4. Owner, however, makes no warranties to any third party, regarding existence of the rights of way, means of access, or other property interest stated, illustrated, or depicted in any way in the Bidding Documents.

3.5. The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 3 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

3.6. Reference is made to the Supplementary Conditions for identification of:

3.6.1. Those reports of explorations and tests of subsurface conditions at the Site which have been utilized by Owner in preparation of the Contract Documents. Each Bidder may rely upon the accuracy of the technical data contained in such reports but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.

3.6.2. Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the Site and which have been utilized by Owner in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such drawings, but not upon the completeness thereof, for the purposes of bidding or construction.

3.6.3. Copies of such reports and drawings will be made available by Owner to any Bidder on request. 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 4.2.1 and 4.2.2 are incorporated therein by reference. Such technical data has been identified and established in the Supplementary Conditions.

3.6.4. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the Supplementary Conditions.

3.6.5. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraph 4.02 and 4.03 of the General Conditions.

3.7. Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

3.8. The lands upon which the Work is to be performed, rights of way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

3.9. The submission of a Bid shall constitute a 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 Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

3.10. The Contract Documents contain the provisions required for the construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Bidder or relieve him from fulfilling any of the conditions of the Contract.

ARTICLE 4 – INTERPRETATIONS

4.1. All questions about the meaning or intent of the Contract Documents shall be submitted, by the close of business at least 5 working days prior to the deadline for receipt of Bids. Questions regarding this Project shall be submitted in writing and emailed to Kendra Robinson, P.E. at krobinson@woodardcurran.com by the close of business (4:00 P.M. Monday through Friday). Questions presented after this time shall not be considered. No question shall be considered which is not submitted in writing. Any questions requiring consideration shall be answered in an addendum delivered to all registered Bidders.

4.2. Written clarifications or interpretations will be issued by Addenda not later than 3 working days before the bid opening date. Only questions answered by formal written Addenda will be binding. Oral and other clarifications or interpretations will be without legal

effect. Addenda will to emailed to all parties recorded as having received the Contract Documents.

4.3. Each Bidder shall be responsible for determining that he has received all Addenda issued.

ARTICLE 5 – PRE BID CONFERENCE

5.1. A non-mandatory pre-Bid conference will be held as indicated in the Invitation to Bid. Bidders are Choose an item. to attend and participate in the conference.

ARTICLE 6 – BID SECURITY

6.1. Each Bid must be accompanied by cash, bid bond, or certified, treasurer's or cashier's check issued by a responsible bank or trust company, payable to Owner. A Bid Bond shall be: (a) in a form satisfactory to Owner; (b) with a surety company qualified to do business in the Commonwealth of Massachusetts and satisfactory to Owner; and (c) conditional upon the faithful performance by the principal of the agreements contained in the Bid.

6.2. The amount of such Bid Security shall be five (5%) percent of the Total Bid as entered in the Bid Form for General Bid. The Bid Security shall be submitted with the bid in the amount stated in the Invitation To Bid. Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid. All Bid Securities except those of the 3 lowest responsible and eligible Bidders will be returned following award of the Contract by Owner. All Bid Securities will be returned on the execution of Contract or, if no award is made, within 30 days, excluding Saturdays, Sundays, and legal holidays after the actual date of opening of the Bids, unless forfeited under the conditions herein stipulated.

6.3. In case a party to whom a Contract is awarded shall fail or neglect to execute the Agreement and furnish the satisfactory bonds within the time specified, the Owner may determine that the Bidder has abandoned the Contract, and thereupon the Bid Forms and acceptance shall be null and void, and the Bid Security accompanying the Bid Form shall be forfeited to Owner as liquidated damages for such failure or neglect and to indemnify said Owner for any loss which may be sustained by failure of the Bidder to execute the Agreement and furnish the bonds as aforesaid; provided that the amount forfeited to Owner shall not exceed the difference between the Bid Price of said Bidder and that of the next lowest responsible and eligible bidder and provided further that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other unforeseen circumstances affecting the Bidder, such Bid Security may be returned to him. After execution of the Agreement and acceptance of the bonds by Owner, the Bid Security accompanying the Bid Form of the Successful Bidder will be returned.

ARTICLE 7 – PERFORMANCE, PAYMENT AND OTHER BONDS; INSURANCE

7.1. Performance, Payment and other Bonds shall be provided in accordance with Article 5 of the General Conditions of the Contract and in accordance with Massachusetts General Laws.

7.2. All Bonds required as Contract Security shall be furnished prior to the execution of the Contract Agreement.

7.3. Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds shall file with each Bond, a certified and effective dated copy of their Power of Attorney.

7.4. The Successful Bidder shall provide insurance as indicated in the General Conditions and as amended in the Supplementary Conditions. Article 6 of the General Conditions and Supplementary Conditions sets forth Owner's requirements as to insurance. When the successful Bidder delivers the executed Contract to Owner, it shall be accompanied by certificates indicating that the required insurance has been secured.

ARTICLE 8 – BID FORM

8.1. Each Bid shall be submitted on the Bid Form. All blank spaces for Bid prices must be filled in with the unit price and computed total for each item.

8.2. Bid Forms shall be completed in ink or typed. The Bid price of each unit item on the form shall be stated in words and figures. If unit prices are required on the Bid Form, discrepancies between unit prices and their respective total amounts will be resolved in favor of the unit prices. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

8.3. A Bid which includes for any item a Bid Price that is abnormally low or high may be rejected as unbalanced. Bidder shall not submit unbalanced prices for any of the bid items on the Bid. All prices shall be reasonable for the Work entailed.

8.4. Certain Bid items may have set minimum and/or maximum prices to provide uniformity in the comparison of Bids established by Owner and indicated on the Bid form. Bids submitted not in compliance with these established amounts, may be rejected for non-compliance with the Instructions to Bidders.

8.5. Bids by corporations 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) and 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 below the signature.

8.6. Bids by partnerships shall be executed in the partnership name and signed by a partner, whose title shall appear under the signature. The official address of the partnership shall be shown below the signature.

8.7. All names shall be typed or printed in ink below the signature.

8.8. The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form). If no Addenda are received the Bidder shall fill in "none" on the Bid Form.

8.9. The address, e-mail and telephone number to which communications regarding the Bid are to be directed shall be shown.

8.10. One (1) copy of each Bid shall be submitted in a sealed envelope bearing on the outside the name of Bidder, his address, and the Project Title for which the Bid is submitted. If the Bid is to be sent by mail, Bid shall be enclosed in another envelope with the notation "BID ENCLOSED" on the face, and addressed as indicated in the Invitation to Bid. The Bid Security shall be submitted with the Bid in a separate envelope.

ARTICLE 9 – RECEIPT OF BIDS

9.1. Sealed Bids for the Work of this Contract will be received at the time and place stated in the Invitation to Bid.

9.2. Owner may consider informal any Bid not prepared and submitted in accordance with the provision hereof.

9.3. Bidders are cautioned that it is the responsibility of each individual Bidder to ensure that its Bid is in the possession of a responsible person prior to the stated time and at the place of the Bid opening. Owner is not responsible for Bids delayed by mail and/or delivery services of any nature.

9.4. The Bidder assumes all responsibility for the Bid arriving on time. Bids received after the time specified in the Invitation for Bids shall not be accepted. No faxed Bids shall be accepted. The time of receipt of a Bid will determine the acceptability of mailed Bids, regardless of postmark. It shall be the sole responsibility of the Bidder to ensure that a Bid has arrived before the time for opening of Bids as specified in the Invitation for Bids.

ARTICLE 10 – MODIFICATION AND WITHDRAWAL OF BIDS

10.1. Bids may be modified only by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

10.2. Bids may be withdrawn prior to the scheduled time (or postponement) of the Bid opening.

10.3. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw his Bid for a period of 39 days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids.

10.4. All modifications and withdrawals shall be submitted in sealed envelopes to Owner prior to the deadline for receipt of Bids, clearly marked on the outside of the envelope with the name of the Project and with the title "withdrawal" or "clarification" and the name of the Bidder.

ARTICLE 11 – OPENING OF BIDS

11.1. All Bids will be opened and read aloud publicly at the time and place indicated in the Invitation for Bids.

11.2. Any Bid received after the time and date specified in the Invitation for Bids shall not be considered.

ARTICLE 12 – AWARD OF CONTRACT

12.1. The Contract will be awarded, if at all, to the lowest responsible and eligible Bidder (Successful Bidder) based on the Total amount bid. The Successful Bidder shall possess the skill, ability, and integrity necessary for the faithful performance of the Work. The term "lowest responsible and eligible Bidder" as used herein shall mean the Bidder as set forth in Massachusetts General Laws, Chapter 30, Section 39M(c).

12.2. Owner reserves the right to the extent consistent with Laws, to reject any and all Bids, to waive any and all informalities if it is in Owner's best interest to do so, and the right to disregard all nonconforming, nonresponsive or conditional Bids.

12.3. Owner also reserves the right to reject the Bid of any Bidder that Owner considers to be unqualified relative to Article 1 above.

12.4. If the Contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within 30 days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids. All Bids shall remain open for 90 days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids; but Owner may, in his sole discretion, release any Bid and return the Bid Security prior to that date.

12.5. The Owner reserves the right to eliminate sections of the Work or parts of sections, as may be determined by them as a basis of award, to keep within the limits of available funds, or to add sections of the Work previously eliminated, provided that such action comports with generally accepted principles of public bidding in the Commonwealth of Massachusetts.

12.6. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

ARTICLE 13 – EXECUTION OF AGREEMENT

13.1. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least 4 unsigned copies of the Agreement and all other applicable Contract Documents. Within 10 days after the date of receipt of such notification Contractor shall execute and return all copies of the Agreement and all other applicable Contract Documents to Owner. Within 10 days thereafter Owner will deliver one fully signed copy to Contractor.

13.2. If the Successful Bidder fails to perform its agreement to execute a Contract in accordance with the terms of its Bid, within the above time limits, and furnish the required Bonds and insurance certificates, which are acceptable to Owner, Owner may consider the Bidder in default.

13.3. If the Bidder is determined to be in default, Bidder's Bid security shall become the property of Owner, as liquidated damages, and Owner will consider the Bid of the next lowest qualified responsible and eligible Bidder.

ARTICLE 14 – CONTRACT TIMES

14.1. Bidder must agree to commence Work on a date to be specified in a written Notice to Proceed from the Owner. The times within which the Work is to be substantially completed and ready for final payment (the “Contract Times”) are set forth in the Contract, as may be modified by the General Conditions or Supplementary Conditions.

ARTICLE 15 – SAFETY AND HEALTH REGULATIONS

15.1. This Project is subject to all of the Safety and Health Regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974 and CFR 29, Part 1910, General Industry Safety and Health Regulations Identified as Applicable to Construction, or any applicable successor regulations, and other specific requirements identified in the Supplementary Conditions.

15.2. The Successful Bidder shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91 596 and all subsequent amendments) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

15.3. The Successful Bidder shall have a competent person or persons, as required under the Occupational Safety and Health Act, on the Site to inspect the Work and to supervise the conformance of the Work with the regulations of the Act.

15.4. This Project is also subject to the Massachusetts Department. of Labor and Industries "Rules & Regulations for the Prevention of Accidents in Construction Operations (Industrial Bulletin No. 12)".

ARTICLE 16 – SALES TAX

16.1. The material and equipment to be used in the Work will be subject to the requirements of Paragraph 7.10 of the General Conditions of the Contract. Taxes will apply to the extent permissible under state law.

ARTICLE 17 – UTILITY UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

17.1. All excavations within public or private ways are subject to the requirements of the “Dig Safe” Law, as codified at M.G.L. c.82, §40 (et seq.), or any successor statute.

ARTICLE 18 – WAGE RATES

18.1. 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 Bidder, 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 this Contract.

18.2. See Article 20 of the General and Supplementary Conditions.

ARTICLE 19 – COMPETITIVE BIDDING

19.1. The bidding and award of the Contract shall be in full compliance with M.G.L. c. 30, §39M.

ARTICLE 20 – CONTRACTOR’S WARRANTY AND GUARANTEES; CORRECTION PERIOD

20.1. Provisions regarding Contractor’s general warranty and guarantees and correction period are set forth in the Contract and Paragraphs 7.17 and 15.08 of the General and Supplementary Conditions, if any.

ARTICLE 21 – LIQUIDATED DAMAGES

21.1. Provisions for liquidated damages are set forth in the Contract.

ARTICLE 22 – SUBSTITUTE OR "OR EQUAL" ITEMS

22.1. The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item of material or equipment may be furnished or used by Contractor if acceptable to Owner, application for such acceptance will not be considered by Owner until after the Effective Date of the Contract; all consideration shall comply with M.G.L. c. 30, §39M(b). The procedure for submission of any such application by Contractor and consideration by Owner is set forth in Article 7 of the General Conditions and may be supplemented in the General Requirements.

ARTICLE 23 – LAWS, REGULATIONS AND PERMITS

23.1. The Bidder's attention is directed to the fact that all applicable local, federal and state Laws; municipal ordinances; and the rules and regulations of all authorities having jurisdiction over the Work, shall apply to the Contract throughout, and they shall be deemed to be included in the Contract Documents as though they were written out in full therein.

23.2. Successful Bidder shall obtain all applicable building, electrical, street opening and trench opening permits.

ARTICLE 24 – CORI

24.1. Any persons performing unsupervised Work must go through the process of a criminal background check or “CORI.” The Successful Bidder awarded the Contract must provide to

Owner a signed CORI release form and a copy of the driver's license from each and every person who will be working on a Site where children are located. Owner will determine and provide an adequate identification method for approved personnel and reserves the right to refuse access to any person without this identification without being charged for any service time.

ARTICLE 25 – INTEREST OF MEMBERS, OFFICERS, OR EMPLOYEES OF THE OWNER; MEMBERS OF LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

25.1. No member, officer or employee of Owner, or its designees or agents, no member of the governing body of the locality in which the Project is situated, and no other public officials, member, officer or employee of Owner, or its designees or agents, no members of the governing body of such locality or localities who exercises any functions or responsibilities with respect to the Project during his tenure or for 1 year thereafter, shall have any interest, direct or indirect, in any agreement, contract or subcontract, or the proceeds thereof, for Work to be performed in connection with the Project. Contractor shall incorporate or cause to be incorporated, in all of its agreements, contracts or subcontracts a provision prohibiting such interest pursuant to the purposes of this section.

END OF SECTION

SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

INFORMATION	LOCATION OF INFORMATION
Easements, Rights-of-Way	Available from Owner
Geotechnical Data Geotechnical Report Soil Boring Data, Results of Laboratory Testing	Following this page
Survey	Shown on Drawings
Order of Conditions	Following this page
Army Corps of Engineers – Pre-Construction Notification	To be provided upon receipt

END OF SECTION

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F: 603.624.9463
www.gza.com



MEMORANDUM

To: Mr. Garrett Bergey, CPMSM
Woodard & Curran, Inc. (W&C)

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

Date: December 6, 2023

File No: 04.0191625.00

Re: Geotechnical Engineering Memorandum
Richard Road Culvert
Bedford, Massachusetts

This memorandum presents the results of GZA's geotechnical evaluation performed at the above-referenced site. Our geotechnical evaluation was completed in accordance with GZA's Proposal for Geotechnical Services dated August 31, 2023. GZA's objectives were to evaluate subsurface conditions and provide geotechnical recommendations for the proposed culvert replacement across Richard Road located in Bedford, 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

Based on discussions with you, we understand the three existing corrugated metal culverts on Richard Road need to be replaced due to deteriorating condition and recent flooding events. The location of the culverts is shown on **Figure 1 – Locus Plan**.

The existing culverts convey Mongo Brook beneath Richard Road. Based on email discussions, available aerial imagery, and GZA's site visit performed on October 17, 2023, the Richard Road culvert appears to be approximately 400-foot-long.

The existing culvert consists of three pipes; a 10-inch corrugated metal pipe (CMP) encased in a 12-inch concrete pipe, a 12-inch CMP, and a 24-inch CMP with earthen headwalls. Based on the survey plan provided by W&C on November 20, 2023, the lowest culvert invert on the north (inlet) side is at about Elevation 111.4 and the south (outlet) side is at about Elevation 110.7. The existing culverts runs through a 20-foot drainage easement and cross three residential properties. Overhead utilities are located along the eastbound Richard Road travel lane. Underground utilities on Richard Road consists of water, sewer, and gas.

Based on our communications with W&C, we understand that the proposed culvert replacements being considered may consist of a 3- or 4-sided precast concrete box culvert. We have assumed the proposed concrete box culvert will bear at an elevation approximately 4 feet below the existing invert elevations; therefore, the concrete box



culvert would be installed at approximate Elevation ±107 and in the same approximate alignment as the existing culverts.

According to W&C, the proposed span of the replacement culvert at Richard Road will likely be less than 10 feet and is therefore not subject to Massachusetts Department of Transportation (MassDOT) Chapter 85 Permitting.

SUBSURFACE EXPLORATIONS

GZA performed a subsurface exploration program to help evaluate subsurface conditions in the vicinity of the proposed culvert. GZA’s drilling subcontractor, New England Boring Contractors (NEBC) of Derry, New Hampshire coordinated utility clearance and drilled test borings GZ-1 through GZ-3 on October 19 and 20, 2023 to depths of up to 26 feet. Borings GZ-1 and GZ-3 were drilled at the west and east ends, respectively, of the existing culvert within the private property easement and each boring extended to a depth of approximately 26 feet below ground surface (bgs). Boring GZ-2 was drilled on the westbound lane of Richard Road east of the existing culvert and extended to a depth of approximately 25.3 feet bgs. 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**.

The test borings were drilled using a track-mounted drill rig with 4-inch-inside-diameter, flush-joint casing and drive-and-wash drilling methods. Standard Penetration Testing and split spoon sampling were performed continuously through fill and 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 within the roadway with cold-patch asphalt. 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 (gradation). 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 (feet)	Stratum	Soil Description	Test Performed
GZ-1	S-5	8-10	Glacial Till	Grey, fine to coarse SAND, and SILT and CLAY, little fine Gravel.	Gradation
GZ-2	S-3	5-7	Fill	Brown, fine to medium SAND some Silt, trace fine Gravel.	Gradation
GZ-3	S-3	4-6	Sand and Silt	Grey, fine SAND and SILT.	Gradation
GZ-3	S-7	14-16	Silt and Clay	Grey, SILT and CLAY, trace fine to coarse Sand.	Gradation

GENERALIZED SUBSURFACE CONDITIONS

Based on the completed test borings, subsurface conditions at the site generally consist of loose to medium dense fill over loose to medium dense sand and silt overlying dense to very dense glacial till, as shown on **Figure 3**. Sand with trace organics and a stiff silt and clay layer were observed beneath the fill stratum in GZ-2 located at midspan of the proposed culvert replacement. Descriptions of the geologic units encountered in the borings are as follows, in general order of occurrence below ground surface at each boring location.



GENERALIZED SUBSURFACE CONDITIONS		
Soil Unit	Approx. Depth Range (feet)	Generalized Description
Asphalt	0.3	4 inches of bituminous asphalt pavement was encountered at the ground surface at boring GZ-2.
Topsoil	0.2 to 0.4	Approximately 0.2 to 0.4 feet of Topsoil was encountered in borings GZ-1 and GZ-3. The Topsoil generally consisted of loose, brown/dark brown, fine to medium SAND, little Silt.
Fill	3.8 to 8.7	Approximately 4 to 9 feet of Fill was encountered directly below the asphalt and topsoil in borings GZ-1 through GZ-3. The Fill generally consisted of loose to medium dense, fine to medium SAND, little to and Silt, trace to little Gravel. Trace organics were encountered within the fill in boring GZ-2.
Sand and Silt	10	Approximately 10 feet of Sand and Silt was encountered directly below the Fill stratum in boring GZ-3. The material generally consisted of loose to medium dense, grey, fine SAND and SILT.
Silt and Clay	3	Approximately 3 feet of Silt and Clay was encountered below the Fill stratum in boring GZ-2 and below the Sand and Silt stratum in boring GZ-3. The material generally consisted of stiff, grey, SILT AND CLAY, trace Sand.
Glacial Till	9 to 18.3+	Approximately 9 to at least 18.3 feet of Glacial Till was encountered in boring GZ-1 directly beneath the Fill stratum, in boring GZ-2 below the Silt and Clay stratum, and in boring GZ-3 below the Silt and Clay stratum. The Glacial Till generally consisted of dense to very dense grey, fine to coarse SAND, little to some Gravel, little to some Silt and Clay.

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

GROUNDWATER

Groundwater was measured in the borings shortly after drilling and measured 5.5 (GZ-1), 5.2 (GZ-2) and 5.7 (GZ-3) feet bgs (Corresponding to Elevations 112.3, 112.8 and 111.6). Water level readings were made in the borings at the time and under conditions stated on the logs, included in **Appendix B**. Based on GZA’s visual observations during drilling, the stream was approximately 1 to 2 feet deep at the time the borings were completed which corresponds to approximately Elevation ±111.

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 the site area is mapped as Andover Granite with schist and gneiss intrudes and pegmatite masses.

IMPLICATIONS OF SUBSURFACE CONDITIONS

RICHARD ROAD

The subsurface conditions at Richard Road, based on boring GZ-1 and GZ-3, generally consist of loose to medium dense fill overlying loose to medium dense sand and silt, overlying dense to very dense glacial till. Trace organics



were encountered within the fill at boring GZ-2 (at the midspan of the proposed culvert), overlying a stiff silt and clay layer. The estimated elevation of the bottom of the proposed culvert at this site will be about Elevation ± 107 feet based on a depth 4 feet beyond the existing invert. Based on the test borings, excavated subgrades at this elevation are likely to be within the medium dense sand and silt stratum at either end of the culvert and within the stiff silt and clay stratum at midspan, as shown on **Figure 3**.

RECOMMENDATIONS AND CONSTRUCTION CONSIDERATIONS

The following recommendations assume the proposed culvert will be installed at approximately Elevation 107 feet.

DEWATERING

Based on the survey plans provided to GZA on November 20, 2023, the approximate upstream invert of the existing culvert is Elevation ± 111 . Groundwater was encountered at Elevation ± 112 feet which is approximately 5 feet above the proposed bottom of footing elevation; therefore, the excavation to footing elevation will require dewatering 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 stream 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 silt and silt and clay subgrades can become unstable if exposed to high dewatering gradients on the sides of excavations below groundwater level.

FOUNDATION SUBGRADE PREPARATION

In order to densify the soils near the footing bearing elevation, the contractor should proof compact the subgrade soils. Following foundation excavation in the dry, the excavated subgrade should be proof compacted. When near or below the water table, 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.

For subgrades above the water table, proof compaction should consist of 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-compact with a minimum of 10 passes of a heavy vibratory plate compactor.

BEARING CAPACITY

The proposed 3- or 4-sided precast concrete box can be supported on the undisturbed medium dense sand and silt or stiff silt and clay stratum. 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 $\frac{1}{2}$ inch over 20 feet.



December 6, 2023

04.0191625.00

Memorandum – Richard Road Culvert, Bedford, Massachusetts

Page | 5

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.

Handwritten signature of Andrew Fournier in black ink.

Andrew Fournier
Project Manager

Handwritten signature of Bruce W. Fairless in black ink.

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

Handwritten signature of Jay L. Hodkinson in black ink.

Jay L. Hodkinson, P.E.
Associate Principal

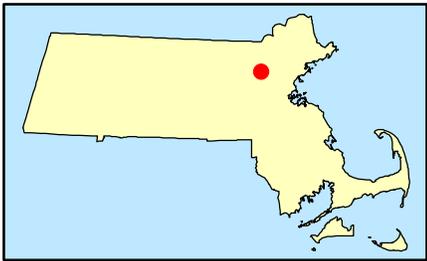
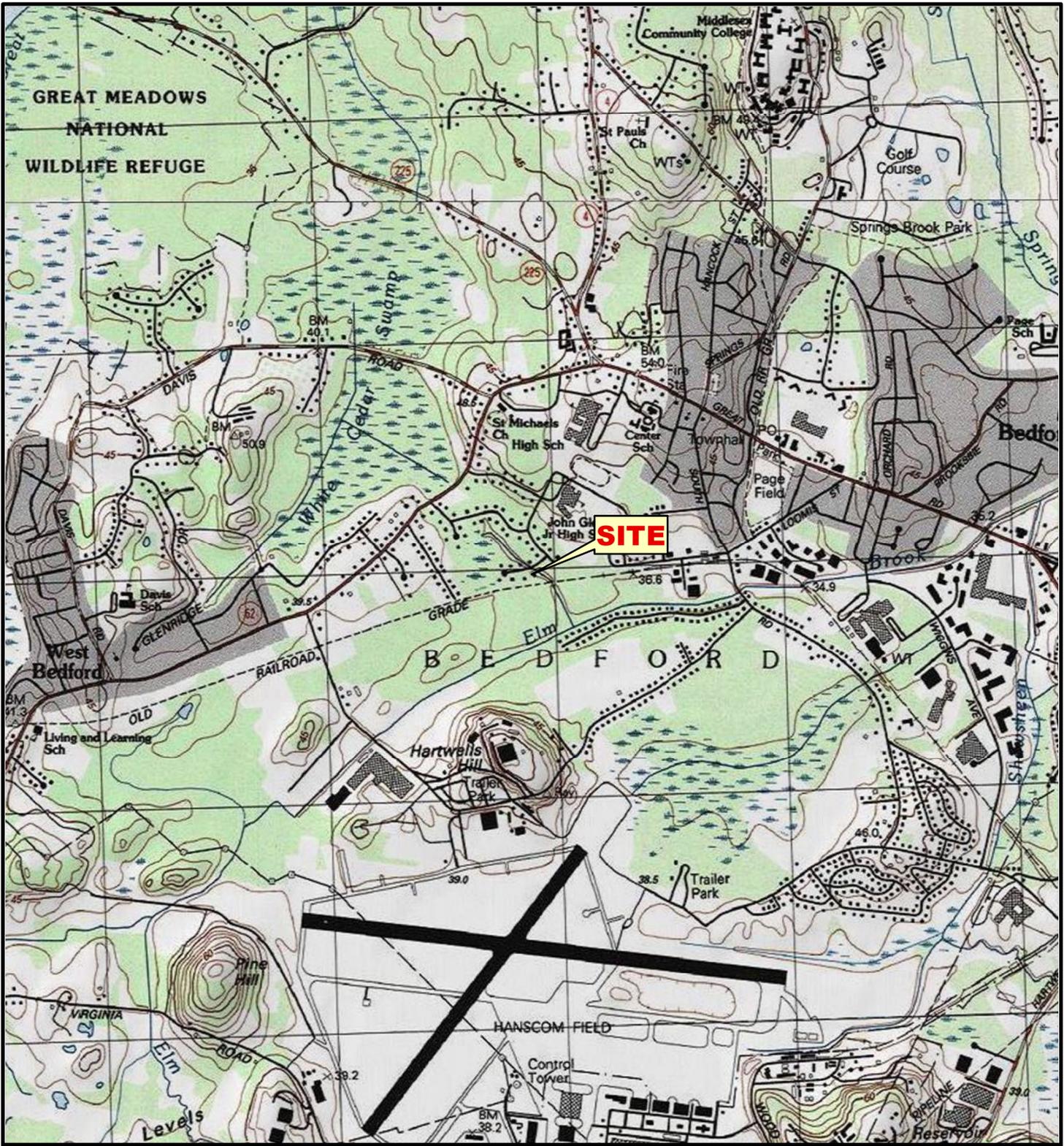
ADF/JLH/BWF:

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Attachments: Figure 1 – Locus Plan
Figure 2 – Exploration Location Plan
Figure 3 – Subsurface Profile
Appendix A – Limitations
Appendix B – Boring Logs
Appendix C – Laboratory Test Results



Figures



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

Data Supplied by :

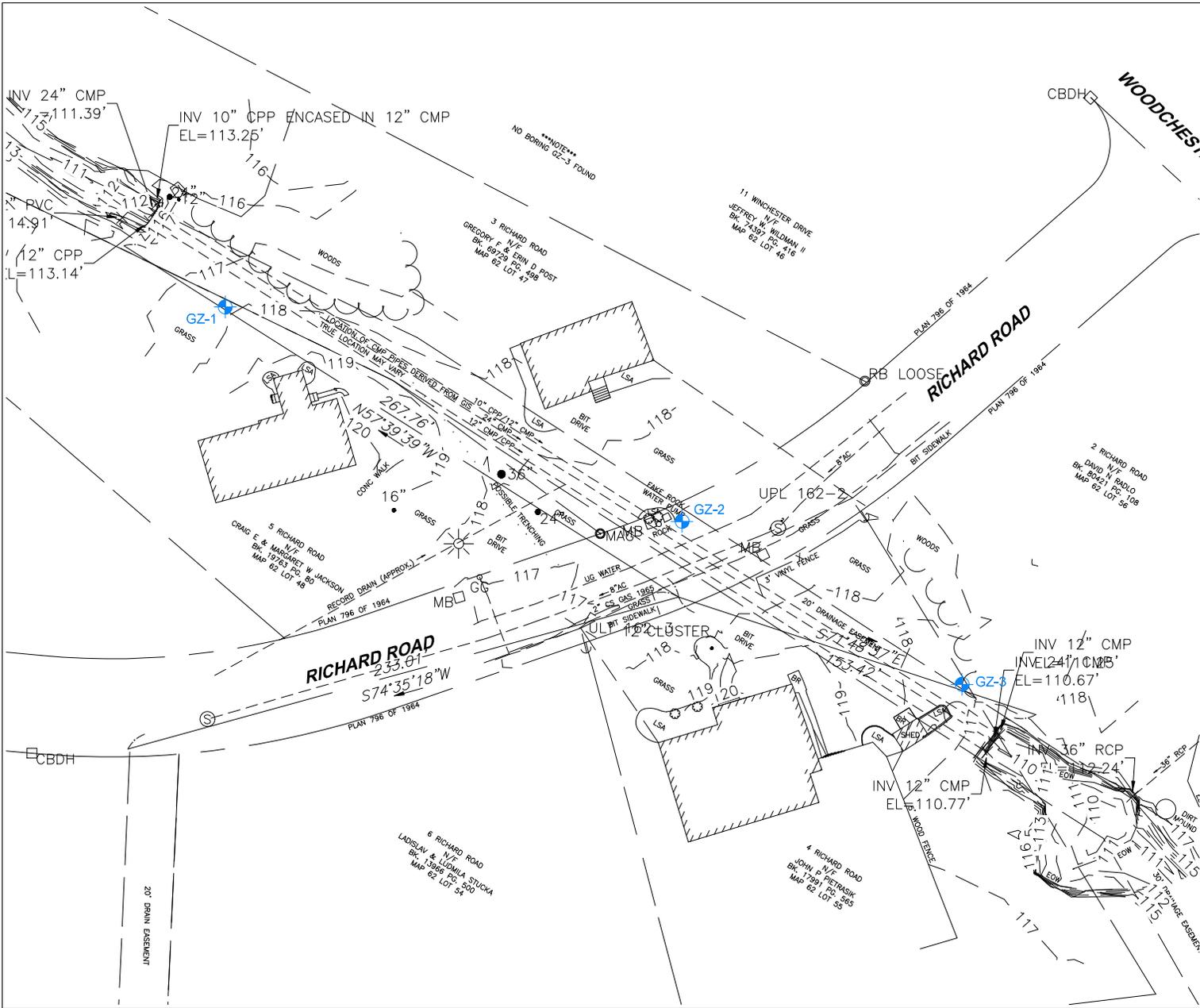


PROJ. MGR.: ADF
 DESIGNED BY: IJC
 REVIEWED BY: ADF
 OPERATOR: IJC
 DATE: 11-28-2023

LOCUS PLAN
 ROAD CULVERT REPLACEMENT
 3-5 RICHARD ROAD
 BEDFORD, MASSACHUSETTS

JOB NO.
 04.0191625.00
 FIGURE NO.
1

© 2023 - GZA GeoEnvironmental, Inc.
 GZA-P:\04\005\04.0191625\00\FIGURES\FIGURE 2 - EXPLORATION LOCATION PLAN.DWG ANSI B - 17X11 DECEMBER 1, 2023 DYLAN SHAEFFER

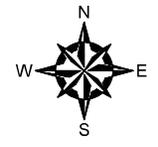


LEGEND

GZ-2 APPROXIMATE LOCATION OF TEST BORINGS

NOTES:

1. BASE PLAN WAS DEVELOPED FROM AN ELECTRONIC DRAWING FILE ENTITLED "RICHARD RD CULVERT (C3D 2018)", BY WOODARD AND CURRAN OF CANTON, MASSACHUSETTS AND TRANSMITTED TO GZA ON NOVEMBER 20, 2023
2. TEST BORINGS WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS OF DERRY, NEW HAMPSHIRE BETWEEN OCTOBER 19 AND 20, 2023 AND WERE OBSERVED BY GZA PERSONNEL.
3. THE LOCATIONS OF THE TEST BORINGS WERE DETERMINED IN THE FIELD BY WOODARD AND CURRAN.



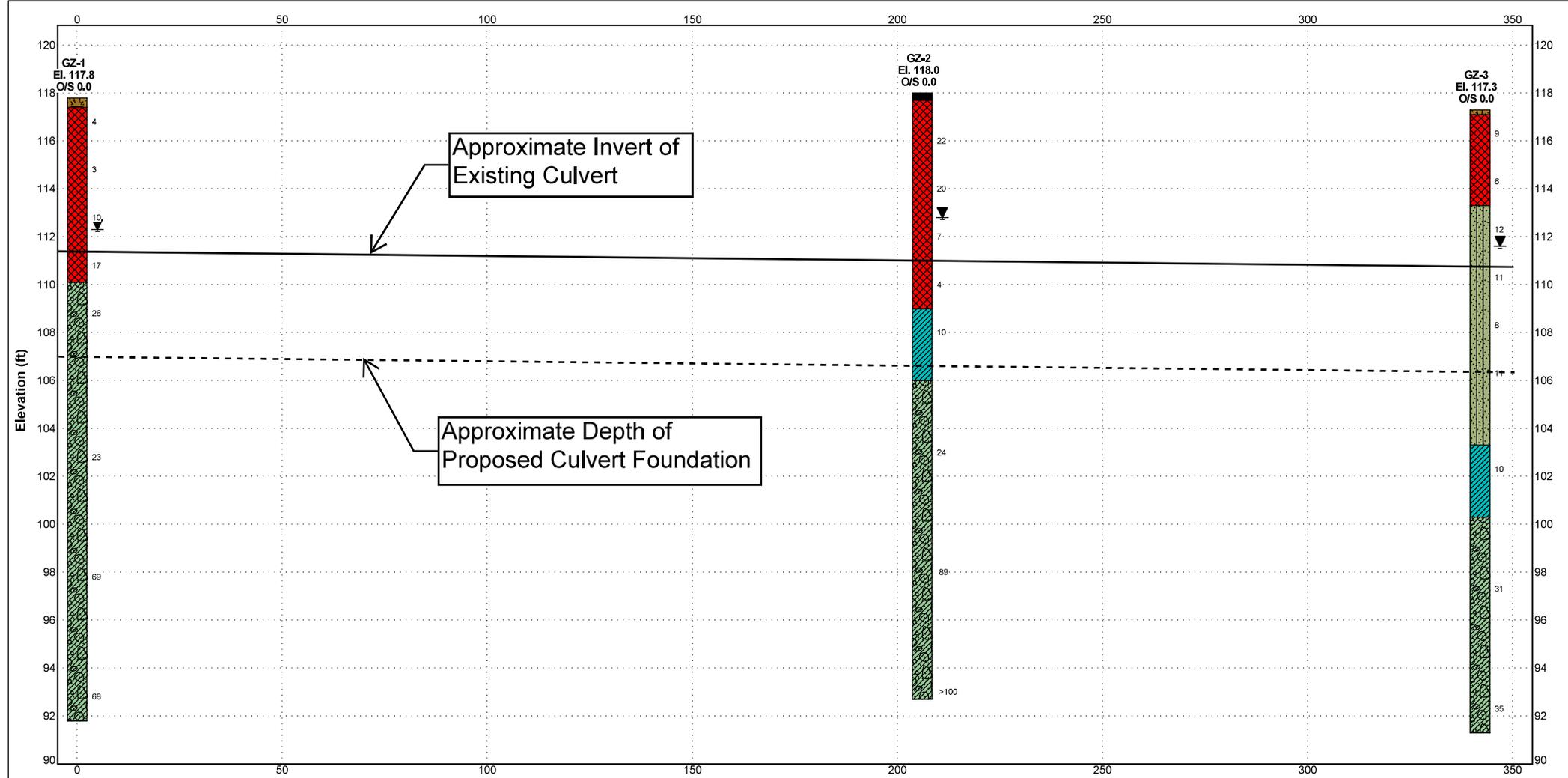
NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED, BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY REQUEST, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT A. N. Y. S. K. O. E. I. A. B. L. T. G. Z. A.

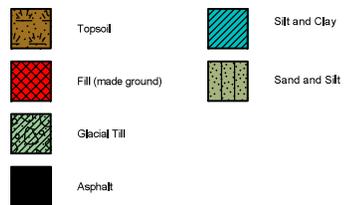
**RICHARD ROAD CULVERT REPLACEMENT
 3-5 RICHARD ROAD
 BEDFORD, MASSACHUSETTS**

EXPLORATION LOCATION PLAN

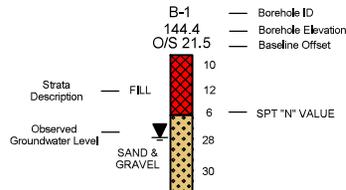
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: WOODARD AND CURRAN
PROJ MGR: ADF DESIGNED BY: DS DATE: DEC 2023	REVIEWED BY: JLH DRAWN BY: DS PROJECT NO.: 04.0191625.00
CHECKED BY: BWF	FIGURE 2
SCALE: 1"=40'	REVISION NO.: -



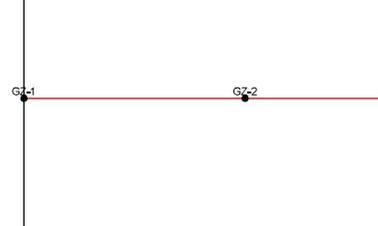
SUBSURFACE STRATIGRAPHY LEGEND



BOREHOLE LEGEND



SITE MAP KEY



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Project No.: 04.0191625.00
Date: 12/5/2023

Richard Rd Culvert Replacement
Bedford, MA

Title: Subsurface Profile
Figure No.: 3



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.

ADDITIONAL SERVICES

12. 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
Richard Rd Culvert Replacement
Bedford, MA

EXPLORATION NO.: GZ-2
SHEET: 1 of 1
PROJECT NO: 04.0191625.00
REVIEWED BY: A. Fournier

Logged By: K. Ashe
Drilling Co.: New England Boring Company
Foreman: Sam Shaw

Type of Rig: ATV
Rig Model: Mobile B50
Drilling Method:
Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 118.0
Final Boring Depth (ft.): 25.3
Date Start - Finish: 10/19/2023 - 10/19/2023

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

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
10/19/23	15:00	10 Min.	5.2	24

Depth (ft)	Casing Blows/ (Core Rate)	Sample						Sample Description (Modified Burmister Classification)	Remark	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (RQD)	SPT Value					
										0.3	ASPHALT	117.7
5		S-1	1.0-3.0	24	8	12 13 9 7	22	S-1: Medium dense, brown, fine to medium SAND, little Silt, little Gravel, dry.	1.		FILL	
		S-2	3.0-5.0	24	15	8 10 10 12	20	S-2: Medium dense, dark brown, fine to medium SAND, some Silt, trace Gravel, trace Organics, moist.				
		S-3	5.0-7.0	24	9	6 4 3 4	7	S-3: Loose, dark brown and gray, fine to medium SAND, some Silt, trace Gravel, trace Organics, wet.				
		S-4	7.0-9.0	24	6	1 2 2 1	4	S-4: Loose, dark brown, and gray, fine to medium SAND, little Silt, trace Organics, wet.				
10		S-5	9.0-11.0	24	10	4 5 5 7	10	S-5: Stiff, gray, SILT & CLAY, wet.		9		109.0
15		S-6	14.0-16.0	24	12	7 10 14 20	24	S-6: Medium dense, gray, fine to medium SAND, little Silt, little Gravel, wet.	2.		GLACIAL TILL	
20		S-7	19.0-20.2	14	7	27 54 35 /2"	89	S-7: Very dense, gray, fine to medium SAND, some Gravel, little Silt, wet.		12		106.0
25		S-8	24.0-25.3	16	10	35 71 65 /4"	>100	S-8: Very dense, gray, fine to medium SAND, some Silt, little Gravel, wet.		25.3		92.7
30								End of exploration at 25.3 feet				

GZA TEMPLATE TEST BORING - GZA GINT DATA TEMPLATE 10-27-20.GDT - 12/5/23 09:25 - P:\04\JOBS\GINT PROJECT DATABASES\04.0191625.00- RICHARD RD CULVERT BEDFORD MA.GPJ

REMARKS

1. - Driller noted increased resistance at approximately 12 ft. b.g.s. (below ground surface)
2. - Boring patched at the ground surface with cold patch asphalt.

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

LOG KEY



GZA
Geo Environmental, Inc.
Engineers and Scientists

BURMISTER SOIL CLASSIFICATION (INORGANIC)

COMPONENT	NAME	PROPORTIONAL TERM	PERCENT BY WEIGHT	IDENTIFICATION OF FINES		
				Material	PI	Atterberg Thread Dia.
MAJOR	GRAVEL, SAND, FINES*		>50	SILT	0	Cannot Roll
Minor	Gravel, Sand, Fines*	and some little trace	35 - 50 20-35 10-20 0-10	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	PLASTIC SOILS		GRAVEL & SAND	
		Consistency	Blows/Ft. SPT N-Value	Density	Blows/Ft. SPT N-Value
Fine to coarse	All fractions > 10%	Very Soft	< 2	Very Loose	< 4
Medium to coarse	<10% fine	Soft	2 - 4	Loose	4 - 10
Fine to medium	<10% coarse	Medium Stiff	4 - 8	Medium Dense	10 - 30
Coarse	<10% fine and medium	Stiff	8 - 15	Dense	30 - 50
Medium	<10% coarse and fine	Very Stiff	15 - 30	Very Dense	> 50
Fine	<10% coarse and medium	Hard	>30		

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 readily 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)
	Gravels with Fines (Appreciable amount of fines)
	Sand More than 50% smaller than No. 4 sieve
Fine Grained Soils More than 50% of material smaller than No. 200 sieve	Clean Sands (Little or no fines)
	Sands with Fines (Appreciable amount of fines)
	Silts and Clays Liquid Limit <50
	Silts and Clays Liquid Limit >50
	Highly Organic Soils

ABBREVIATIONS

MR = Mud Rotary	Tv = Field Vane Shear Test (Torvane)
HSA = Hollow Stem Auger	PP = Pocket Penetrometer
SSA = Solid Stem Auger	PI = Plasticity Index
SS = Split Spoon Sampler	MC = Moisture Content
U = Undisturbed Sample (Shelby Tube)	CO = Consolidation
MC = Modified California Sampler	UC = Unconfined Compression Test
V = Vibracore	SI = Sieve Analysis
M = Macrocore	DS = Direct Shear
R = Refusal	PID = Photoionization Detector
USCS = Unified Soil Classification System (ASTM D2487)	ppm = Parts Per Million
NYCBC = New York City Building Code	REC = Recovery
WOR = Weight of Rods	RQD = Rock Quality Designation
WOH= Weight of Hammer	▼ = Measured Water Level
SPT = Standard Penetration Test (ASTM D1586)	
N-Value = Cumulative number of uncorrected blows for the middle two 6-inch intervals (blows/foot).	



Appendix C – Laboratory Test Results



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

Client Information:
 GZA GeoEnvironmental
 Bedford, NH
 Project Manager: Andrew Fournier
 Assigned By: Client
 Collected By: Client

Project Information:
 Richard Rd Culvert Replacement
 Bedford, MA
 GZA Project Number: 04.0191625.00
 Summary Page: 1 of 1
 Report Date: 11.1.23

LABORATORY TESTING DATA SHEET, Report No.: 7423-K-B034

Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests										Proctor / CBR / Permeability Tests							Laboratory Log and Soil Description		
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_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										
SS	GZ-1 / S-5	8-10	23-S-B869					15.6	48.2	36.2												Grey f-c SAND and SILT & CLAY, little fine Gravel	
SS	GZ-2 / S-3	5-7	23-S-B870					4.4	70.6	25.0												Brown f-m SAND, some Silt, trace fine Gravel	
SS	GZ-3 / S-3	4-6	23-S-B871					0.0	58.1	41.9												Grey fine SAND and SILT	
SS	GZ-3 / S-7	14-16	23-S-B872					0.0	7.0	93.0												Grey SILT & CLAY, trace f-c Sand	

Date Received: 10.27.23

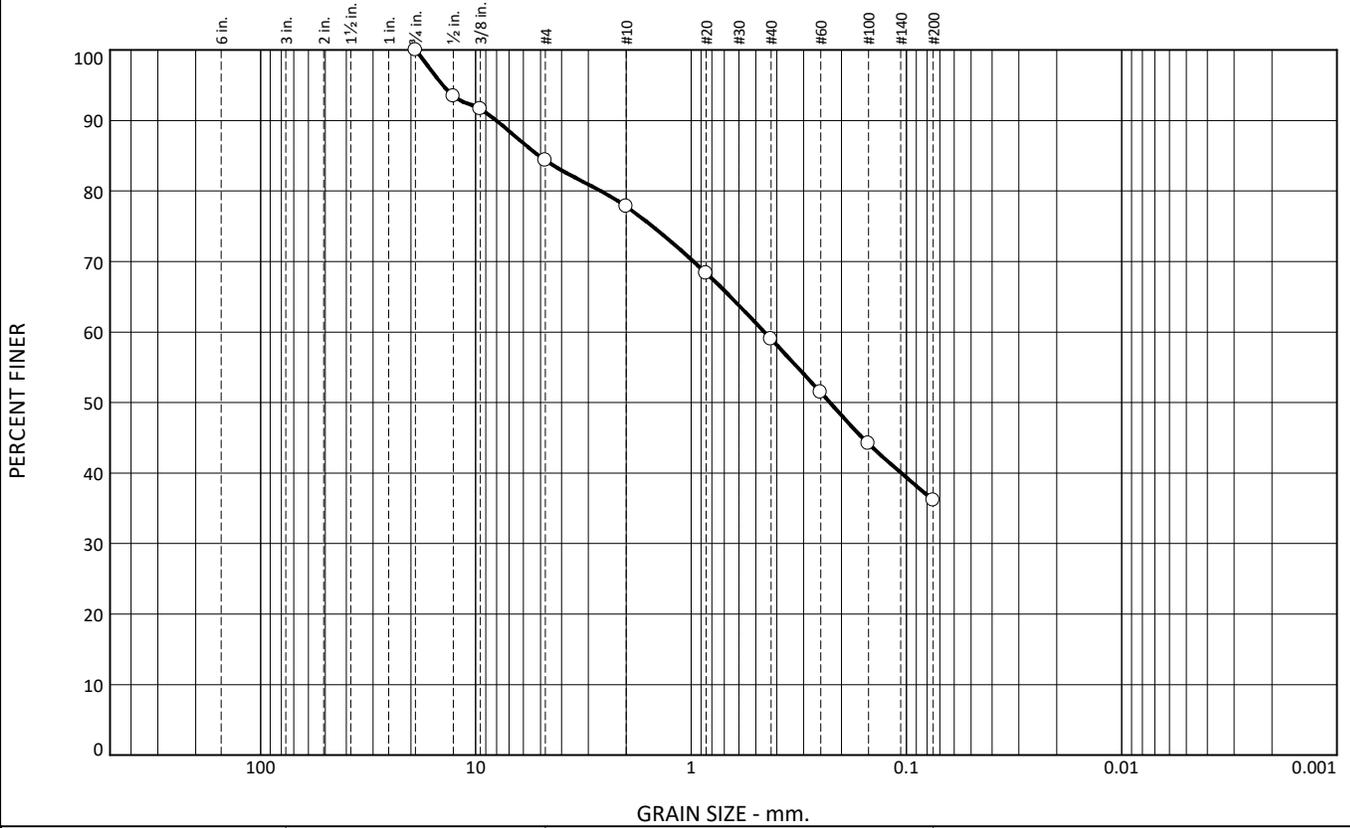
Reviewed By: 

Date Reviewed: 11.2.23

This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.
 This report shall not be reproduced, except in full, without prior written approval from the Agency, as defined in ASTM E329.

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.6	6.6	18.8	22.8	36.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	93.5		
3/8"	91.6		
#4	84.4		
#10	77.8		
#20	68.3		
#40	59.0		
#60	51.4		
#100	44.2		
#200	36.2		

Soil Description

Grey f-c SAND and SILT & CLAY, little fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 8.0302 D₈₅= 5.0834 D₆₀= 0.4566
D₅₀= 0.2263 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

* (no specification provided)

Source of Sample: Split Spoon Depth: 8-10'
Sample Number: GZ-1 / S-5

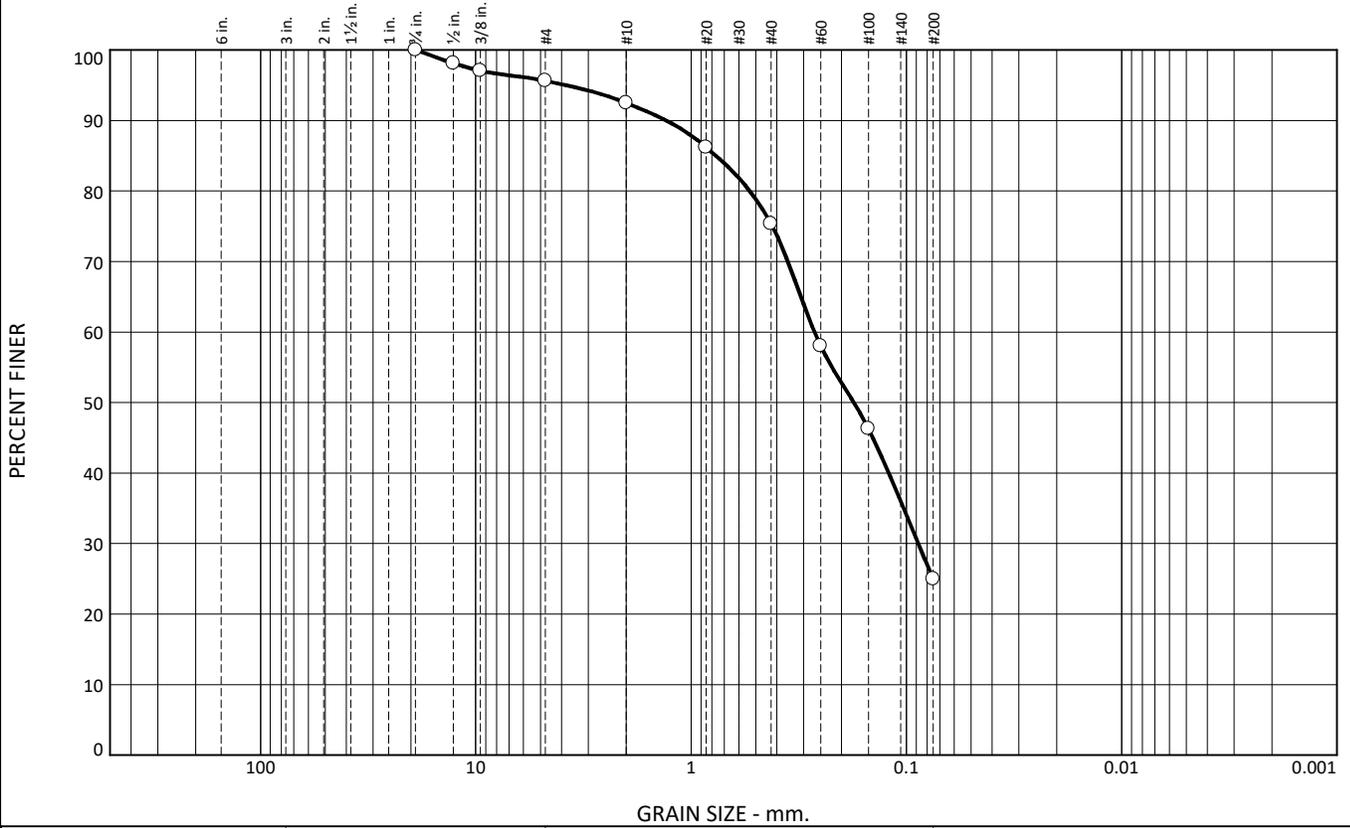
Date: 11.1.23

Thielsch Engineering Inc. Cranston, RI	Client: GZA GeoEnvironmental Project: Project No:
Figure 23-S-B869	

Tested By: AF / SF Checked By: Andrew Flanagan

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.4	3.1	17.1	50.4	25.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.1		
3/8"	97.1		
#4	95.6		
#10	92.5		
#20	86.2		
#40	75.4		
#60	58.0		
#100	46.3		
#200	25.0		

Soil Description

Brown f-m SAND, some Silt, trace fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 1.3060 D₈₅= 0.7660 D₆₀= 0.2670
D₅₀= 0.1753 D₃₀= 0.0880 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

* (no specification provided)

Source of Sample: Split Spoon Depth: 5-7'
Sample Number: GZ-2 / S-3

Date: 11.1.23

Thielsch Engineering Inc. Cranston, RI	Client: GZA GeoEnvironmental Project: Project No:
Figure 23-S-B870	

Tested By: AF / SF Checked By: Andrew Flanagan

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	58.0	41.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#20	100.0		
#40	99.9		
#60	99.4		
#100	94.8		
#200	41.9		

Soil Description

Grey fine SAND and SILT

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 0.1338 D₈₅= 0.1236 D₆₀= 0.0924
D₅₀= 0.0827 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample visually classified as non-plastic.

* (no specification provided)

Source of Sample: Split Spoon
Sample Number: GZ-3 / S-3

Depth: 4-6'

Date: 11.1.23

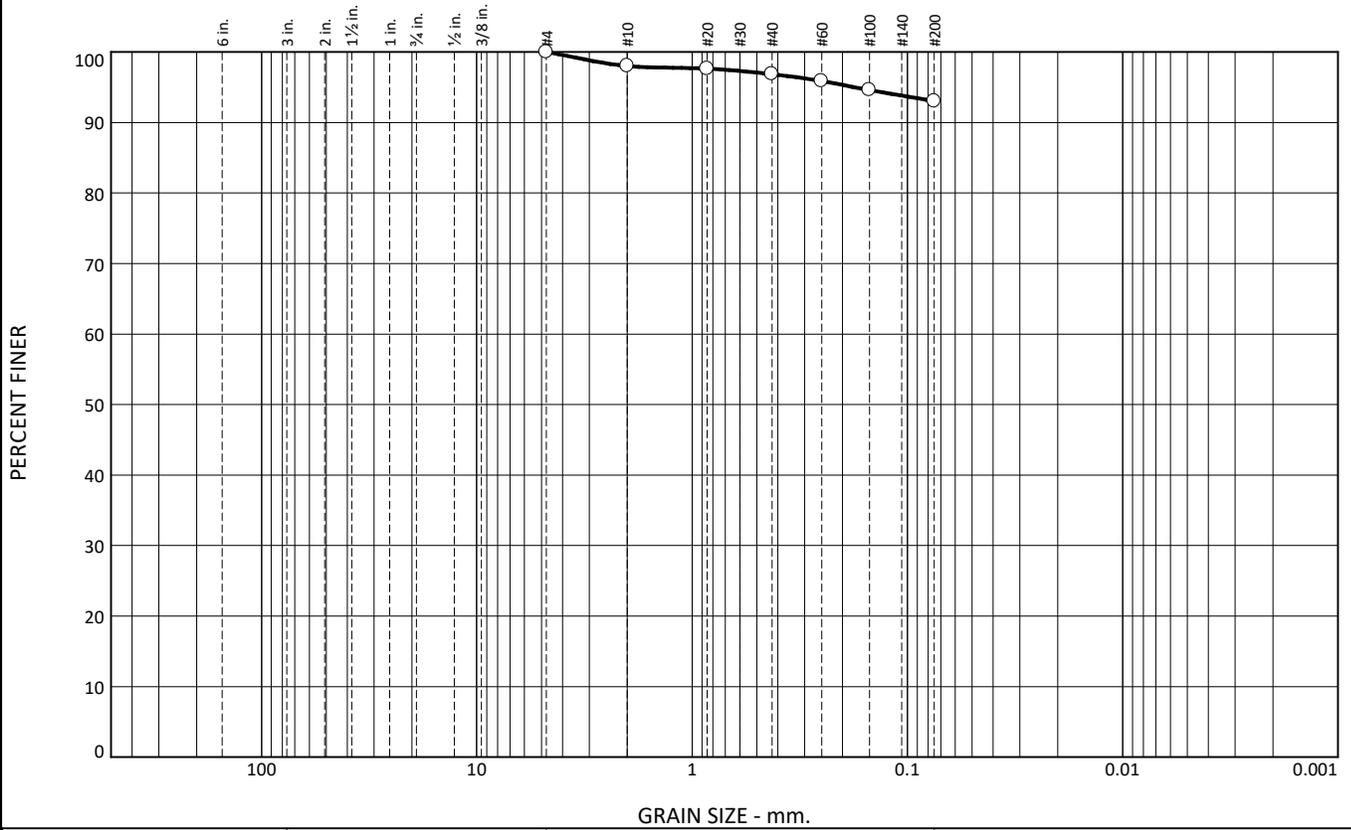
Thielsch Engineering Inc. Cranston, RI	Client: GZA GeoEnvironmental Project: Project No:
Figure 23-S-B871	

Tested By: AF / SF

Checked By: Andrew Flanagan

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.0	1.1	3.9	93.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.0		
#20	97.6		
#40	96.9		
#60	95.9		
#100	94.6		
#200	93.0		

Soil Description

Grey SILT and CLAY, trace f-c Sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= D₈₅= D₆₀=
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

* (no specification provided)

Source of Sample: Split Spoon Depth: 14-16'
Sample Number: GZ-3 / S-7

Date: 11.1.23

Thielsch Engineering Inc. Cranston, RI	Client: GZA GeoEnvironmental Project: Project No:
Figure 23-S-B872	

Tested By: AF / SF

Checked By: Andrew Flanagan

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 103-0925
 MassDEP File #
 eDEP Transaction #
 BEDFORD
 City/Town

A. General Information

Please note:
 this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important:
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. From: Bedford
 Conservation Commission

2. This issuance is for (check one):
 a. Order of Conditions b. Amended Order of Conditions

3. To: Applicant:
Mike Sprague
 a. First Name b. Last Name
Town of Bedford Department of Public Works
 c. Organization
314 Great Road
 d. Mailing Address
Bedford MA 01730
 e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):
See attached Page 1.1
 a. First Name b. Last Name
 c. Organization
Richard Road
 d. Mailing Address
Bedford MA 01730
 e. City/Town f. State g. Zip Code

5. Project Location:
See attached Page 1.1
 a. Street Address b. City/Town
 c. Assessors Map/Plat Number d. Parcel/Lot Number
 Latitude and Longitude, if known: d m s d m s
 d. Latitude e. Longitude

Property Owner and Project Location:

2 Richard Road – David N. Radlo, Tr.;	Map 062-0056
3 Richard Road – Gregory F. Post & Erin D.;	Map 062-0047
4 Richard Road – John P. Pietrasik & Kathleen Garity;	Map 062-0055
5 Richard Road – Graig Jackson & Margaret W.;	Map 062-0048
Richard Road Roadway – Town of Bedford	



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
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Provided by MassDEP:
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A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
 N/A -Town Roadway & Drainage Easement
- a. County _____ b. Certificate Number (if registered land) _____
- c. Book _____ d. Page _____
7. Dates: March 28, 2024 April 10, 2024 April 17, 2024
 a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance
8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
 See attached Page 10.1 for plans
- a. Plan Title _____
- b. Prepared By _____ c. Signed and Stamped by _____
- d. Final Revision Date _____ e. Scale _____
- f. Additional Plan or Document Title _____ g. Date _____

B. Findings

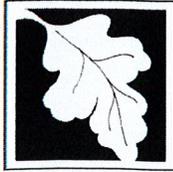
1. Findings pursuant to the Massachusetts Wetlands Protection Act:
 Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

- a. Public Water Supply b. Land Containing Shellfish c. Prevention of Pollution
- d. Private Water Supply e. Fisheries f. Protection of Wildlife Habitat
- g. Groundwater Supply h. Storm Damage Prevention i. Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



Massachusetts Department of Environmental Protection
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 City/Town

B. Findings (cont.)

Denied because:

- b. the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
- 3. Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input checked="" type="checkbox"/> Bank	~165 a. linear feet	~165 b. linear feet	~45 c. linear feet	~45 d. linear feet
5. <input checked="" type="checkbox"/> Bordering Vegetated Wetland	~124 a. square feet	~124 b. square feet	~124 c. square feet	~124 d. square feet
6. <input checked="" type="checkbox"/> Land Under Waterbodies and Waterways	~2350 a. square feet ~16 e. c/y dredged	~2350 b. square feet ~16 f. c/y dredged	~780 c. square feet	~780 d. square feet
7. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	1410 a. square feet	1410 b. square feet	855 c. square feet	855 d. square feet
Cubic Feet Flood Storage	66 e. cubic feet	66 f. cubic feet	204 g. cubic feet	204 h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. <input checked="" type="checkbox"/> Riverfront Area	1725 a. total sq. feet	1725 b. total sq. feet		
Sq ft within 100 ft	1725 c. square feet	1725 d. square feet	340 e. square feet	340 f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet



Massachusetts Department of Environmental Protection
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B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	a. square feet	b. square feet	c. $\frac{\text{cu yd}}{\text{nourishment}}$	d. $\frac{\text{cu yd}}{\text{nourishment}}$
14. <input type="checkbox"/> Coastal Dunes	a. square feet	b. square feet	c. $\frac{\text{cu yd}}{\text{nourishment}}$	d. $\frac{\text{cu yd}}{\text{nourishment}}$
15. <input type="checkbox"/> Coastal Banks	a. linear feet	b. linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	a. square feet	b. square feet		
17. <input type="checkbox"/> Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. <input type="checkbox"/> Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet



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B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. Restoration/Enhancement *:
 a. square feet of BVW _____ b. square feet of salt marsh _____
24. Stream Crossing(s):
 a. number of new stream crossings _____ b. number of replacement stream crossings _____

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - a. The work is a maintenance dredging project as provided for in the Act; or
 - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
 - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on April 17, 2027 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



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C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]
"File Number 103-0925 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



Massachusetts Department of Environmental Protection
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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
- (1) is subject to the Massachusetts Stormwater Standards
- (2) is NOT subject to the Massachusetts Stormwater Standards

If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
- i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
 - ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
 - iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



Massachusetts Department of Environmental Protection
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Provided by MassDEP:
103-0925
MassDEP File #

eDEP Transaction #
BEDFORD
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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

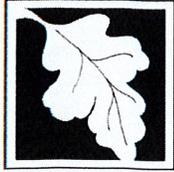
i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 19(f) through 19(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 19(f) through 19(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



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WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.



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D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? Yes No
2. The bedford Conservation Commission hereby finds (check one that applies):
 - a. that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw	2. Citation
---------------------------------	-------------

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.
 - b. that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Town of Bedford Wetlands Protection Bylaw	
1. Municipal Ordinance or Bylaw	2. Citation
3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
 The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

See attached pages 10.1 – 10.2

Project Description: The project is for the replacement of the Mongo Brook culvert as it passes through the Richard Road neighborhood.

Procedural History: The Notice of Intent was filed on March 28, 2024 under the Massachusetts Wetlands Protection Act and the Town of Bedford Wetlands Protection Bylaw. Legal notice of the public hearing was published in *The Lowell Sun* on April 4, 2024. The hearing was opened and closed on April 10, 2024. The Commission voted to issue an Order of Conditions.

The Commission voted to issue a Variance for work within the 25-foot buffer strip (2.2.2.2) and for work 2 feet below the contour of BLSF (2.2.2.6) as the project constitutes an overriding public interest.

Plans and Documents: Notice of Intent, prepared by EcoTec, Inc.; dated March 28, 2024;

“Town of Bedford - Bedford, Massachusetts - Richard Road Culvert Replacement”; prepared by Woodard & Curran; Scott C. Salvucci, P.E.; dated March, 2024;

Special Conditions:

The Commission finds that the following special conditions are necessary for the protection of the interests listed.

21. This Order of Conditions shall apply to any successor in interest, or successor in control of this property. The Commission shall be notified in writing at the time of any such transfer in title for all or part of the property that occurs prior to the issuance of a Certificate of Complacence. Prior to any transfer of title, the Order of Conditions shall be recorded at the Registry of Deeds or Land Court.
22. The project shall be performed according to the Notice of Intent and plans and documents submitted by the Applicant, as referenced above.
23. Any change made or intended to be made in the plans or documents shall require submission to the Commission for review. The Commission shall determine whether a change is substantial enough to require a new filing or Amendment to the Order.
24. The Commission hereby designates the Bedford Conservation Administrator as its administrative agent, with full powers to administer and enforce this Order.
25. The Commission must be notified immediately of any adverse environmental impacts that develop during the course of this project.
26. The Applicant or project proponent shall provide all concerned parties with a copy of this Order of Conditions, to include the contractor, all sub-contractors concerned with earth-moving, grading, landscaping, mitigation measures, erosion and sediment control, or other aspects of the project, who shall also be responsible for compliance of this Order. The Order of Conditions and site plans referenced in the Order shall remain on site at all times throughout the course of this project, at those locations where work conditioned by the Order is to take place or is in process.
27. The Commission shall be notified at least 14 working days prior to the start of work.

28. Wetland flags and flag numbers shall remain in place for the duration of the project. Damaged or destroyed flags shall be replaced and their location inspected by the Commission. The method by which missing flags are located shall be subject to the approval of the Commission.
29. Erosion controls installation shall be conducted without creating disturbed surfaces or introducing additional fill material. Erosion controls shall be inspected each work day or weekly otherwise and sediments shall be removed with hand tools if their accumulation compromises proper sedimentation control. Erosion controls shall not be removed without approval of the Commission, however, they must be removed per the direction of the Commission prior to the issuance of a Certificate of Compliance.
30. Erosion controls shall be inspected prior to a forecasted rainfall event of significant duration or intensity and during periods of rapid snow melt. Subsequent to each such event, erosion controls shall be inspected and repaired, to include removal of sediments within one week of the event and prior to the next forecasted event. Erosion controls shall remain in place until all work has been completed and soil is stabilized completely, and until the Commission has approved their removal.
31. Refueling, washing, or other maintenance of vehicles and equipment, and the storage of materials which may pose a pollution risk shall not take place within resource areas, the 100-foot buffer zone, the 100-year Floodplain, or within the watersheds to basins or swales.
32. No materials including but not limited to gravel, soil, boulders, brush, logs, stumps, slash, asphalt debris and construction samples, shall be stored or buried within the 100-foot buffer zone. All such excess materials shall be removed from the site prior to the completion of the project. This does not apply to the usage of gravel for stormwater BMPs.
33. Any material, to include displaced soil, which accumulates at the base of the filter sock/silt fence line or migrates beyond the line, shall be removed by the contractor within the same working day.
34. Any exposed soil within the 100-foot buffer zone shall be immediately mulched with straw until seeding can take place. The straw shall be spread uniformly in a blanket of sufficient thickness to completely hide the soil from view. All slopes with a steepness greater than 3:1 shall be stabilized with erosion control biodegradable matting, with specifications subject to the approval of the Commission.
35. Vegetation shall be established on all disturbed soil surfaces and approved by the Commission prior to the issuance of a Certificate of Compliance.
36. Prior to the issuance of a Certificate of Compliance, the Applicant shall provide the Commission with an as-built plan prepared by an appropriate professional showing road, utilities, buildings, stormwater management structures, grading, elevations, resource area boundaries, wetland flag locations, permanent wetland bounds, the 25-foot protected buffer, snow storage areas, mitigation plantings, and easements that may apply in addition to any other features that the Commission deems necessary. The as-built plan must be submitted in both PDF and CAD formats.
37. No application of herbicides, pesticides, and fertilizers are permitted on this site within 25 feet of wetland resource areas.



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E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

April 17, 2024

1. Date of Issuance

Please indicate the number of members who will sign this form.

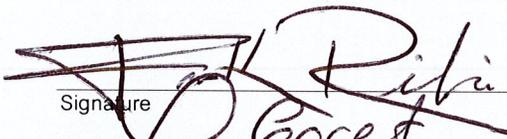
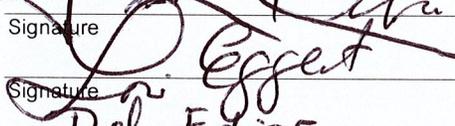
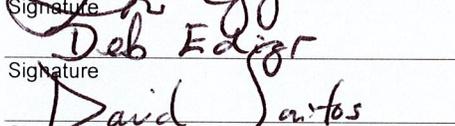
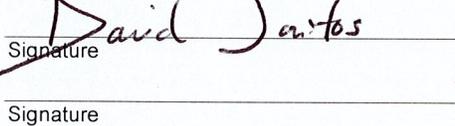
Four

This Order must be signed by a majority of the Conservation Commission.

2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Bedford Conservation Commission

	Frank Richichi
Signature	Printed Name
	Lori Eggert
Signature	Printed Name
	Deb Edinger
Signature	Printed Name
	Davis Santos
Signature	Printed Name

by hand delivery on

by certified mail, return receipt requested, on

April 17, 2024
 Date

Date



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

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F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



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G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Bedford
 Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:
Bedford
 Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location MassDEP File Number

Has been recorded at the Registry of Deeds of:

County Book Page

for: Property Owner

and has been noted in the chain of title of the affected property in:

Book Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee
Transmittal Form

DEP File Number:

103-0925

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

1. Location of Project

a. Street Address	b. City/Town, Zip
c. Check number	d. Fee amount

2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town	State	Zip Code
Phone Number	Fax Number (if applicable)	

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

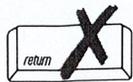
Name

Mailing Address

City/Town	State	Zip Code
Phone Number	Fax Number (if applicable)	

4. DEP File Number:

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



B. Instructions

1. When the Departmental action request is for (check one):

- Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)
- Superseding Determination of Applicability – Fee: \$120
- Superseding Order of Resource Area Delineation – Fee: \$120



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee
Transmittal Form

DEP File Number:

103-0925

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <https://www.mass.gov/service-details/massdep-regional-offices-by-community>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

SECTION 00 41 01

BID FORM

- A. This Bid is submitted to the Town of Bedford, MA (Owner).
- B. Declarations: The undersigned declares that the only persons or parties interested in this Bid as principals are as stated; that the Bid is made without any collusion with other persons, firms, or corporations; that it has carefully examined all the Contract Documents as prepared by the Owner; that it has informed itself fully in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. The prices Bid shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.
- C. Open Bids: All Bids shall remain open for 90 days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids.
- D. Bid Security: The Bid Security accompanying this Bid shall be in the amount of 5% percent of the Bid. The undersigned agrees that the Bid Security accompanying this Bid shall become the property of Owner if the Bidder fails to execute the Contract as stated below.
- E. Notice of Award: If a Notice of Award accompanied by at least 4 unsigned copies of the Contract and all other applicable Contract Documents is delivered to the undersigned within 30 days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids, the undersigned will, within 10 days after the date of receipt of such notification, execute and return all copies of the Contract, provide Bonds and insurance, and all other required documents and applicable Contract Documents to Owner. The premiums for all Bonds required shall be paid by Contractor and shall be included in the Contract Price.
- F. Bonds: The undersigned agrees to furnish a 100% Performance Bond and a 100% Payment Bond with a surety company acceptable to the Owner if awarded a Contract.
- G. Contract Times and liquidated damages are as set forth in the Contract.
- H. Addenda: The undersigned acknowledges receipt of addenda numbered:
-
- I. Requirements of the Bid
1. Bidders must bid on each item. Bid prices must be written in both words and figures. All entries in the Bid must be made clearly and in ink or typed. Bidders shall insert computed total in the spaces provided on the Bid Form.
 2. Amounts shall be shown in both words and figures, where indicated. In case of discrepancy, the amount shown in words will govern.
 3. The Bid pricing shall include all labor, equipment, materials, removal, overhead, profit, insurance, incidentals and items inherent to and required to complete the Work.

J. In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and equipment and labor to complete the Work in its entirety, in the manner and under the conditions required, at the prices listed as follows.

BID PRICES SHALL EXCLUDE SALES AND USE TAX

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)
1A	8" HDPE Drain Pipe @ _____	25		
	_____ Dollars and _____ Cents PER Linear Foot	LF		
1B	12" HDPE Drain Pipe @ _____	30		
	_____ Dollars and _____ Cents PER Linear Foot	LF		
1C	15" HDPE Drain Pipe @ _____	190		
	_____ Dollars and _____ Cents PER Linear Foot	LF		
2	36" RCP Culvert Replacement @ _____	1,205		
	_____ Dollars and _____ Cents PER Linear Foot	LF		
3	8" PVC Gravity Sewer (SDR-35) @ _____	245		
	_____ Dollars and _____ Cents PER Linear Foot	LF		
4	Precast Concrete Catch Basin @ _____	2		
	_____ Dollars and _____ Cents PER Each	EA		
5A	4-Foot Diameter Drain Manhole @ _____	4		
	_____ Dollars and _____ Cents PER Each	EA		

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)
5B	5-Foot Diameter Drain Manhole @ _____ _____ Dollars and _____ Cents PER Each	1		
		EA		
6A	Manhole Frames and Covers @ _____ _____ Dollars and _____ Cents PER Each	5		
		EA		
6B	Frame and Grate @ _____ _____ Dollars and _____ Cents PER Each	2		
		EA		
7	Precast Concrete Headwalls @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		
8	Storm Drain Cleanout @ _____ _____ Dollars and _____ Cents PER Each	2		
		EA		
9	Storm Drain Bypass Pumping @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		
10	Sewer Bypass Pumping @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		
11	Riprap Slope Stabilization @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		

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)
12	Pavement Removal @ _____ Dollars and _____ Cents PER Square Yard	1,200 SY		
13A	Temporary Trench Pavement @ _____ Dollars and _____ Cents PER Square Yard	285 SY		
13B	Permanent Trench Pavement @ _____ Dollars and _____ Cents PER Square Yard	285 SY		
14A	Full-Width Binder Course Pavement @ _____ Dollars and _____ Cents PER Ton	35 TN		
14B	Full-Width Top Course Pavement @ _____ Dollars and _____ Cents PER Ton	20 TN		
15	HMA Driveway @ _____ Dollars and _____ Cents PER Ton	105 TN		
16	HMA Sidewalk @ _____ Dollars and _____ Cents PER Square Yard	175 SY		
17	Loam & Seed @ _____ Dollars and _____ Cents PER Square Yard	1,575 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)
18	Site Clearing @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		
19	Rigid Insulation @ _____ _____ Dollars and _____ Cents PER Square Yard	55		
		SY		
20	Erosion and Sedimentation Control Devices @ _____ _____ Dollars and _____ Cents PER Ton	1		
		LS		
21	Test Pits @ _____ _____ Dollars and _____ Cents PER Each	6		
		EA		
22	Traffic Management and Controls @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		
23	Removal and Disposal of Asbestos Pipe @ _____ _____ Dollars and _____ Cents PER Linear Foot	245		
		LF		
24	Wetlands Restoration @ _____ _____ Dollars and _____ Cents PER Square Yard	15		
		SY		
25	Mobilization/Demobilization @ _____ _____ Dollars and _____ Cents PER Lump Sum	1		
		LS		

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)
26	Owner's Contingency Allowance for Abutter Property Restoration @ _____	1	N/A	\$25,000
	Twenty-Five Thousand Dollars and Zero Cents PER Not to Exceed	NTE		
27	Owner's Contingency Allowance (per Paragraph 13.02 of the General Conditions) for Materials Escalation Price Adjustment (statutory requirement) @ Ten Thousand Dollars and Zero Cents NOT TO EXCEED	1	N/A	\$10,000
		NTE		

TOTAL BID PRICE (based on Unit Price Schedule above)

_____ Dollars and \$ _____
 _____ Cents (Use figures)
 _____ (Use words)

Unit Prices have been computed in accordance with Paragraph 13.03.A of the General Conditions and Supplementary Conditions, if any. Bidder acknowledges that 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 above, as provided in the General Conditions and Supplementary Conditions, if any.

Contract Price Adjustments

- A. *Owner's Contingency for Materials Escalation Price Adjustment per MGL c30s38A and (per Paragraph 13.02 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 the Supplementary Conditions.

K. Bidder Name and Address: The names and residences of all persons and parties interested in the foregoing Bid as principals are as follows:

Give first and last names in full. In the case of a corporation, see Article 8.5 of the Instructions to Bidders, in the case of a partnership, see Article 8.6 of the Instructions to Bidders.

L. Representations and Certifications:

1. The undersigned hereby certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.
2. The undersigned hereby certifies 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.
3. Pursuant to M.G.L. c. 62C, §49A, the undersigned hereby certifies under the penalties of perjury that the undersigned, to the best of its knowledge and belief, has filed all state tax returns and paid all state taxes required under Law.
4. The undersigned hereby certifies under the penalties of perjury, pursuant to M.G.L. c.62C, §49A(b), that it has complied with all laws of the Commonwealth relating to taxes, to reporting of employees and contractors, and to withholding and remitting child support. The Bidder also understands that the Massachusetts Conflict of Interest Law, M.G.L. c. 268A, applies to the party ultimately chosen as Contractor with respect to the services required to be provided under this Contract. Contractor and its officers, employees, agents, subcontractors and affiliated agencies shall not participate in any activity which constitutes a violation of the Massachusetts Conflict of Interest Law or which creates an appearance of a violation of the Massachusetts Conflict of Interest Law.
5. The undersigned hereby certifies that it has not given, offered, or agreed to give any gift, contribution, or offer of employment as an inducement for, or in connection with, the award of a Contract pursuant to these Bidding Documents.
6. The undersigned hereby certifies that no consultant to, or subcontractor for, the Bidder has given, offered, or agreed to give any gift, contribution, or offer of employment to the Bidder, or to any other person, corporation, or entity as an inducement for, or in connection with, the award to the consultant or subcontractor on a Contract by the Bidder.

7. The undersigned hereby certifies that no person, corporation, or other entity, other than a bona fide full-time employee of the Bidder has been retained or hired to solicit for or in any way assist the Bidder in obtaining the Contract (pursuant to the Bidding Documents) upon an agreement or understanding that such person, corporation or entity be paid a fee or other compensation contingent upon the award of a Contract to the Bidder.
8. The undersigned hereby certifies that it is in compliance with and shall remain in compliance with M.G.L. c. 151B and shall not discriminate on any prohibited bases outlined therein. The Bidder also hereby certifies that it shall comply with any and all Supplier Diversity Office thresholds, as applicable, if they have been established in conjunction with this Invitation for Bids.
9. The undersigned hereby certifies that is presently not debarred, suspended, or otherwise prohibited from practice by any federal, state, or local agency, and that, should any proceeding arise in which it is debarred, suspended, or otherwise prohibited from practice by any federal, state, or local agency, the Bidder shall inform Owner within one (1) business day of such debarment, suspension, or prohibition from practice.
10. The undersigned hereby certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word “person” shall mean any natural person, business, joint venture, partnership, corporation, union, committee, club or other business or organization, entity, or group of individuals.
11. The Bidder has familiarized himself with the nature and extent of the Contract Documents, Work, Site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
12. Bidder has studied carefully all reports and drawings of physical conditions included with these Bidding Documents, and accepts that all measurements and Technical Data included have limited reliance and the Bidder has made such investigations of its own as necessary and has based his Bid on those investigations.
13. Bidder has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies (in addition to or which pertain to the physical conditions at the Site or otherwise may affect the cost, progress, performance or furnishing of the Work) as Bidder considers necessary for the performance or furnishing of the Work at the Contract Price, with in the Contract Times and in accordance with the other terms and conditions of the Bidding Documents, and no additional examination, investigations, explorations, tests, reports, or similar information of data are or will be required by Bidder for such purposes.
14. Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Bidding Documents.
15. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any

group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner. The Bidder certifies that it has reviewed the insurance requirements contained in the Contract Documents and certifies that it will comply with them.

16. The undersigned hereby certifies that it shall provide services under this Contract as an independent contractor with Owner and not as an employee of Owner. No employee, agent or representative of Contractor shall be entitled to receive any benefits of employment with Owner, including without limitation salary, overtime, vacation pay, holiday pay, sick leave, health insurance, life insurance, pension or deferred compensation.
17. The undersigned hereby certifies that Work shall be performed as expeditiously as is consistent with professional skill and care and the orderly progress of the Work. Contractor shall exercise due care and diligence in the rendition of all Work in accordance with the applicable professional standards in the eastern Massachusetts area.
18. Post-Bid Submittals: If awarded the Contract, the undersigned agrees to furnish, without limitation, the following information prior to the time established for execution of the Contract:
 - Massachusetts Foreign Corporation Certificate, if applicable
 - OSHA training records for each employee assigned to this Project
 - Bonds and insurance certificates

Social Security Number or Federal
ID Number

Corporate Name, or Legal Entity

Date

By:

Corporate Officer, or duly authorized signature of legal entity (if
applicable)

This Certificate shall be completed when Bidder is a Corporation and shall be so completed by its Clerk. In the event that the Clerk is the person signing the Bid on behalf of the Corporation, this certificate shall be completed by another officer of the Corporation.

CERTIFICATE OF CORPORATE BIDDER

I _____, certify that I am the _____ of the Corporation named as Bidder in the attached Bid Form; that _____, who signed said Bid Form on behalf of the Bidder was then _____ of said Corporation; that I know his/her signature hereto is genuine and that said Bid Form was duly signed, sealed and executed for and on behalf of its governing body.

(Corporate Seal)

Name of Bidder

Address of Bidder

Telephone Number

By: _____
(Signature)

Printed Name

Printed Title

Date

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 _____ (Seal) **SURETY** _____ (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 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

- B. 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: _____
- C. 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.

1.03 SPECIALTY EXPERIENCE OF BIDDER OR SUBCONTRACTORS

C. Identify at least 10 projects that included either or a combination of stormwater and sewerage utilities within public streets within the last 10 years.

Client/Owner Name/Address	Project Name/Location	CURRENT Contact Name, Phone, Email	Bidder or Subcontractor (Name)	Time Period

Additional Requirements

- B. Submit detailed information for each person or firm evidencing qualifications and experience and ability to meet the requirements specified for the following.
 - 1. Sewage or stormwater bypass pumping: provided, operated, and maintained by a firm that has been regularly engaged in providing bypass pumping for the last 10 years and with at least 10 successful projects.
 - 2. Surveying: registered surveyor in the state where Project is located that has been regularly and continuously engaged in surveying for the last 10 years.

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.

1.09 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. List any and all citations and/or violations issued by regulatory agencies and/or judgments against Bidder from a court of law; all assessed penalties or liquidated damages, and the Project in which they occurred; and any and all contract terminations.

- B. List involvement in violation of 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 52 10

CONTRACT

CONTRACT made this CHOOSE NO day of CHOOSE MONTH in the year INSERT YEAR, by and between the Town of Bedford, Massachusetts, with offices located at 10 Mudge Way, Bedford MA 01730, acting through its Select Board, hereinafter called Owner, and INSERT CONTRACTOR NAME hereinafter called Contractor, with offices located at INSERT CONTRACTOR ADDRESS ,CITY, STATE, ZIP. Owner and Contractor in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.1. Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as the removal and replacement of culverts and associated headwalls; replacement of storm drain infrastructure; replacement of sewer main and reconnection of sewer services; site restoration; and includes all materials and equipment, construction, and services inherent to the Work.

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

ARTICLE 2 – ENGINEER

2.1. The Engineer for this Project is Woodard & Curran, Inc., which will 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 3 – CONTRACT TIMES

3.1. The Contract Time shall commence within 30 days following the effective date of the Contract or as stated in a Notice to Proceed.

3.2. The Work shall be substantially complete within 60 calendar days from the commencement of Contract Times and completed and ready for final payment within 90 calendar days from the commencement of Contract Times.

3.3. Contractor agrees that the Work shall be prosecuted regularly, diligently, and uninterruptedly and at such rate of progress as will ensure full completion thereof within the Contract Time stated above. It is expressly understood and agreed, by and between Contractor and Owner, that the Contract Time is reasonable for the completion of the Work, taking into consideration the average climatic range and usual conditions prevailing in this locality.

ARTICLE 4 – CONTRACT PRICE

4.1. Owner will pay Contractor for performance of the Work in accordance with the Contract Documents in current funds at the prices agreed upon in the Contractor's Bid Form attached to this Contract.

TOTAL PRICE

[IN WORDS] Dollars and [IN WORDS] Cents

[\$[DOLLAR AMOUNT]]

4.1.1. Unit Prices have been computed in accordance with Paragraph 13.03 of the General Conditions and Supplementary Conditions, if any.

4.1.2. 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 13.03 of the 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. Final payment for unit price items will be based on actual quantities determined and based on the unit prices in the Contractor's Bid Form.

4.2. Adjustments to the Contract Price for Owner's Contingency Allowances will be made in accordance with the General Conditions, Paragraph 13.02 and Supplementary Conditions, if any.

4.2.1. Adjustments to the Contract Price will be made for diesel fuel, gasoline, liquid asphalt, and portland cement in cast-in-place concrete based on the Base Prices and index established for adjustments in accordance with price adjustment clauses included in the Supplementary Conditions.

ARTICLE 5 – APPLICATIONS FOR PAYMENT

5.1. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions using the form provided in Division 01 General Requirements. Applications for Payment will be processed by Engineer and Owner as provided in the General Conditions and Supplementary Conditions, if any.

ARTICLE 6 – PROGRESS AND FINAL PAYMENTS

6.1. Owner will make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as approved by Engineer, monthly during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in Paragraph 15.01 of the General Conditions.

6.2. Owner will make progress and final payments as provided in Article 15 of the General Conditions and in accordance with the applicable Massachusetts General Law. Owner shall not make payments in advance.

6.3. In consideration for performance of the Work in accordance with the requirements of this Contract, and in accordance with M.G.L. c.30, §39G, Owner shall pay Contractor the prices set forth in Contractor's Bid, a copy of which is attached hereto and incorporated by reference.

6.4. If this Contract is a unit price contract, miscellaneous expenditures associated with Contractor's Work on this Project shall not be paid by Owner. In the event that an unforeseen miscellaneous expense is incurred, Contractor shall receive Owner's approval in writing prior to incurring the expense if it will subsequently seek payment of said expense from Owner.

6.5. Payment shall be made to Contractor for Work completed in accordance with the Contract Documents as specified in Article 15 of the General and Supplementary Conditions, if any.

6.6. If Owner objects to all or part of any Application for Payment, Owner shall notify Contractor in writing within 10 days after presentation of the Application for Payment to Owner with Engineer's recommendation, and shall pay that portion of the Application for Payment not in dispute within 30 days after receipt of Engineer's recommendation.

6.7. Payment of the amounts due under this Contract shall release Owner and its officers, employees, boards, commissions, committees, agents and representatives, from any and all claims and liability in any way relating to this Contract or anything done in pursuance thereof.

6.8. No payment by Owner to Contractor shall be deemed to be a waiver of any right of Owner under this Contract or ratification by Owner of any breach hereof by Contractor.

ARTICLE 7 – LIQUIDATED DAMAGES

7.1. Owner and Contractor recognize that time is of the essence of this Contract and that Owner will suffer financial loss if the Work is not completed within the Contract Time specified in Article 3 above, plus any extensions thereof allowed in accordance with Article 4 of the General Conditions. They 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 **\$ 500** for each day that expires after the time specified 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 **\$500** for each day that expires after the time specified above for completion and readiness for final payment until the Work is completed and ready for final payment.

7.2. Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is for reasons included in Paragraph 4.05 C. of the General Conditions.

7.3. Provided, further, that Contractor shall furnish Owner the required notification of such delays in accordance with Article 11 of the General Conditions.

ARTICLE 8 – ASSURANCES

8.1. Contractor has familiarized himself with the nature and extent of the Contract Documents, the Work Site, local conditions, and Federal, State and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work. The Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.2. Contractor has given Engineer and Owner written notice of any conflict, error or discrepancy that he has discovered in the Contract Documents and the written resolution thereof by Engineer and Owner is acceptable to Contractor.

8.3. Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions and General Conditions, and accepts the determination of the extent of the Technical Data contained in such reports and drawings upon which Contractor is entitled to rely.

8.4. Contractor has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Paragraphs 8.1 and 8.3 above) which pertain to the subsurface or physical conditions at or contiguous to the Site or otherwise may affect the cost, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

8.5. Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.1. The Contract Documents which comprise the Contract between Owner and Contractor are attached hereto and made a part hereof and consist of the following:

- 9.1.1. Bid Form and documentation submitted with the Bid
- 9.1.2. This Contract
- 9.1.3. Construction Performance Bond
- 9.1.4. Construction Payment Bond
- 9.1.5. Certificate of Insurance
- 9.1.6. General Conditions
- 9.1.7. Supplementary Conditions
- 9.1.8. Specifications

9.1.9. Drawings dated SELECT DATE

9.1.10. Addenda

9.1.11. Any Modification, including Change Orders, duly delivered after execution of the Contract.

ARTICLE 10 – MISCELLANEOUS

10.1. Terms used in this Contract which are defined in Article 1 of the General Conditions shall have the meanings assigned in the General Conditions and Supplementary Conditions, if any.

10.2. Neither Owner nor Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part its interest under any of the Contract Documents; and, specifically but without limitation, Contractor shall not assign any monies due or to become due without the prior written consent of Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

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

10.4. By entering into this Contract, Contractor certifies under penalties of perjury that its proposal was made and submitted in good faith and without collusion or fraud with any person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

10.5. By entering into this Contract, the Contractor certifies under the penalties of perjury, pursuant to M.G.L. c.62C, §49A(b), that it has complied with all laws of the Commonwealth relating to taxes, to reporting of employees and contractors, and to withholding and remitting child support.

10.6. The Contract Documents constitute the entire agreement between Owner and Contractor and may only be altered, amended or repealed by a Modification.

10.7. Any action at law or suit in equity instituted by the Contractor as a result of the performance, non-performance or alleged breach of this Contract shall be filed in the Superior Court of the Commonwealth of Massachusetts for Middlesex County, MA, and in no other court or jurisdiction.

10.8. If Contractor discovers or is informed of any discrepancy or inconsistency in the Contract Documents in relation to any law, statute, ordinance, by-law, decree, code, rule, regulation, or order, Contractor shall promptly, before commencing services under this Contract, report the same to Owner in writing.

10.9. Contractor acknowledges that it has not been influenced to enter into this Contract, nor has Contractor relied upon any warranties or representations not set forth in this instrument.

10.10. No member, officer or employee of Owner, or its designees or agents, no member of the governing body of the locality in which the Project is situated, and no other public officials, member, officer or employee of Owner, or its designees or agents, no members of the governing body of such locality or localities who exercises any functions or responsibilities with respect to the Project during his tenure or for 1 year thereafter, shall have any interest, direct or indirect, in any agreement, contract or subcontract, or the proceeds thereof, for Work to be performed in connection with the Project. Contractor shall incorporate or cause to be incorporated, in all of its agreements, contracts or subcontracts a provision prohibiting such interest pursuant to the purposes of this section.

10.11. Contractor shall maintain the confidentiality of information designated by Owner as confidential, unless withholding such information would violate the law or create a risk of significant harm to the public, or unless Contractor has been required to release such information by final judgment or order of a court of competent jurisdiction, or unless Owner has expressly waived such confidentiality in advance in writing. Contractor shall not represent or purport to represent that it speaks for Owner vis-à-vis the media or the public at-large without Owner's express, written consent in advance.

10.12. Prior to commencing services under this Contract, Contractor shall furnish Owner, in writing, the names, addresses and telephone numbers of not fewer than two (2) principal employees of its business who are to be contacted in the event of an after-hours emergency.

10.13. This Contract is executed in 4 copies as a sealed instrument.

10.14. To the extent any of the foregoing sections required by Massachusetts law are inconsistent with other, non-statutory sections in this Contract, any statutorily-mandated provisions contained herein shall control.

10.15. Contractor hereby acknowledges that the use of alcoholic beverages, narcotics, and mood-altering substances, except for current valid, legal prescriptions, by any officer, employee, agent, or representative of Contractor is prohibited on Owner property which is the subject matter of this Contract and during all hours of work under this Contract. If any officer, employee, agent, or representative of Contractor violates the foregoing provision, Owner shall have the right to order that such officer, employee, agent, or representative of Contractor shall not be permitted to return to work on this Contract. Under such circumstances, Contractor shall promptly remove the subject officer, employee, agent, or representative from the job Site and shall not permit the subject officer, employee, agent, or representative to perform further work in conjunction with this Contract.

10.16. Pursuant to M.G.L. c. 270, §22, the Commonwealth of Massachusetts Smoke Free Workplace Law, Contractor, its officers, employees, agents, and representatives shall refrain from smoking and from using tobacco products in any public building in the Town.

10.17. To the extent permitted by law, for each employee of Contractor who is performing services under this Contract, Contractor shall, subject to its confidentiality and privacy obligations owing to its employees and third parties, provide a written confirmation to Owner that such employee

passed Contractor's pre-employment criminal background screen. In the event that any employee refuses to permit Contractor to provide such information to Owner, Contractor shall not assign such employee to perform services for Owner, and such employee shall not be authorized to perform services for Owner. Owner shall be permitted to keep such information in its files.

10.18. Contractor shall furnish all supplies, equipment, and labor necessary for the performance of the services required by this Contract in accordance with the applicable professional standards in the eastern Massachusetts area. Contractor warrants that it has in its employ, and throughout the term of the Contract or any extension or renewal thereof, will continue to have a sufficient number of persons experienced in developing and providing services required by this Contract, such that Contractor's obligations under the Contract will be carried out in a prompt, safe and professional manner. Contractor shall comply with all provisions of law applicable to its work including without limitation statutes, by-laws rules, regulations, orders and directives.

10.19. This Contract shall be considered to include in their entirety all terms respecting workers' compensation insurance and other terms required to be included in it by M.G.L. c. 152, as amended, and any other laws, as though such terms were set forth in their entirety herein. Contractor shall comply with all applicable provisions of Laws and Regulations as specified by the Williams-Steiger Occupational Safety and Health Act of 1970, as amended.

10.20. The award of this Contract and the continued operation of this Contract are subject to appropriation by Bedford Town Meeting of sufficient money to fund the Contract. Owner may terminate this Contract upon written notice to Contractor if a source of money to fund the Contract is lost during any year of the Contract term. In the alternative, the parties may agree in writing to amend the Contract to provide for a Contract Price which represents the reduced appropriation for a contract year.

ARTICLE 11 – COUNTERPARTS AND SIGNATURES

11.1. This Contract may be executed in several counterparts, and as so executed, shall constitute one agreement binding on all parties hereto, notwithstanding that all of the parties have not signed the same counterpart. Each party to this Agreement agrees that delivery of an executed signature page of this Agreement to the other party (or its attorney) by electronic transmission shall be binding on each of the parties if the original of the electronic transmission has been delivered to the other party. This Agreement may be executed by electronic or digital means bearing a handwritten reproduction, electronic image of a signature, or other mark indicating signatures.

[Signature Page Follows]

0235172.01
Issue Date: June 2024

Richard Road Culvert Replacement Project
Town of Bedford, Massachusetts

IN WITNESS WHEREOF, the parties hereto have signed this Contract in quadruplicate. All portions of the Contract Documents have been signed or identified by Owner and Contractor.

This Contract shall become effective on **SELECT DATE**.

OWNER:
TOWN OF BEDFORD, MA
By: **SELECT BOARD**

CONTRACTOR:
INSERT CONTACTOR NAME

By _____
Printed Name

Title

Address for giving notices:
INSERT ADDRESS FOR GIVING NOTICES

Address for giving notices:
INSERT ADDRESS FOR GIVING NOTICES

Agent for service of process:

Approved:

INSERT NAME - ADDRESS

Town Counsel

As required by Chapter 693 of the Acts of 1964 (M.G.L. Chapter 44 Section 31C), this is to certify that the Town of Bedford, Massachusetts has an appropriation which is adequate to cover the cost of this contract.

Date

Signature of Town Accountant

Note: If Contractor is a corporation or other legal entity, an affidavit and Certificate of Vote giving the principal the right to sign the Contract must accompany the executed Contract.

END OF SECTION

CONSTRUCTION PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we

(Name of Contractor)

a Choose an item. hereinafter call "Principal" and
(Corporation, Partnership, Joint Venture, Limited Liability Company, or Individual)

_____ of _____, State of _____
(Surety) (City) (State)

called the "Surety" and licensed by the State Division of Insurance to do business under the laws of the Commonwealth of Massachusetts are held and firmly bound to the Town of Bedford, Massachusetts, hereinafter called "Owner," in the penal sum of

_____ Dollars and _____ Cents (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the Choose No. day of Choose Month, Insert Year, a copy of which is hereto attached and made a part hereof for the construction described as follows:

Richard Road Culvert Replacement Project
TOWN OF BEDFORD, MASSACHUSETTS

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

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder of the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this Contract or to the Work or to the Specifications. The Surety Company providing the bond shall have a rating of A or better within the Best Key Rating Guide.

PROVIDED, FURTHER, that it is expressly agreed that the Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent (20%), so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this Bond, and whether referring to this Bond, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

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

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this, the _____ day of _____, _____.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (seal)

Surety's Name and Corporate Seal (seal)

By: _____
Signature

By: _____
Signature (attach power of attorney)

Print Name

Print Name

Title

Title

Address, City, State, Zip

Address, City, State, Zip

Attest: _____
Signature

Attest: _____
Signature

Title

Title

NOTE: If Contractor is a partnership, all partners should execute bond.

CONSTRUCTION PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we

(Name of Contractor)

a CHOOSE AN ITEM hereinafter call "Principal" and (Corporation, Partnership, Joint Venture, Limited Liability Company, or Individual)

(Surety) of (City), State of (State)

called the "Surety" and licensed by the State Division of Insurance to do business under the laws of the Commonwealth of Massachusetts are held and firmly bound to the Town of Bedford, Massachusetts, hereinafter called "Owner," in the penal sum of

Dollars and Cents (\$)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the Choose No. day of Choose Month, Insert Year, a copy of which is hereto attached and made a part hereof for the construction described as follows:

Richard Road Culvert Replacement Project TOWN OF BEDFORD, MASSACHUSETTS

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

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder of the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this Contract or to the Work or to the Specifications. The Surety Company providing the bond shall have a rating of A or better within the Best Key Rating Guide.

PROVIDED, FURTHER, that it is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent (20%), so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended.

The term "Amendment", wherever used in this Bond and whether referring to this Bond, the Contract or the Loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

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

IN WITNESS WHEREOF, this instrument is executed in six (6) counterparts, each one of which shall be deemed an original, this, the _____ day of _____, _____.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (seal)

Surety's Name and Corporate Seal (seal)

By: _____
Signature

By: _____
Signature (attach power of attorney)

Print Name

Print Name

Title

Title

Address, City, State, Zip

Address, City, State, Zip

Attest: _____
Signature

Attest: _____
Signature

Title

Title

NOTE: If Contractor is a partnership, all partners should execute bond.

SECTION 00 72 00

**STANDARD GENERAL CONDITIONS
OF THE BEDFORD CONSTRUCTION CONTRACT**

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. Agreement—The “Contract”.
 3. Application for Payment - The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. Bid - The price submission on the prescribed form by the individual, partnership, corporation, or other entity setting forth the monetary amount of the total Contract, together with any unit prices requested, on a form prescribed by the Owner, pursuant to M.G.L. c.30, or c. 149, §§44A et seq., as the case may be. May also be referred to as “Proposal” which may be used interchangeably and shall have the same meaning.
 5. Bidder - The individual, partnership, corporation, or other entity that submits a Bid pursuant to an Invitation for Bids by Owner.
 6. Bidding Documents - Any and all documents issued by Owner in requesting Bids pursuant to M.G.L. c. 30 s389M., which shall include, but shall not be limited to, the Invitation to Bid, the Instructions to Bidders, Bid Bond (if any), Bidder Qualifications, Bid Form, Contract, Performance Bond, Payment Bond, General Conditions of the Bedford Construction Contract, Supplementary Conditions, Minimum Prevailing Wage Rates, and other additional information provided to potential Bidders by Owner or as statutorily required.
 7. Bidding Requirements - Any and all requirements contained in any portion of the Bidding Documents issued by Owner.
 8. Change Order - A written order to the Contract signed to show the recommendation of the Project Manager, if any, the approval of Engineer and the authorization of Owner, executed with the same formality as the Contract, issued after the execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Price or the Contract Times. The Contract Price and Contract Times may be changed only by Change Order. A Change Order signed by Contractor indicates Contractor's Contract therewith, including the adjustment in the Contract Price or the Contract Times.

9. A Change Order request may originate with Owner, Engineer, if any, or Contractor and shall be submitted to Owner. The Change Order request shall be made in writing and in accordance with the provisions of the Contract and applicable procedures of Owner. The term “equitable adjustment”, as used in these conditions, shall include all adjustments to the Contract Price or to the Contract Times to which Contractor is entitled, pursuant to M.G.L. c.30, Sections 39N and 39O. Such equitable adjustment shall be made in accordance with the provisions of this Article.
10. A Change Order may be submitted for changes in the Contract Work, including but not limited to, changes in:
 - a. The Drawings and Specifications;
 - b. in the method or manner or performance of the Work; and/or
 - c. in the schedule for performance of the Work.
11. Change Proposal - A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off (any reductions in payment) against payments due; or seeking other relief with respect to the terms of the Contract.
12. Claim
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer’s decision regarding a Change Proposal or Change Order; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
 - b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer’s decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to subparagraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.

13. Complete and/or Completion - Whenever the word “Complete and/or Completion” is utilized in the Contract in reference to Work completed or when referring to the completion date of the Contract and the assessment of liquidated damages, it shall be understood to mean that all Work on the Project is completed, the facilities or construction are fully operational or may be used for the intended purpose, the data required to close out the Project has been submitted and approved, and incidental items included in the closeout Punch List have been completed to Owner’s satisfaction.
14. Constituent of Concern - Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
15. Contract - The entire and integrated written contract between Owner and Contractor, executed by Owner and Contractor, which concerns the Work (including, without limitation, Contract Times and Contract Price), identifies the parties and Engineer, and designates the items that qualify as Contract Documents. May also be referred to as “Agreement.”.
16. Contract Documents - Those documents enumerated in the written Contract between the Owner and Contractor and consist of the Contract, these General Conditions of the Contract, the Supplementary General Conditions of the Contract, other Conditions of the Contract, Drawings, Specifications, Addenda issued prior to the execution of the Contract, other documents listed in the Contract, and Modifications issued after the execution of the Contract.
17. Contract Price - The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
18. Contract Times - The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work (as referred to as Final Completion).
19. Contractor - The individual or entity with which Owner has contracted for performance of the Work.
20. Cost of the Work - See Paragraph 13.01 for definition.
21. Drawings - The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor prepared or approved by Engineer and which complement the Specifications. Shop Drawings and other Contractor submittals are not Drawings as so defined. May also 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.
22. Effective Date of the Contract - The date, indicated in the Contract, on which the Contract becomes effective.

23. Electronic Document - Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
24. Electronic Means - Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.
25. Engineer - The individual or entity named as such in the Contract.
26. Field Order - A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
27. Hazardous Environmental Condition - The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, Radioactive Material or other material in such quantities or circumstances that may present a substantial or notable danger or harm to persons or property exposed thereto in connection with the Work.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to Industry Practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
28. Laws and Regulations; Laws or Regulations - All Federal, Massachusetts and Town of Bedford law applicable to this Work including, without limitation, statutes, by-laws, rules, regulations, orders and directives, as amended, and including, without limitation, the Occupational Safety and Health Act, as amended, and related regulations, as amended, in effect throughout the term of the Contract and any extension or renewal thereof, with which Contractor shall be required to comply.
29. Liens - Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

30. Milestone - A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
31. Modification - A written amendment signed by both parties to the Contract, a Change Order, a Work Change Directive, or a minor written change in the Work Ordered by the Engineer (Field Order).
32. Notice of Award - The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
33. Notice to Proceed - A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
34. Owner - Sometimes referred to as Awarding Authority, is the Town of Bedford, a body corporate and politic located in Bedford, Middlesex County, Massachusetts. Owner and its authorized representatives, as well as Engineer and Owner's Project Manager, if any, shall at all times have access to and be permitted to observe and review all Work, materials, payrolls, records of personnel, conditions of employment, invoices for materials, and generally all records relating to the Work.
35. Progress Schedule - A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times. May also be referred to as "Construction Schedule", which may be used interchangeably and shall have the same meaning.
36. Project - The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
37. Project Manager - If referring to the Owner, the representative identified by the Owner at the beginning of the Project as speaking for the Owner as described herein.
38. Project Manual - Not used.
39. Resident Project Representative - The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
40. Samples - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
41. Schedule of Submittals - A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

42. 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.
43. Shop Drawings - All drawing, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
44. Site - Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
45. Specifications - Specifications Sections included under Division 01 through Division 48 of the Contract Documents. 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.
46. 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.
47. Submittal - A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
48. Substantial Completion - Shall mean either that the Work required by the Contract has been completed except for Work having a Contract Price of less than one (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 required by the Contract.

49. Successful Bidder - The lowest responsible and eligible Bidder, as defined in M.G.L. c. 30, 39M, or 149, §§44A et seq., on the basis of competitive Bids publicly opened and read by Owner forthwith upon expiration of the time for the filing thereof; provided, however, that Owner may reject any and all Bids if it is in the public interest to do so.
50. Supplementary Conditions - The part of the Contract that amends or supplements these General Conditions, and as may have been prepared by Engineer on behalf of and approved by Owner.
51. Supplier - A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
52. Technical Data
 - a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

53. Underground Facilities - All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
54. Unit Price Work - Work to be paid for on the basis of unit prices.
55. Work - The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
56. All Work mentioned or indicated in the Contract Documents shall be performed by Contractor as part of the Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others. Should the Drawings or the Specifications disagree in themselves or with each other, Contractor shall provide the better quality or greater quantity of Work unless otherwise directed by written addendum to the Contract. All indications or notations which apply to one of a number of similar situations, materials, or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents. Where codes, regulations, standards, requirements and publications of public and private bodies are referred to in the Specifications, references shall be understood to be to the latest revision prior to the date of receiving Bids, except where otherwise indicated. Where no explicit quality or standards for workmanship are established for Work, such Work is to be of good quality and consistent with the quality required by the Contract Documents. The Drawings are diagrammatic only, and are not intended to show the alignment, physical locations, or configurations of such Work. Owner and Engineer assume no liability arising out of jurisdictional issues raised or claims advanced by trade organizations or other interested parties based on the arrangement or manner of subdivision of the content of the Drawings and Specifications. Contractor shall make all necessary arrangements to reconcile any such jurisdictional conflicts without delay, damage or cost to Owner, unless otherwise agreed by the parties hereto.

57. Work Change Directive - A written order prepared by Engineer and signed off on by Owner and Engineer, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Price or Contract Times, or both. Owner may, by Work Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract, consisting of additions, deletions, or other revisions, the Contract Price and Contract Times being adjusted accordingly.
58. Additional Terms
- a. Final Completion—The time at which all Work is completed and ready for final payment in accordance with Paragraph 15.06 of these General Conditions.
 - b. 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.
 - c. 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 or Final Completion, but which items will not significantly interfere with the safe, reliable operation and integrity of the Project or its intended use.
 - d. Purchase Order—A written agreement between Contractor and a Supplier for provision of material and equipment.
 - e. Warranty Period—the correction period after the date of Substantial Completion per Paragraph 15.08 of these General Conditions.

1.02 Terminology

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

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

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Contract Price or Contract Times: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well- known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance

- A. Performance and Payment Bonds: When Contractor delivers the signed counterparts of the Contract to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. Before any Work at the Site is started, Contractor shall deliver to Owner, with copies to Engineer and each additional insured identified in Article 6, certificates of insurance (and other evidence requested by Owner) evidencing minimum levels of insurance which Contractor is required to purchase and maintain in accordance with the requirements of Article 6.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to 4 printed copies of the Contract (including 1 fully signed counterpart of the Contract), and 1 copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least 1 original printed record version of the Contract Documents, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 Before Starting Construction

- A. Preliminary Schedules: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract and the lead times for equipment and materials;
 2. a preliminary Schedule of Submittals;
 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; 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. Provide Evidence of Insurance in accordance with Paragraph 2.01.

2.04 Preconstruction Conference; Designation of Authorized Representatives

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

2.05 Acceptance of Schedules

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

2.06 Electronic Transmittals

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

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

- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the Owner's printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. In the event of any conflict among the Contract Documents, the Contract Documents shall be construed according to the following priorities:
- Highest Priority: Amendments
- Second Priority: Contract
- Third Priority: Addenda--later date to take precedence
- Fourth Priority: Supplementary General Conditions
- Fifth Priority: General Conditions
- Sixth Priority: Division 01, General Requirements
- Seventh Priority: Technical Specifications
- Eighth Priority: Drawings, with larger scale drawings to take precedence
- Tenth Priority The Contractor's Bid.
- F. Notwithstanding the order of priority of documents set forth in Paragraph 3.01.E, any matters contained in the Specifications which have been omitted from the Drawings or vice versa shall be construed as though contained in both. In the event of any duplication, conflict, or discrepancy between the Drawings and the Specifications or between other Contract clauses, so far as the same pertains to the Drawings, the Specifications or any Modifications to the Drawings or the Specifications, the matter shall be promptly brought to the attention of Engineer, without whose instructions Contractor shall not adjust the matter except at its own risk. Any instructions of Engineer shall be given in writing.
- G. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

H. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 Reference Standards

A. Standard Specifications, Codes, Laws, and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.
3. Paragraphs or subparagraphs herein are intended to be consistent with the requirements of Massachusetts statutes governing public building construction contracts in the Commonwealth. Any other provisions required by statute to be included herein shall be deemed to be so included. In addition, Owner and Contractor recognize that other rights, duties and obligations with respect to public construction contracts are provided for by statute, notwithstanding the fact that they are not provided for in the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

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

B. Resolving Discrepancies

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

3.04 Requirements of the Contract Documents

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

3.05 Reuse of Documents

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 Commencement of Contract Times; Notice to Proceed

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

4.02 Starting the Work

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

4.03 Reference Points

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 Progress Schedule

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

4.05 Delays in Contractor's Progress

- A. Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, pandemics and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.
- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
 - 1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 - 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 - 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

- E. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Subparagraph 4.05.D and Paragraph 11.01.
- F. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- G. Should Contractor request additional time to complete the Work, it shall document its reasons therefor and request an extension of time for the alleged delay. Failure to notify Owner of any delay as provided in this Article shall preclude Contractor from subsequently claiming any time extension or other relief due to said delay. Request for extensions of time shall be submitted as a Change Order request to Owner.
- H. Contractor shall submit the amount of a Claim to Owner 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, Owner shall not approve any costs in the Claim incurred more than 20 days before Contractor notified Owner in writing of the act or failure to act involved in the Claim.
- I. Owner and Contractor agree that they understand that this subparagraph places a burden on Contractor to inform Owner, as soon as practicable, whenever Contractor considers that an action or inaction of Owner or Engineer could result or has resulted in a delay in the Project, thereby providing Owner and Engineer with the opportunity to take action to avoid or lessen the time extensions or damages that might be associated with such action or inaction.
- J. Contractor and the Surety on Contractor's performance bond shall be jointly and severally liable for, and shall pay to Owner the expenses for inspection of Work performed after the time stipulated in the Owner-Contractor Contract for Substantial Completion. Such inspection costs shall include fees paid to Engineer and its consultants as extra services at the rate stipulated in the Owner-Engineer Contract, the costs of any other Project representatives of Owner at the current salary rate and any other direct expenses due to inspection. Owner may retain from monies otherwise due Contractor whatever sums accrue to Owner pursuant to this provision. Contractor shall not be liable for inspection costs for delay in performance as provided hereunder for any period for which an extension of the Contract Times has been granted.
- K. No claim for extension of time shall be allowed on account of failure of Engineer to furnish Drawings, Specifications or instructions until 15 days after receipt by Engineer by registered or certified mail, or by hand delivery acknowledged by Engineer, of written demand for such instructions, Drawings, or Samples, and not then unless such claim be reasonable.

- L. Contractor hereby agrees that Contractor shall have no claim for damages of any kind against Owner or Engineer on account of any delay in the commencement of the Work and/or any hindrance, delay or suspension of any portion of the Work, whether such delay is caused by Owner, Engineer, or otherwise, except as and to the extent expressly provided under M.G.L. c.30, §39O in the case of written orders by Owner. Contractor acknowledges that Contractor's sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.
- M. Statutory reference: M.G.L. c.30 §39O
1. The Awarding Authority may order the 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 fifteen days or more or due to a failure of the Awarding Authority to act within the time specified in this contract, the Awarding Authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the 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.
 2. The Contractor shall submit the amount of a claim under provision (a) 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 this 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 Contractor notified the Awarding Authority in writing of the act or failure to act involved in the claim.
 3. 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 Contractor for payment for an increase in the cost of his performance as provisions a. and b. give the Contractor against the Awarding Authority, but nothing in provisions a. and b. shall in any way change, modify or alter any other rights which the Contractor or the Subcontractor may have against each other.

N. Liquidated Damages

1. If Contractor shall fail to achieve Substantial Completion within the Contract Times, it shall be liable to pay Owner the daily amount as stipulated in the Contract not as a penalty, but as fixed and agreed upon damages for breach of contract. The said amount is fixed and agreed upon because of the difficulty of ascertaining Owner's actual damages. It is mutually understood that the said amount is a reasonable approximation or estimate thereof as of the date of the Contract. The said amount may be withheld from periodic or final payments due to Contractor, in addition to retainage and other back charges.

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

5.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment, at his own expense and without liability to Owner.

5.02 Use of Site and Other Areas

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

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. Removal of Debris during Performance of the Work: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
 - D. Loading of Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 Subsurface and Physical Conditions

- A. Reports and Drawings: The Supplementary Conditions identify:
 1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
 3. Technical Data contained in such reports and drawings.
- B. Underground Facilities may be shown or indicated on the Drawings pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. Reliance by Contractor on Technical Data: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in subparagraph 1.01.A.46.b.
- D. Limitations of Other Data and Documents: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
 4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 Differing Subsurface or Physical Conditions

- A. Notice by Contractor: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents;
or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.
- B. **Engineer's Review:** After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. **Owner's Statement to Contractor Regarding Site Condition:** After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. **Early Resumption of Work:** If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. Possible Price and Times Adjustments (Statutory reference: M.G.L. c.30 §39N)

1. 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 Awarding 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 Awarding 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 methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the Awarding Authority shall make an equitable adjustment in the Contract price and the Contract shall be modified in writing accordingly.
2. If the Contractor claims that any acts or omissions of the Owner or the Engineer, including any instructions or orders, whether oral, written, by Drawings, or otherwise, involve extra cost or time, and the Contractor has not received a written acknowledgment by the Owner or Engineer that extra payment will be made or time extended on account thereof, the Contractor shall promptly so notify the Engineer in writing of such Claim and shall not proceed with the Work relating to such Claim until the Contractor has received a further written order to proceed in accordance with this Agreement. No Claim by the Contractor on account of such acts, omissions, instructions or orders shall be valid unless the Contractor has so notified the Engineer in writing, before proceeding, and has received the further written order to proceed.
3. The Contractor shall have the burden of demonstrating the effect of the claimed delay on the Contract Times, and shall furnish the Engineer with such documentation relating thereto as the Engineer may reasonably require. Estimates of the extension of time shall be accompanied by a schedule showing how the Critical Path has been affected.

F. Underground Facilities; Hazardous Environmental Conditions:

1. Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities.

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

5.05 Underground Facilities

- A. The locations of existing underground facilities shown on the Contract Drawings are approximate only, and are included to indicate that the underground facilities are present, and it shall be Contractor's responsibility to make arrangements with all utility companies for field locations. Contractor shall also contact "Dig Safe" and other appropriate departments, agencies and companies to ensure that all underground facilities are located prior to excavation, regardless of the fact that they may or may not be shown on the Drawings.
- B. Contractor's Responsibilities: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
 1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;
 3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- C. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

- D. Engineer's Review: Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary, issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- E. Owner's Statement to Contractor Regarding Underground Facility: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- F. Early Resumption of Work: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- G. Possible Price and Times Adjustments
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

- b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraph 11.01 and Paragraph 4.05.E; and
 - c. Contractor gave the notice required in Subparagraph 5.05.B.
 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 Hazardous Environmental Conditions at Site

- A. Reports and Drawings: The Supplementary Conditions identify:
 1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
 2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 3. Technical Data contained in such reports and drawings.
- B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in subparagraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work. Nothing in the Contract Documents shall limit the responsibility of Contractor for any Hazardous Environmental Condition which is caused by Contractor or by any of its officers, employees, boards, commissions, committees, agents, or representatives.
 - D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
 - E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs. In that event, Contractor and its officers, employees, agents and representatives shall have no authority to handle, transport, remove, or dispose of any materials the presence of which at the Site constitutes a Hazardous Environmental Condition without written authorization from Owner. In any event, Contractor shall be liable for its negligence or willful misconduct.
 - F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Subparagraph 4.05 D and Article 11.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Subparagraph 5.06.I obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

- A. As required by M.G.L. c. 149, §44E, or by these General or Supplementary Conditions, Contractor shall furnish a Performance Bond, acceptable to Owner, as security for the faithful performance of its obligations under the Contract. Said Performance Bond shall be in the amount of 100% of the Contract Price and shall be issued by a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and approved by Owner. Said Performance Bond shall obligate Contractor, its surety, and their successors and assigns for all of the Work required to be performed by Contractor under the Contract. Said Performance Bond shall remain in effect no less than one (1) year after the expiration of the term of the Contract, or any extension or renewal thereof.

- B. As also required by M.G.L. c. 149, §44E, or by these General or Supplementary Conditions, Contractor shall furnish a Payment Bond, acceptable to Owner, as security for the faithful payment of its obligations under the Contract. Said Payment Bond shall be in the amount of one hundred percent (100%) of the Contract Price and shall be issued by a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and approved by Owner. Said Payment Bond shall obligate Contractor, its surety, and their successors and assigns to pay for labor, materials and equipment furnished for use regarding the Work to be performed by Contractor under the Contract.
- C. Said Payment Bond shall remain in effect no less than one (1) year after the expiration of the term of the Contract, or any extension or renewal thereof.
- D. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- E. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- F. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- G. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within twenty (20) days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- H. If Contractor has failed to obtain a required bond, Owner may exclude Contractor from the Site and exercise Owner’s termination rights under Article 16.
- I. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- J. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 Insurance - General Provisions

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better. Notwithstanding any other provision of the Contract Documents, Contractor shall provide to Owner, with its proof of insurance coverage, endorsements or riders to the policies of Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance, Umbrella Form, which indicate that Owner and Engineer are named as additional insureds on each such policy
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.
- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party’s full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party’s obligation to obtain and maintain such insurance.

- G. In addition to the liability insurance required to be provided by Contractor, Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to Owner, Engineer, or third parties.
- H. Contractor shall require:
1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.
- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within 3 days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 Contractor's Insurance

- A. Required Insurance: Contractor shall purchase and maintain Workers' Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of these General and Supplementary Conditions if any.

1. Contractor shall provide and maintain throughout the term of the Contract and any extension or renewal thereof the following insurance with companies that are authorized and licensed in the Commonwealth of Massachusetts to issue policies for the coverages and limits so required. Contractor shall also ensure that any and all Subcontractors and sub-subcontractors provide insurance in the following limits and that Owner is named as an additional insured and meet the following requirements.

2. Commercial General Liability including but not limited to:

- a. Premises/Operations
- b. Products/Completed Operations
- c. Contractual
- d. Independent Contractors
- e. Broad Form Property Damage
- f. Personal Injury
- g. Medical Expense
- h. Underground Explosion and Collapse Hazard (XCU)

Limits for Commercial General Liability at a minimum shall be:

- a. General Liability
 - General Aggregate \$2,000,000.00
 - Each Occurrence \$1,000,000.00
- b. Products/Completed Operations \$2,000,000.00

c.	Personal Injury	\$1,000,000.00
d.	Medical Expense	\$ 5,000.00
e.	Bodily Injury:	
	Each Occurrence	\$1,000,000.00
	Annual Aggregate	\$1,000,000.00
f.	Personal Injury, with employment exclusion deleted.	
	Annual Aggregate	\$1,000,000.00
g.	Property Damage:	
	Each Occurrence including Explosion	\$1,000,000.00
	Annual Aggregate	\$1,000,000.00
	Collapse and Underground coverage.	
h.	Bodily Injury:	
	Each Person	\$1,000,000.00
	Each Accident	\$1,000,000.00
i.	Property Damage: Each Occurrence	\$1,000,000.00
3.	Automotive Liability including but not limited to:	
a.	Scheduled Autos	
b.	Hired Autos	
c.	Non Owned Autos	
	Limit for Automotive Liability at a minimum shall be:	
	Combined Single Limit	\$1,000,000.00
4.	Workers' Compensation and Employer's Liability	
a.	Worker's Compensation Statutory Amount	
b.	Employer's Liability	
	Each Accident	\$1,000,000.00

Disease Policy Limit \$1,000,000.00

Disease Each Employee \$1,000,000.00

5. Provide Excess Umbrella for Liability Coverage. Use of Umbrella to meet other insurance limits will not be accepted. Limits for liability at a minimum shall be:

a. Each Occurrence \$5,000,000.00

b. General Aggregate \$5,000,000.00

Excess Liability Insurance, Umbrella Form shall be following form, providing coverage over commercial general liability insurance, automobile liability insurance, and employer's liability under workers' compensation insurance.

B. 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.

C. Certificates evidencing such insurance shall be furnished to Owner at the execution of the Contract. Such certificates shall not merely name the types of policies provided, but shall specifically refer to the Contract and shall state that such insurance is as required by the Contract. With the certificates, Contractor shall submit an insurance certification form from insurer/insurers, indicating that the coverages provided do in fact satisfy all the insurance requirements listed under Article 6 of the General Conditions, and the amendments thereto under the Supplementary Conditions.

D. Contractor shall make no claims against Owner or its officers for any injury to any officers or employees or for damage to its equipment arising out of work contemplated by the Contract.”

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

1. include at least the specific coverages required;

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

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

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 5. include all necessary endorsements to support the stated requirements.
- F. Additional Insureds: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);
 4. not seek contribution from insurance maintained by the additional insured; and
 5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 Builder's Risk and Other Property Insurance

- A. Builder's Risk: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. Insurance of Other Property; Additional Insurance: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 Property Losses; Subrogation

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

- | | |
|----------------------|----------------|
| 1. General Aggregate | \$3,000,000.00 |
| 2. Each Occurrence | \$1,000,000.00 |

A rider on the Contractor's Liability Insurance will not be acceptable.

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

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

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

D. Contractor shall waive all rights against Owner for all losses and damages caused by any perils covered by the policies of insurance provided in response to Paragraph 6.05 and any other property insurance applicable to the Work, and also waive such rights against the Subcontractors, Engineer, Engineer's consultant and all other parties named as insured in such policies for loss and damages so caused.

1. As required by Subparagraph 6.02-H of the General Conditions each subcontract between Contractor and a Subcontractor will contain similar waiver provisions by Subcontractor in favor of Owner, Contractor, Engineer, Engineer's consultants and all other parties named as insureds.
2. All such policies provided in response to Paragraph 6.05 of these General Conditions and, of the Supplementary Conditions shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights or recovery against Owner, Engineer or Engineer's consultant.

- E. If Owner has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor in accordance with Paragraph 6.02 through of the General Conditions, as amended by the Supplementary Conditions, on the basis of its not complying with the Contract Documents, Owner will notify Contractor in writing thereof within 14 days of the date of delivery of such certificates to Owner in accordance with Paragraph 2.01.B. Contractor will provide such additional information in respect of insurance provided by him as Owner may reasonably request.

6.06 Receipt and Application of Property Insurance Proceeds

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

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 Contractor's Means and Methods of Construction

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

7.02 Supervision and Superintendence

- A. Contractor shall employ a competent superintendent, reasonably acceptable to Owner, and necessary assistants who shall be in attendance at the Project Site full time and at all times during the progress of the Work until the date of Substantial Completion, and for such additional time thereafter as Engineer may determine to be necessary for the expeditious completion of the Work. Contractor shall remove the superintendent if requested to do so in writing by Owner or by Engineer on behalf of Owner, and shall promptly replace him with a competent person reasonably acceptable to Owner, at no increase in the Contract Price or Contract Times. Contractor shall not replace such superintendent without the prior written approval of Engineer.
1. Any persons performing unsupervised Work must go through the process of a criminal background check or "CORI." Contractor must provide to Owner a signed CORI release form and a copy of the driver's license from each and every person who will be working on a Site where children are located. Owner will determine and provide an adequate identification method for approved personnel and reserves the right to refuse access to any person without this identification without being charged for any service time.
- B. Contractor shall retain a competent engineer or surveyor who shall establish sufficient lines and grades for the Work.
- C. Contractor shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or Owner, every reasonable opportunity for the storage of materials.
- D. Contractor shall arrange for and attend job meetings with Engineer and such other persons as Engineer and Owner may from time to time wish to have present. Contractor shall be represented by a principal, or Project manager, as well as by Contractor's own superintendent. An authorized representative of any Subcontractor or sub-Subcontractor shall attend such meetings if the representative's presence is requested by Engineer. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings, including costs, payments, Change Orders, time schedules and manpower. Any notices required under the Contract may be served on such representatives.
- E. Contractor warrants that its financial condition is sound and that Contractor shall be capable of obtaining any bonds required by the Contract Documents. Contractor shall promptly advise Owner of any occurrence, event, fact, or other matter that has had or will have a materially adverse effect upon the financial condition of Contractor.

- F. Contractor hereby represents and warrants to Owner that Contractor is a business entity which is experienced and skilled in the construction of projects of the type described in the Contract Documents, is licensed to engage in the general construction business in the Commonwealth of Massachusetts, and is in compliance with all applicable Laws and Regulations and all case law relative thereto.
- G. Before starting the Work, and at frequent intervals during the progress thereof, Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by Owner, Engineer and Contractor and shall at once report to Engineer any error, inconsistency or omission Contractor may discover. Any necessary change shall be ordered as provided in the Contract Documents. If Contractor proceeds with the Work without such notice to Engineer, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents Contractor could have discovered such errors, inconsistencies or omissions Contractor shall bear all costs arising therefrom.

7.03 Labor; Working Hours

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.
- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's prior written consent, which will not be unreasonably withheld.
 - 1. Regular working hours are defined as 8 hours per day, Monday through Friday, excluding holidays, between the hours of 7:00 AM and 5:00 PM. Requests to work other than regular working hours shall be submitted to Engineer not less than 48 hours prior to any proposed weekend work or scheduled extended work weeks. Occasional unscheduled overtime on weekdays may be permitted provided 2 hours' notice is given to Engineer.

- D. Contractor shall reimburse Owner for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working hours stipulated in Subparagraph 7.03.C. At Owner's option, overtime costs may either be deducted from Contractor's monthly payment request or deducted from Contractor's retention prior to release of final payment. Overtime costs for Owner's personnel shall be based on the individual's current overtime wage rate. Overtime costs for personnel employed by Engineer or Owner's independent testing laboratory shall be calculated in accordance with the terms of their respective contracts with Owner.
- E. This Contract is subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, Public Law 87 581, 87th Congress. No Contractor or Subcontractor contracting for any part of the Work shall require or permit any laborer or mechanic to be employed on the Work in excess of 40 hours in any work week unless such laborer or mechanic receives compensation at a rate not less than 1.5) times that person's basic rate of pay for all hours worked in excess of 40 hours in such work week.
- F. Contractor shall employ only competent persons to do the Work and whenever Owner shall notify Contractor, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.
- G. Contractor and Subcontractors shall, insofar as practicable, give preference in the hiring of workers for the Project to qualified local residents with first preference being given to citizens of the United States who have served in the armed forces of the United States and have been honorably discharged therefrom or released from active duty therein.
- H. Contractor and all Subcontractors shall comply with the Massachusetts Prevailing Wage law as contained in M.G.L. c. 149 §§ 26-27 which are included in the Supplementary Conditions.

7.04 Services, Materials, and Equipment

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

- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
1. Wherever it is written that an equipment manufacturer must have a specified period of experience with its product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 “Or Equals”

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

- c. has a proven record of performance and availability of responsive service; and
 - d. is not objectionable to Owner.
 - 2. Contractor certifies that if the proposed item is approved and incorporated into the Work there will be no increase in cost to the Owner or increase in Contract Times; and
 - 3. the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. This Subparagraph 7.05.A. is subject to the following:

“Specifications for such contracts, and specifications for contracts awarded pursuant to the provisions of said sections forty-four A to forty-four L of said chapter one hundred and forty-nine, shall be written to provide for full competition for each item of material to be furnished under the contract; except, however, that said specifications may be otherwise written for sound reasons in the public interest stated in writing in the public records of the awarding authority or promptly given in writing by the awarding authority to anyone making a written request therefor, in either instance such writing to be prepared after reasonable investigation. Every such contract shall provide that an item equal to that named or described in the said specifications may be furnished; and an item shall be considered equal to the item so named or described if, in the opinion of the awarding authority: (1) it is at least equal in quality, durability, appearance, strength and design, (2) it will perform at least equally the function imposed by the general design for the public work being contracted for or the material being purchased, and (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the said specifications. For each item of material the specifications shall provide for either a minimum of three named brands of material or a description of material which can be met by a minimum of three manufacturers or producers, and for the equal of any one of said named or described materials.” Statutory reference M.G.L. c. 30, §39M(b).
- C. Contractor’s Expense: Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.
- D. Engineer’s Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Engineer will be the sole judge of acceptability. No “or-equal” item will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an “or-equal,” which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- E. Effect of Engineer's Determination: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- F. Treatment as a Substitution Request: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06. Contractor shall submit to Engineer for review, drawings to scale, showing the effect this substitute will have upon the adjoining materials, piping, equipment, etc., at no additional cost to Owner.

7.06 Substitutes

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

- 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.
 - 5. will identify:
 - a. all variations of the proposed substitute item from the item specified; and
 - b. available engineering, sales, maintenance, repair, and replacement services.
 - 6. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. Engineer's Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. Reimbursement of Engineer's Cost: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

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

7.07 Concerning Subcontractors and Suppliers

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so. Contractor shall be required to submit to Owner a list of Subcontractors, Suppliers and other persons it intends to use at a certain date to be specified by Owner. Contractor shall not use any Subcontractor, Supplier or other person to which Owner objects and to which Owner provides written notice of such objection to Contractor.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 Patent Fees and Royalties

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

- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, and hold harmless Owner and Engineer and all of their officers, employees, boards, commissions, committees, agents and representatives from and against all claims, causes of action, suits, costs, damages, and liability of any kind which arise out of Contractor's or Subcontractors' infringement of patent rights or copyrights incident to the use in the performance of the Work of, or resulting from Contractor's or Subcontractors' incorporation of, any invention, design, product or device not specified in the Contract Documents.
- C. Neither Owner, nor Engineer, nor any of their officers, employees, boards, committees, commissions, agents and representatives shall be under any personal obligation or shall incur any personal liability by reason of this Contract, the execution thereof or anything relating thereto which arises out of Contractor's or a Subcontractor's infringement of patent rights or copyrights incident to the use in the performance of the Work of, or resulting from Contractor's or a Subcontractor's incorporation of, any invention, design, product or device not specified in the Contract Documents.
- D. Nothing herein shall modify Contractor's general indemnification obligations, as set forth in this Contract.

7.09 Permits

- A. It is the specific responsibility of Contractor to make, in proper and timely fashion, all necessary notifications to relevant federal, state, and local governing bodies and to obtain and comply with the provisions of all permits, inspections or applications required by the Work specified, as well as to make all required submittals required under those auspices. Contractor shall indemnify Owner from, and pay for all claims resulting from, failure to adhere to these requirements. Contractor shall promptly provide Engineer and Owner with reproductions of all permits, licenses and permissions.
- B. Owner has waived the building permit fee only for this Project. All other pertinent permit and inspectional service fees shall apply.
- C. Contractor shall pay the then current inspection fee to Owner for all inspections required by state and local codes, and required by Owner.
- D. Contractor shall pay all charges of utility companies for connections to the Work. Contractor shall be aware of, observe and comply with all laws, ordinances, regulations, orders, permits, licenses, etc., and shall conduct his operations in compliance thereto, and shall indemnify Owner and Engineer from any claim or liability arising from, or based upon a violation of same.

7.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- B. The Town is exempt from Commonwealth of Massachusetts sales tax. M.G.L. c.64H, §6(f) exempts “sales of building materials and supplies to be used in the construction, reconstruction, alteration, remodeling or repair of (1) any building structure, public highway, bridge or other public works owned by or held in trust for the benefit of any governmental body or agency mentioned in paragraph (d) and used exclusively for public purposes; (2) any building or structure owned by or held in trust for the benefit of any corporation, foundation, organization or institution described in paragraph (e) and used exclusively in the conduct of its religious, scientific, charitable or educational purposes; and (3) any building, structure, residence, school or other facility included under any written contract dated on or after January 1, 1985 arising out of or related to the Massachusetts Port Authority residential and school soundproofing programs, notwithstanding whether such building, structure, residence, school or other facility is owned by or held in trust for the benefit of the Massachusetts Port Authority or is used exclusively for public purposes; provided, however, that such governmental body or agency or such corporation, foundation, organization or institution shall have first obtained a certificate from the Commissioner stating that it is entitled to such exemption and the vendor keeps a record of the sales price of each such separate sale, the name of the purchaser, the date of each such separate sale and the number of such certificate. In this paragraph 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 terms shall also include rental charges for construction vehicles, equipment and machinery rented specifically for use on the Site of any such tax exempt project or while being used exclusively for the transportation of materials for any such tax exempt project.”
- C. M.G.L. c.64I, §7 exempts from use tax “Sales exempt from the taxes imposed under chapter sixty- four H; provided, however, that in the case of the purchase of any motor vehicle or trailer, as defined in section one of chapter ninety, or any boat or airplane, other than from a vendor who is regularly engaged in the business of making sales at retail of such motor vehicles, trailers, boats or airplanes, the receipts from which are exempt from the tax imposed under said chapter sixty-four H, the purchaser thereof, except when said purchaser is the spouse, mother, father, brother, sister or child of the seller, shall pay the tax imposed by this chapter”.
- D. Contractor shall not pay, and Owner shall not reimburse or pay Contractor or any other party, either directly or indirectly, for this or any other tax for which an exemption is provided under law. Owner will provide a state sales tax exemption number to Contractor for use with response to this Project.

7.11 Laws and Regulations

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

7.12 Record Documents

- A. Contractor shall maintain a record set of Contract Documents which shall record all deviations from the Drawings and Specifications and shall be updated in detail to reflect the actual progress of the Work. Owner and Engineer shall have free and complete access to such Contract Documents during the Work. Upon Substantial Completion, Contractor shall furnish to Owner through Engineer one set of "as built" plans in such form as Owner shall require. Contractor shall also maintain a record set of the Specifications, Addenda, Change Orders and other Modifications in good order and marked and annotated currently to record changes made during the Work. Record documents in relation thereto shall be in compliance with M.G.L. c. 30, §39R.

7.13 Safety and Protection

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

- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
- K. The right of possession of the premises shall remain at all times in Owner. Contractor's right to entry and use thereof arises solely from the permission granted by Owner under the Contract Documents. Contractor shall confine Contractor's apparatus, the storage of materials and the operations of Contractor's workmen to limits indicated by Laws and Regulations, the Contract Documents, permits, and/or directions of Engineer and shall not unreasonably encumber the premises with Contractor's materials. Owner shall not be liable to Contractor, Subcontractors, their employees or anyone else with respect to the conditions of the premises, except only for a condition caused directly and solely by the negligence of Owner.
- L. Contractor shall at all times maintain a safe workplace, in full compliance with all federal, state, and local health and safety Laws and Regulations and shall indemnify and hold Owner and Engineer harmless from and against any and all liability, loss, damage or expense arising from Contractor's failure to do so.
- M. Contractor shall use only areas specifically assigned by Owner for parking, storage of materials and construction operations and shall comply with all local municipal regulations regarding use of and parking on public ways.
- N. Contractor shall repair any and all streets, drives, curbs, sidewalks, and landscaping which are disturbed by construction operations and shall leave them in as good condition after completion of the Work as they were in before commencement of the Work.
- O. Contractor shall not place or maintain, or allow to be placed or maintained, on or about the Project Site any advertising matter, sign, bill, poster, or billboard of any kind, except those required by law or the Contract Documents, without the prior written consent of Owner.

7.14 Hazard Communication Programs

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

7.15 Emergencies

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

7.16 Submittals

A. Shop Drawing and Sample Requirements

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

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.
 3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. Submittal Procedures for Shop Drawings and Samples: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. Shop Drawings
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. Samples
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Engineer's Review of Shop Drawings and Samples

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of subparagraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.
5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

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

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

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.
 - d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.

- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

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

6. The issuance of a notice of acceptability by Engineer;
 7. The end of the Correction Period established in Paragraph 15.08;
 8. Any inspection, test, or approval by others; or
 9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.
- F. Miscellaneous. Contractor shall give Engineer timely notice of any additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work. Contractor shall not proceed with any Work not clearly and consistently defined in the Contract Documents, but shall request additional Drawings or instructions from Engineer. If Contractor proceeds with such Work without obtaining further Drawings, Specifications or instructions, Contractor shall correct Work incorrectly done at Contractor's own expense. Contractor shall give continuous attention to the faithful prosecution of the Work and shall keep the same under its personal control. It shall be responsible for all the acts and omissions of its employees, Subcontractors, and of all persons directly or indirectly employed by it in connection with the prosecution of this Work.
- G. Contractor may submit Requests for Information to Engineer to help facilitate Contractor's performance of the Contract. Prior to submitting each Request for Information, Contractor shall first carefully study and compare the Contract Documents, field conditions, Owner-provided information, Contractor prepared Coordination Drawings and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources.
1. Each Request for Information shall be submitted to Engineer, in writing on such form and with such accompanying information as Engineer may require for such purpose. Each Request for Information shall identify the specific sources which were reviewed by Contractor in its efforts to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

2. Contractor shall submit each Request for Information sufficiently in advance of the date by which such information is required in order to allow Engineer sufficient time, in Engineer's professional judgment, to permit adequate review and response and to permit Contractor compliance with the latest Construction Schedule. Contractor shall maintain a log at the Project Site that sequentially numbers and lists each Request For Information. This log shall also contain the Drawing reference or Specification section to which the request pertains, the date of request, to whom the request was made, by whom the request was made, the nature of the request, and Engineer's resolution thereof.
 3. This log shall be updated weekly by Contractor and reviewed at each Project meeting, and the resolution of requests for information shall be made part of the minutes of such meetings.
 4. Contractor shall reimburse Owner amounts charged to Owner by Engineer for responding to Contractor's Requests for Information where such information is available to Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, or Project correspondence or documentation.
- H. Contractor shall be responsible to Owner for the acts and omissions of all entities or persons performing or supplying the Work regardless of tier.
- I. Contractor shall furnish sufficient forces, plant and equipment as may be necessary to insure the progress of the Work in accordance with the Project Schedule. If, in the opinion of Owner, Contractor has fallen behind the Project Schedule, Contractor shall submit a proposal demonstrating the manner in which the desired rate of progress may be increased and shall take such steps, at Contractor's own cost, as may be necessary to meet the Project Schedule. It shall be the responsibility of Contractor to maintain its schedule so as not to delay the progress of the Work or the scheduled work of separate contractors.
- J. Contractor shall be solely responsible for properly laying out the Work, and for all lines, elevations and measurements for all of the Work. It shall verify the figures shown on the Drawings before laying out the Work and will be responsible for any error or inaccuracies resulting from its failure to do so. In the event that Contractor shall, while laying out the Work, become aware of (i) any conflicts among or between the Drawings, the Specifications or any Modification to the Drawings or the Specifications and the actual layout of the Work, or (ii) any conflicts or inconsistencies in the Drawings and Specification themselves, it shall promptly notify Engineer, without whose instructions Contractor shall not adjust the matter except at his own risk.
- K. If this Project requires the containment, abatement, or removal of Asbestos or material containing Asbestos, lead or waste containing lead-based paint, Contractor shall ensure that the person or entity performing the Asbestos or lead related services is licensed pursuant to applicable Laws and Regulations.

- L. Chemical waste shall be stored in corrosion resistant containers, removed from the Project Site, and disposed of not less frequently than every three (3) weeks unless directed otherwise. Disposal of chemical waste shall be in accordance with requirements of the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP). Fueling and lubricating of vehicles and equipment shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants to be discarded or burned shall be disposed of in accordance with approved procedures meeting all applicable Laws and Regulations. In the event of an oil or hazardous materials spill large enough to violate applicable Laws and Regulations, Contractor shall notify the Engineer immediately. Contractor shall be responsible for immediately cleaning up any oil or hazardous waste spills resulting from its operations. Any costs incurred in cleaning up any such spills shall be borne exclusively by Contractor.
- M. Contractor shall be solely responsible for compliance with Laws and Regulations governing the handling, storage, use or disposal of hazardous materials or wastes used, stored, generated or disposed of in connection with construction of the Work and shall obtain all permits and approvals, give all required notices, and observe all applicable procedures prescribed by the EPA, DEP or other governmental authorities having jurisdiction with respect to such activities. At Owner's request, Contractor shall properly furnish Owner with evidence satisfactory to the Owner demonstrating Contractor's compliance with such procedures, the giving of such notices, and the issuance of such permits and approvals.
- N. Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the Site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the Site.
- O. Contractor shall at all times protect excavations, trenches, adjacent buildings and materials from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin, and shall remove promptly any accumulation of water. Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.
- P. Contractor shall be responsible for all security measures necessary and appropriate to protect the Work area until acceptance by Owner to assure that the Work, and all materials and equipment stored at the Site, are fully and completely protected against loss or damage due to vandalism, theft, or malicious mischief. Contractor shall not use guard dogs for this purpose unless authorized in advance in writing by Owner. If Owner approves the use of guard dogs, each dog shall at all times be accompanied by an adult handler.
- Q. Contractor shall be responsible for the adequate strength and safety of all scaffolding, staging, and hoisting equipment and for temporary shoring, bracing, and tying.

- R. Contractor shall furnish on Site all personal protective equipment as required, approved first aid supplies, the name of its first-aid attendant, and a posted list of emergency facilities.
- S. No unauthorized visitors shall be allowed on the Work Site without permission from Contractor.
- T. Contractor shall employ labor subject to contract terms and conditions in order to ensure harmonious labor relations on the Site and prevent strikes or labor disputes. Contractor, in the event of a labor dispute including strikes, shall take whatever action is required at no expense to Owner to prevent the disruption of the Work. Contractor shall also not permit employment of any person who is not of good character and morals nor permit disorderly or indecent conduct on the Site. It shall not permit the consumption of alcoholic beverages or illegal drugs on the job site nor permit any employment or person under its supervision or control to be under the influence thereof.
- U. Statutory reference: M.G.L. c.149, §§30 and 34
- No laborer, worker, mechanic, foreman or inspector working within this Commonwealth in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or 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 (48) hours in any one week, or more than six (6) days in any 1 week, except in cases of emergency.
- V. Statutory reference: M.G.L. c.149,§25)
- Every employee under this Contract shall lodge, board and trade where and with whom he elects, and neither the Contractor nor his agents or employees shall, either directly or indirectly, require as a condition of the employment of any person that the employee shall lodge, board or trade at a particular place or with a particular person.
- W. Statutory Reference: M.G.L. c.149,§34B
- The Contractor shall pay to any reserve police officer employed by him in any city or City the prevailing rate of wage paid to regular police officers in such city or City.”
- X. Contractor is solely responsible for the proper and safe operation and maintenance of all utility systems within the construction limits, whether these are supplied by Owner’s distribution system or otherwise, until the Work is accepted by Owner, and until Owner has notified Contractor that other arrangements have been made. Contractor shall maintain and operate appurtenances within the construction area which serve the distribution system, subject to periodic inspection by Owner’s operating personnel. Inspection by any representative or personnel of Owner shall not relieve Contractor of its responsibilities in connection with operation and maintenance of these facilities and equipment. Contractor shall provide Owner at

least 72 hours' advance notice of Contractor's desire to extend, connect, disconnect, or turn on or off any steam, electric, water, or other service from Owner's supply systems. The actual operation shall be witnessed and approved by an authorized representative of Owner. All Work to be performed by Contractor, shall be carried out without interference with Owner's normal operation. Where any Work requires interruption of any service, the Contractor shall make advance arrangements with Owner for dealing with and minimizing such interruption.

- Y. Contractor agrees to procure materials, equipment, labor and supplies from such sources and to perform all Work on the Project with labor, material suppliers and Subcontractors that will work harmoniously with Owner's employees, employees of other contractors employed by Owner, and with other elements of labor involved in the construction of the Project or the operation of the building in which the Project is located, including, without limitation, any tenant improvement work contractors engaged by Owner or any tenants of Owner.

7.18 Indemnification

- A. Contractor shall compensate Owner for all damage to Owner's property of any nature arising out of Contractor's work. To the fullest extent permitted by law, Contractor shall indemnify, defend, and hold harmless Owner and all of its officers, employees, boards, commissions, committees, agents and representatives from and against all claims, causes of action, suits, costs, damages, and liability of any kind which arise out of the breach by Contractor or its Subcontractor(s) of their obligations under this Contract, or the act or omission of Contractor, its Subcontractor(s), or their officers, employees, agents and representatives or anyone directly or indirectly employed by them, or anyone for whose acts or omissions they may be liable, regarding the Work to be performed by Contractor under the Contract, or which arise out of the violation of any applicable Laws and Regulations or which relate to personal injury or property damage suffered by Contractor or any of its officers or employees regarding the subject matter of the Contract.
- B. Neither Owner, nor any of its officers, employees, boards, committees, commissions, agents and representatives shall be under any personal obligation or shall incur any personal liability by reason of this Contract, the execution thereof or anything relating thereto which arises out of the violation of any provision of this Contract, or the violation of any applicable Laws and Regulations, or which relates to personal injury or property damage suffered by Contractor or its employees, regarding the subject matter of the Contract.

7.19 Delegation of Professional Design Services

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.
- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 Other Work

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of subparagraph 4.05.C.3.

8.02 Coordination

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

3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 Legal Relationships

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

ARTICLE 9 – OWNER’S RESPONSIBILITIES

9.01 Communications to Contractor

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

9.02 Replacement of Engineer

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

9.03 Furnish Data

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

9.04 Pay When Due

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

9.05 Lands and Easements; Reports, Tests, and Drawings

- A. Owner’s duties with respect to providing lands and access, such as easements, are set forth in Paragraph 5.01.
- B. Owner’s duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 Change Orders

- A. Owner’s responsibilities with respect to Change Orders are set forth in Article 11.

9.07 Inspections, Tests, and Approvals

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Article 14.

9.08 Limitations on Owner's Responsibilities

- A. Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- B. Contractor shall provide services under any Contract with Owner as an independent contractor with Owner and not as an employee of Owner. No employee, agent or representative of Contractor shall be entitled to receive any benefits of employment with Owner, including without limitation salary, overtime, vacation pay, holiday pay, sick leave, health insurance, life insurance, pension or deferred compensation.

9.09 Safety Programs

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 Owner's Representative

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

10.02 Visits to Site

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer and Owner deem 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. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 Resident Project Representative

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

10.04 Engineer's Authority

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.
- E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 Determinations for Unit Price Work

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

10.06 Decisions on Requirements of Contract Documents and Acceptability of Work

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

10.07 Limitations on Engineer's Authority and Responsibilities

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Subparagraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 Compliance with Safety Program

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

ARTICLE 11 – CHANGES TO THE CONTRACT

11.01 Amending and Supplementing the Contract

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

11.02 Change Orders and Change Proposals

A. Change Orders

- 1. A Change Order may be submitted for changes in the Contract work, including but not limited to, changes in:
 - a. the Drawings and Specifications
 - b. in the method or manner or performance of the Work; and/or
 - c. in the schedule for performance of the Work.
- 2. Whenever a Change Order is requested or ordered, and said Change Order will cause an adjustment in the Contractor's cost, the Contractor may request an equitable adjustment in writing in the Contract Price.

B. Change Proposals

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

- C. Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto.
 - 1. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Times (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
- D. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
 - 1. The circumstances that form the basis for the requested adjustment;
 - 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 - 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 - 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 - 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.03. Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- E. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraph 4.05.
- F. Change Proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.
- G. The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.
- H. Owner and Contractor shall attempt to negotiate an equitable adjustment in the Contract Price before commencement of the pertinent Work. In the absence of a Contract for an equitable adjustment and when so directed, Contractor shall proceed with the Change Order work on a time and material basis, and Contractor will provide Owner with a written notice to that effect.

- I. Contractor shall provide Owner with all cost and pricing data used in computing the amount of the equitable adjustment, and Contractor shall certify that the pricing data used was accurate, complete, and current.
- J. With respect to any sum of money due to be paid by Contractor to Owner under the Contract, an appropriate Change Order shall be issued deducting said sum of money from payments then due or thereafter due to Contractor from Owner. If such deductions from payments then due or thereafter due to Contractor from Owner are not sufficient to cover such amounts, Contractor shall pay the difference to Owner.

11.03 Computing Equitable Adjustments

- A. Equitable adjustments in the Contract price shall be determined according to one of the following methods, or a combination thereof, as determined by Owner:
 - 1. fixed price basis, provided that the fixed price shall be inclusive of items (1) through (5) below and shall be computed in accordance with those provisions;
 - 2. estimated lump sum basis, to be adjusted in accordance with contract unit prices, or other agreed upon unit prices provided that the unit prices shall be inclusive of all costs related to such equitable adjustment;
 - 3. time and materials basis, on a not-to-exceed predetermined upset amount to be subsequently adjusted on the basis of actual costs based on the following items (1) through (5):
 - (1) the cost at minimum prevailing rates for direct labor, material, supplies and use of equipment exclusive of hand tools;
 - (2) plus cost of Workers' Compensation Insurance, union fringe benefits, federal unemployment taxes, Federal Social Security, and Massachusetts Unemployment Compensation, or, as an alternative Contractor may elect to use a flat 20% of the total labor rate in item (1);
 - (3) plus 15% of item (1) for overhead, superintendence, and profit, which will be paid to Contractor for Work performed by Contractors' own trade forces (for Work performed by Subcontractor, Subcontractor will be entitled to a 15% mark-up and Contractor to a 5% mark-up; for Work performed by a sub-Subcontractor, the sub-Subcontractor will be entitled to a 15% mark-up, Subcontractor to a 5% mark-up, and Contractor to a 5% markup);
 - (4) if the net change is in addition to the Contract Price, it shall include Contractor's overhead, superintendence, and profit. On any change which involves a net credit, no allowances for overhead, superintendence, and profit shall be figured;

- (5) plus actual direct premium cost of payment and performance bonds required of Contractor and its Subcontractors, provided there will be an appropriate credit for bond premiums in the case of a credit Change Order.
- B. If unit prices are stated in the Contract Documents or subsequently agreed upon, or if quantities originally contemplated are so changed in a proposed Change Order that application of such unit prices to quantities of Work proposed will cause substantial inequity to Owner or Contractor, the applicable unit prices shall be equitably adjusted.

11.04 Work Performed Under Protest

- A. Contractor shall perform all Work as directed by Owner and if Owner determines that certain Work for which Contractor has requested a Change Order does not represent a change in the Contract, or if Contractor and Owner cannot agree to the amount of compensation for a Change Order,
- B. Contractor shall perform said Work under protest and shall follow the procedures described in the following subparagraphs 1. and 2.
 - 1. If Contractor claims compensation for a Change Order not approved by Owner, Contractor shall, on or before the first working day following commencement of any such work or sustaining of any such damage, submit to Owner's representative a written statement of the nature of such work or damage sustained. Contractor will not be entitled to compensation for any portion of its Change Order claim related to work performed prior to Owner's receipt of the written statement referred to in the previous sentence.
 - 2. On or before the second working day after the commencement of such work or sustaining of such damage, and daily thereafter, Contractor shall file to the extent possible with Engineer and Owner itemized statements of the details and costs of such work performed or damage sustained; and unless such statements shall be made as so required, its claim for such compensation shall be forfeited and invalid and it shall not be entitled to payment on account of any such work or damage.
- C. Owner shall have the right to reject Change Orders executed by Contractor under a reservation of rights.
- D. Any contested Change Orders shall be resolved according to Article 12.

11.05 Computing Time Extensions

- A. Contract Times shall not be changed due to a delay in Contractor's early completion date until all Contract Float is used and performance of the specified work necessarily extends beyond the Contract Time. An extension in Contract Time will not be approved unless Contractor demonstrates through a detailed CPM schedule analysis that unforeseeable causes, beyond the control of and without the fault or negligence of both Contractor and Subcontractors or Suppliers at any tier, led to performance or completion of all or part of the Work beyond the corresponding Contract Times despite Contractor's reasonable and diligent actions. If granted, an extension in Contract Times shall be Contractor's sole and exclusive remedy for any delay, disruption, interference, hindrance, and associated costs, however caused.

11.06 Statutory Provisions – Differing Site Conditions; Timely Decisions

- A. The Contractor's attention is directed to M.G.L. c.30, §§39I, 39J, 39N, 39O, and 39P, the provisions of which apply to the Contract.
 1. Differing Site Conditions, M.G.L. c.30, §39N
 - a. If, during the progress of the Work, the Contractor or the Owner 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 Owner may request an equitable adjustment in the Contract price 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 as discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the Owner 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
 - b. Documents and are of such 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 Owner shall upon submission by the Contractor of a properly submitted change order request, make an equitable adjustment in the Contract price and the Contract shall be modified in writing accordingly.

2. Timely decision by the Owner. M.G.L. c.30, §39P

- a. Whenever the Contract requires the Owner or the Engineer to make a decision during construction of the Project on interpretation of the specifications, approval of equipment, material, or any other approval, or progress of the Work, that decision shall be made promptly and, in the event, no later than 30 days after receipt of a written submission for such decision by the Contractor, but if such decision requires extended investigation and study, the Owner or the Engineer shall, within 30 days after the receipt of the submission, give the Contractor written notice of the reasons why the decision cannot be made within the 30 day period and the date by which the decision will be made.

11.07 Certificate of Appropriation. M.G.L. c.44, §31C

- A. The Contract shall not be deemed to have been made until the auditor or accountant or other officer of the Town having similar duties has certified thereon that an appropriation in the amount of the contract is available therefor and that an officer or agent of the Town, or Awarding Authority has been authorized to execute said contract and approve all requisitions and change orders. No order to the Contractor for a change in or addition to the Work, whether in the form of a drawing, plan, detail or any other written instruction, unless it is an order which the Contractor is willing to perform without any increase in the contract price, shall be deemed to be given until the auditor or accountant, or other officer of the Awarding Authority having similar duties, has certified thereon that an appropriation in the amount of such order is available therefore; but such certificate shall not be construed as an admission by the Awarding Authority of its liability to pay for such work. The certificate of the auditor or accountant or other officer of the Awarding Authority having similar duties that an appropriation in the amount of the contract or in the amount of such order is available shall bar any defense by the Awarding Authority on the grounds of insufficient appropriation.

11.08 Price Adjustment clause in contracts for road, bridge, water and sewer projects awarded. M.G.L. c.30, §38A

- A. See Supplementary Conditions for Base Prices for diesel fuel, gasoline, liquid asphalt, and portland cement in cast-in-place concrete to be used and Contract Price Adjustments calculations.

ARTICLE 12 – CLAIMS

12.01 Claims

- A. Claims Process: The following disputes between Owner and Contractor are subject to the Claims process set forth in this Article:
1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals and Change Orders;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Subparagraph 15.06.B.
- B. Submittal of Claim: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. Review and Resolution: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. Owner and Contractor shall first attempt in good faith to resolve all unsettled Claims, counterclaims, disputes and other matters by senior management mediation per Paragraph 17.01.B.
- E. Mediation
1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process. See Article 17.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 3. Partial Approval: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. Denial of Claim: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. Final and Binding Results: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 Cost of the Work

- A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment, and shall include no markup.

B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees shall include foremen at the Site. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Only those materials required as a result of such Work and reasonable freight charges for delivery of same are allowable. Only the equipment and machinery required as a result of such Work is allowable. Costs for equipment and machinery shall be based upon the current Nielson/Dataquest Rental Bluebook for Construction Equipment (the "Bluebook"). In determining the rental rate the following shall apply:
 - a. For equipment already on the Project the monthly prorated rental rate by the hourly use shall be applicable;
 - b. For equipment not on the Project the daily rate, the weekly rate, or monthly rate will prevail, whichever will prove to be most cost effective. Small tools and manual equipment are examples of costs not allowable under this item. These costs are considered to be included in the Contractor's Fee as detailed in paragraphs 11.6 of the General Conditions.

(1 month (normal use) = 176 hours)

(See subparagraph 13.01-B.5.c. for equipment and machinery actually rented).

4. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
5. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
6. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item, provided that the Contractor shall substantiate that this reimbursement payment is customarily considered normal to his operations.
 - c. All construction equipment and machinery and the parts thereof actually rented from others in accordance with rental agreements approved in advance, in writing, by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof all in accordance with terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work, provided such losses and damages have resulted from causes other than the act or omission of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Subparagraph 13.01.B.1 or specifically covered by Subparagraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. Costs due to the negligence or willful misconduct of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
6. Expenses incurred in preparing and advancing Claims.
7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Subparagraph 13.01.B.

D. Contractor's Fee

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Contract.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Article 11.
2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Article 11.
3. Executed Change Orders shall be submitted to Owner in triplicate on the Change Order Form included in Contract Documents.
4. Contractor shall include 3 copies of invoices to substantiate all costs for materials and equipment directly associated with work involved in the change order.
5. Contractor shall include 3 copies of labor summary to include name, classification, wage and date for all personnel directly involved in the Work associated with the Change Order.

- E. Documentation and Audit: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of 3 years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. Cash Allowances: (Not used).
- C. Owner's Contingency Allowance: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.
- E. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:
1. if the total cost of a particular item of Unit Price Work amounts to 5% percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 15% from the estimated quantity of such item indicated in the Contract; and
 2. if there is no corresponding adjustment with respect to any other item of Work; and
 3. if Contractor believes that Contractor has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a claim for an adjustment in the unit price for that quantity by which the actual quantity exceeds 115% of the estimated quantity in accordance with Article 10.05 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

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

14.01 Access to Work

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

14.02 Tests, Inspections, and Approvals

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

- B. 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.
- C. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.
- D. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- 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. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. Contractor's Obligation: It is Contractor's obligation to ensure the Work is not defective.
- B. Engineer's Authority: Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. Notice of Defects: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

- D. Correction, or Removal and Replacement: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. Preservation of Warranties: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. Costs and Damages: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

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

14.05 Uncovering Work

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

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

14.06 Owner May Stop the Work

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.
- B. If Owner stops Work under Paragraph 14.06.A. Contractor shall not be entitled to any extension of Contract Times or increase in Contract Price.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses, and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.
- E. In the event of an emergency caused by defective Work, if Contractor fails to respond to notification within 12 hours, Owner may proceed with alleviating the condition, and at his option may impose a surcharge upon Contractor or a decrease in the Contract Price to cover associated costs in relation thereto.

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

15.01 Progress Payments

- A. Basis for Progress Payments: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. Applications for Payments
 - 1. At least 20 days before the date established in the Contract for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Contract.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

- c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in subparagraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;

- c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
- d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due

- 1. Ten (10) days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner

- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to Submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

- h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work; or
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens.
- 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 - 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by subparagraph 15.01.D.1 and subject to interest as provided in the Contract.
- F. M.G.L. c.30, § 39G is incorporated herein by reference.
 - G. M.G.L. 30, c. 39F is incorporated herein by reference.

15.02 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.
 - 1. No materials or supplies for the Work shall be purchased by Contractor or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor shall warrant that it has clear title to all materials and supplies used by it in the Work, free from all liens, claims, or encumbrances.

2. Contractor shall defend, indemnify, and save Owner and Engineer harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. Contractor shall at Owner's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then Owner may, after having served written notice on the said Contractor either pay unpaid bills, of which Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to Contractor shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon Owner to either Contractor or Contractor's Surety. In paying any unpaid bills of the Contractor, Owner shall be deemed the agent of Contractor and any payment so made by Owner shall be considered as payment made under the Contract by Owner to Contractor and Owner shall not be liable to Contractor for any such payment made in good faith.

15.03 Substantial Completion

- A. Substantial completion and payment in relation thereto shall be in compliance with M.G.L. c.30, §39G for Utility Contracts.
 1. For utility contracts, Owner, within 21 days of receipt of certification from Contractor that the Work has been substantially completed, shall present to Contractor a written declaration that work has been substantially complete, or an itemized list of incomplete or unsatisfactory work items.
 - a. Within 10 days after the effective date of Substantial Completion and receipt of an Application for Payment, Owner shall submit to Contractor payment for the quantity and price of the Work done with the following deductions:
 - b. A retainer of 1% of the undisputed Substantial Completion payment amount.
 - c. Less the estimated cost of completing all incomplete and unsatisfactory work items.
 - d. An amount equal to sum of all demands for direct payment filed by subcontractors and not yet paid to subcontractors or deposited in a joint account.

- B. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- C. After Substantial Completion, the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- D. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.D for that part of the Work.
 - 2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

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

15.05 Final Inspection

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

15.06 Final Payment

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

- e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Subparagraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. **Engineer's Review of Final Application and Recommendation of Payment:** If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. **Notice of Acceptability:** In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. **Completion of Work:** The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

- E. Final Payment Becomes Due: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 Waiver of Claims

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 Correction Period

- A. If within 1 year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the Work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within 60 days but after the end of the Correction Period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

- C. If, after receipt of a notice of defect within 60 days and within the Correction Period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Subparagraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the Correction Period for that item may start to run from an earlier date if so provided in the Contract Documents.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the Correction Period hereunder with respect to such Work will be extended for an additional period of 1 year after such correction or removal and replacement has been satisfactorily completed.
- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

- A. Owner may order Contractor in writing to suspend, delay, or interrupt all or any part of the Work without cause for such period of time as it may determine to be appropriate for the convenience of Owner; provided however, that if there is a suspension, delay or interruption for 15 days or more or due to a failure of Owner to act within the time specified in this Contract, Owner shall make an adjustment in the Contract Price for any increase in the cost of performance of this Contract but shall not include any profit to Contractor on such increase; and provided further, that Owner 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. Contractor shall submit the amount of said Claim to Owner 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 this Contract and, except for costs due to a suspension order, Owner shall not approve any costs in the Claim incurred more than 20 days before Contractor notified Owner in writing of act or failure to act involved in the claim.
- C. The above revisions contained in Paragraph 16.01 are in compliance with M.G.L. c. 30, §39O.

16.02 Owner May Terminate for Cause

- A. If Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if Contractor fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards Laws and Regulations or orders of any public authority having jurisdiction or disregards an instruction, order or decision of Engineer, or otherwise is guilty of a substantial violation of any provision of the Contract, then Contractor shall be in default, and Owner may, without prejudice to any other right or remedy and upon written notice to Contractor of such default, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the Project Site, and all materials intended for the Work, wherever stored, and, if such default is not cured within 7 days after such notice, may terminate the employment of Contractor, accept assignment of any or all Subcontracts, and finish the Work by whatever method Owner may deem expedient. Owner shall be entitled to collect from Contractor all direct, indirect, and consequential damages suffered by Owner on account of Contractor's default, including without limitation additional services and expenses of Engineer made necessary thereby. Owner shall be entitled to hold all amounts due Contractor at the date of termination until all of Owner's damages have been established, and to apply such amounts to such damages.
- B. If, after final completion of the Work, Owner determines that the unpaid amount (if any) due to Contractor for the portion of the Work performed by Contractor in accordance with Contract exceeds any costs and damages incurred by Owner as the result of Contractor's breach of this Contract, such excess shall be paid to Contractor. If the costs and damages incurred by Owner as the result of Contractor's breach of this Contract exceeds the unpaid amount (if any) due to Contractor for the portion of the Work performed by Contractor, Contractor shall promptly pay such excess to Owner upon written demand by Owner. In the event of a termination of the Contract pursuant to this Article, Owner and Contractor shall forthwith return to the other all papers, materials and other properties of the other held by each for the purposes of execution of the Contract. In addition, each party will make reasonable efforts to assist the other party in an orderly termination of this Contract.

- C. If Contractor is determined by a court of competent jurisdiction to be bankrupt, or if any assignment shall be made by Contractor or by any guarantor of Contractor for the benefit of creditors, or if a petition is filed by Contractor or by guarantor of Contractor for adjudication as a bankrupt, or for reorganization or an arrangement under any provision of the Bankruptcy Act as then in force and effect, or in an involuntary petition under any of the provisions of the Bankruptcy Act is filed against Contractor and such involuntary petition is not discharged within 90 days thereafter, in any event Owner may terminate this Contract upon written notice to Contractor.
- D. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraph 16.02.

16.03 Owner May Terminate for Convenience

- A. Owner may, at any time, terminate the Contract for Owner's convenience and without cause. Upon receipt of written notice from Owner of such termination for Owner's convenience, Contractor shall promptly:
 - 1. cease operations as directed by Owner in the notice;
 - 2. take actions necessary, or that Owner may direct, for the protection and preservation of the Work; and
 - 3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Subcontracts and purchase orders and enter into no further subcontracts and/or purchase orders.
- B. In the event of such termination for Owner's convenience, Contractor shall be compensated only for Work performed and expenses actually incurred in accordance with the Contract prior to termination, together with reasonable demobilization expenses (provided that there are appropriated Project funds available for such demobilization expenses). Owner, however, shall not compensate Contractor for lost profits, overhead expenses, termination expenses, or other such costs or expenses.

16.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7) days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

- A. Any Claim arising out of or related to the Contract, except those waived as provided herein, shall, after final decision by Engineer or 30 days after submission of the Claim to Engineer, be subject to mediation as a condition precedent to the institution of legal or equitable proceedings by either party.
- B. Owner and Contractor shall first 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.
- C. Owner and Contractor shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be conducted under the auspices of the American Arbitration Association in accordance with the most current version of the Association's Construction Industry Mediation Rules in effect at the time the request for mediation is filed. Request for mediation shall be filed in writing with the other party to this Contract and with the American Arbitration Association.
- D. All necessary parties may be brought into such mediation.

- E. The parties shall bear equally the mediator's fee and any filing fees required for the mediation. The mediation shall be held in the place where the Project is located unless another location is mutually agreed upon. Written contracts reached in mediation shall be enforceable as written settlement contracts in any court having jurisdiction thereof. In the event that any such claim, dispute or controversy is not resolved through the mediation process, either party is free to pursue any such claim, dispute, or other matter in an appropriate court proceeding in a court of competent jurisdiction.
- F. This Paragraph 17.01 shall not prohibit the initiation of legal proceedings or equitable proceeding in circumstances where mediation will not be completed before the expiration of the applicable time within which to initiate legal proceedings or equitable proceedings. Under no circumstances shall either party call for mediation of any Claim or dispute arising out of this Contract after such period of time as would normally bar the initiation of legal proceedings to litigate such a Claim or dispute under the laws of the Commonwealth of Massachusetts.
- G. This Paragraph 17.01 shall survive completion or termination of the Contract.

ARTICLE 18 – CONTRACTOR'S ACCOUNTING METHOD REQUIREMENTS

18.01 Definitions

- A. The words defined herein shall have the meaning stated below whenever they appear in this Article 18:
 - 1. "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.
 - 2. "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his/her residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the Awarding Authority.
 - 3. "Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a CERTIFIED opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

4. "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which s/he has made and sets forth his/her opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the Contractor.
5. "Management", when used herein, means the chief executive officers, partners, principals, or other person or persons primarily responsible for the financial and operational policies and practices of the Contractor.
6. Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

18.02 Books, Records, and Accounts

- A. Every Contract or contract awarded or executed pursuant to §§44-58, inclusive of c.7C, §11C of c.25A, and pursuant to §39M of c.30 or to §§44A-44H, inclusive, of c.149, shall provide that:
 1. The Contractor shall make, and keep for at least 6 years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor.
 2. Until the expiration of 6 years after final payment, the Awarding Authority, 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/her Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or his/her Subcontractors.
 3. If the Contract 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/her 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.

4. If the Contract is a contract as defined herein, the Contractor has filed a statement of management on internal accounting controls as set forth in Paragraph 18.03 below prior to the execution of the contract.
5. If the Contract 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 18.05 below.

18.03 Internal Accounting Controls

- A. 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:
 - a. to permit preparation of financial statements in conformity with generally accepted accounting principles, and
 - b. 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.

18.04 Internal Accounting Controls Statement

- A. 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 or she 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 18.02 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.

18.05 Financial Statement

- A. Every Contractor awarded a contract by the Commonwealth or by any political subdivision thereof shall annually file with the Commissioner of Division of Capital Asset Management 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 statement shall be made available to the Owner upon request.

18.06 Public Records/Inspection

- A. Records and statements required to be made, kept or filed under the provisions of this Article 18 shall not be public records as defined in M.G.L. c.4, §7 and shall not be open to public inspection; provided, however, that such records and statements shall be made available pursuant to the provisions of Subparagraph 18.02-A.2 and 18.05-A.

ARTICLE 19 – NONDISCRIMINATION IN EMPLOYMENT

19.01 Nondiscrimination; General

- A. Contractor and Subcontractors shall not discriminate in employment practices.

19.02 Ratio

- A. Contractor and Subcontractors shall maintain not less than 5% percent ratio of minority employee man hours to total man hours.

19.03 Nondiscrimination

- A. In connection with the performance of Work under the Contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age, sex, gender identity, sexual orientation (which shall not include persons whose sexual orientation involves minor children as the sex object), genetic information, ancestry, children, marital status, veteran status or membership in the armed services, the receiving of public assistance, and handicap. The aforesaid provision shall include, but not be limited to the following: advertising; recruitment; hiring; rates of pay or other forms of compensation; terms, conditions or privileges of employment; employment upgrading; transfer; demotion; layoff; and termination. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination or other applicable agency of the Commonwealth of Massachusetts setting forth the provisions of the Fair Employment Practices Law of the Commonwealth. The Contractor shall also undertake in good faith, affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age, sex, gender identity, sexual orientation (which shall not include persons whose sexual orientation involves minor children as the sex object), genetic information, ancestry, children, marital status, veteran status or membership in the armed services, the receiving of public assistance, and handicap, and to eliminate and remedy any effects of such discrimination in the past.

19.04 Certification Form

- A. Successful Bidder shall submit a Contractor's Certification Form and a Subcontractor's Certification Form concerning its employment practices and policies in order to maintain its eligibility to receive the award of the Contract. These forms shall be submitted with the signed Contract Documents.

ARTICLE 20 – MINIMUM PREVAILING WAGE RATES

20.01 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 M.G.L. c.149, §26 to 27D inclusive, as amended, apply to this Project. . It is the responsibility of Contractor, to request if necessary, any additional information on Minimum Prevailing Wage Rates for those tradespeople who are not covered by the schedule of wage rates, but who may be employed for the proposed Work under this Contract.

20.02 Wage Rates

- A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of minimum prevailing wage rates established in compliance with Laws, including without limitation M.G.L. c.149, §26-27G, shall be a part of these Contract Documents. Copies of State wage schedules are included in the Supplementary Conditions.
 1. Regulations for the Commonwealth of Massachusetts Prevailing Wage Act, M.G.L. c. 149, §§26 et seq., state that payment of compensation to workmen for Work performed on public work on a lump sum basis, piece work system, or a price certain for the completion of a certain amount of work, or the production of a certain result shall be deemed a violation of the Act regardless of the average hourly earnings resulting therefrom.
- B. If, after the Notice to Proceed, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such wages as shall be determined by the officials administering the Laws mentioned above. Such approved minimum rate shall be retroactive to the time of the initial employment of such person on such trade or occupation. Contractor shall notify Owner of his intention to employ persons in trades or occupations not classified in sufficient time for Owner to obtain approved rates for such trades or occupations.
 1. The schedules of wages included are minimum rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of these specified in the schedules shall be adjusted by Contractor.
 2. The said schedules of wages shall continue to be the minimum rates to be paid during the life of the Contract and updated annually. A legible copy of said schedules shall be kept posted in a conspicuous place at the Site of the Work throughout the active progress of the Work.

3. If Federal wages are included and where rates differ, the higher rates shall apply as a minimum for that trade.
4. The Contractor shall submit weekly payroll records to the Owner during the progress of the Contract, for each day work is performed and keep them on file for 3 years.
5. Once a wage schedule has been issued for a Project, it will remain in effect for the entire Project and shall be updated annually. Appeals of wage determinations or classifications of employment may be made to the Department of Labor Standards.
7. A wage schedule issued for a Project may not be issued on any other project. If, by chance, the Owner fails to provide a wage schedule to use when figuring a bid, do not use one from another project. In this case, the Contractor should contact the Office of Labor and Workforce Development, Department of Labor Standards immediately and urge the Owner to correct the oversight.
8. The failure of the Owner to provide a wage schedule does not excuse the Contractor from paying the minimum prevailing wage rate.
9. The minimum prevailing wage applies equally to unionized and non-unionized workers.
11. The wage schedule issued for each Project shall be updated annually.
13. Only contributions to the following plans may be deducted. All contributions shall be made to bona fide plans.
 - Health and Welfare
 - Pension
 - Supplementary Unemployment
14. If the Contractor contributes to any, or all, of the above plans, it may deduct the hourly amount contributed from the “total rate”. If the Contractor does not contribute to any of the benefit plans listed above, then the hourly rate of pay will be the “total rate” from the wage schedule.
15. All other deductions, including but not limited to the following, may not be subtracted from the employee's hourly minimum prevailing wage rate:
 - Vacation Time
 - Sick Time
 - Training Funds
 - Charitable Contributions

- Workers Compensation
 - Unemployment Insurance
 - Uniforms
16. Overtime, which shall be paid to all employees who work more than 40 hours per week, shall be at least time-and-one-half the base rate (“total rate” less benefits, if any).
 17. Any “separate check” given to any employee as the “benefit portion” of the minimum prevailing wage may not be treated differently than the check for “base wages”. All “separate checks” are considered wages and subject to state and federal taxes, unemployment insurance and worker's compensation requirements.
 18. A reporting form is sent along with each wage schedule that may be used. Each report shall contain at least: the employee's name, address, occupational classification, hours worked and wages paid. Do not submit weekly payroll reports to the Executive Office of Labor and Workforce Development, Department of Labor Standards.
 20. Apprentices shall be registered with the Division of Apprentice Training (DAT). All persons not registered with DAT shall be paid the “total rate” listed on the wage schedule. An apprentice sheet showing percentages based on the apprentice steps is included with all wage schedules.
 21. Failure to pay the minimum prevailing wage subjects the Contractor to potential civil and criminal liability.

ARTICLE 21 – MISCELLANEOUS

21.01 Giving Notice

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

- B. Both the address given in the Bid Form upon which this Contract is founded, and Contractor's office at or near the Site of the Work are hereby designated as places to either of which notices, letters, and other communications to Contractor shall be certified, mailed, or delivered, the delivering at the above named place, or depositing in a postpaid wrapper directed to the first named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon Contractor; and the date of said service shall be the date of such delivery or mailing.
- C. The first named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor, and delivered to Owner and Engineer in accordance with this Article 20. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter or other communication upon Contractor personally.
- D. Notices given to the Owner shall be given to the Director of Public Works and to the Engineer.

21.02 Computation of Times

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

21.03 Cumulative Remedies

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

21.04 Limitation of Damages

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

21.05 No Waiver

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract. No forbearance or indulgence in any form or manner by Owner shall be construed as a waiver of any term or condition hereto or in any way limit the legal or equitable remedies available to Owner. No waiver by Owner of any default or breach shall constitute a waiver of any subsequent default or breach. Neither party shall be construed as waiving any provision of the Contract unless the waiver is executed in writing as an amendment to the Contract.
- B. No officer, official, agent, or employee of Owner shall have the power to amend, modify, or alter the Contract or waive any of its provisions or to bind Owner by making any promise or representation not contained herein except by an amendment, in writing, executed by Owner in the same manner as the Contract is executed. Neither party may rely on any conduct, statement, action, inaction, or course of conduct of the employees, agents or officers of the other party as having changed, modified or amended the Contract.

21.06 Survival of Obligations

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

21.07 Controlling Law

- A. This Contract shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, regardless of choice of law principles.
- B. Without limitation, the Contractor shall comply with the provisions of M.G.L. c. 149, §§26 to 27D, as amended, and the applicable minimum wage rates as issued by the Director of the Executive Office of Labor and Workforce Development (EOLWD), Department of Labor Standards (DLS). The Contract shall be considered to include in their entirety all terms respecting workers' compensation, insurance and other terms required to be included in it by M.G.L. c. 152, as amended, and any other Laws, including, without limitation, M.G.L. c. 30, §§38A, 39F, 39G, 39I, 39L, 39M, 39N, 39O, 39P, and 39R, as amended, and M.G.L. c. 149, §§34, 34A, and 34B, as amended, and M.G.L. c. 82, §40, as amended, as though such terms were set forth in their entirety herein.
- C. The provisions of M.G.L. c. 149, §§34 (Public contracts; stipulation as to hours and days of work; void contracts), 34A (Contracts for public works; workers' compensation insurance; breach of contract; enforcement and violation of statute), and 34B (Contracts for public works; wages for reserve police officer) shall hereby be incorporated into this Contract by reference.

21.08 Assignment of Contract

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

21.09 Successors and Assigns

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

21.10 Headings

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

21.11 Severability

- A. If any provision of the Contract Documents is determined to be invalid or unenforceable by final judgment of a court of competent jurisdiction, the remaining provisions shall continue in effect to the extent permitted by law. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

21.12 Required Provisions

- A. If any such provision is not herein inserted or inserted in improper form, upon the application of either party, the Contract Documents shall be changed by Owner, at no increase in Contract Price or Contract Times, so as to strictly comply with the law and without prejudice to the rights of either party herein.

21.13 Attorney's Fees

- A. In the event that any legal or equitable action, suit, or claim, counter-claim, cross-claim, or third-party claim of any kind relating to the Contract is filed, pleaded or initiated by Owner or Contractor against the other party to the Contract, which results in a judgment, award or order of any kind in favor of Owner, Contractor shall be responsible for all reasonable costs, expenses, attorney's fees and expert witness fees incurred by Owner in filing, prosecuting, maintaining, appealing or defending against such action, suit, or claim, counter-claim, cross-claim, or third-party claim.

21.14 Actual Knowledge

- A. Any cause of action which Owner may have in connection with Work shall be deemed to accrue only when Owner has obtained actual knowledge of the act of omission which gives rise to the cause of action, not before.

21.15 No Personal Liability

- A. No officer, member of a board, commission or committee, employee or agent, representative or official of Owner shall in any way, directly or indirectly, be personally or individually liable under any provisions of the Contract or to Contractor with respect to the Contract or the Work. Each subcontract shall include the foregoing limitation, which shall be effective if Owner ever succeeds to Contractor's rights and obligations under the subcontract.

21.16 Amendment

- A. The Contract may be amended only by written Contract of the parties.

21.17 Certification of Tax Compliance

- A. By entering into a Contract with the Owner, the Contractor certifies under the penalties of perjury, pursuant to M.G.L. c. 62C, §49A(b), that it has complied with all laws of the Commonwealth of Massachusetts relating to taxes, to the reporting of employees and Contractors, and to the withholding and remitting of child support.

21.18 Conflict of Interest

- A. Contractor understands that the Massachusetts Conflict of Interest Law, M.G.L. c. 268A, applies to Contractor with respect to the services required to be provided under the Contract. Contractor and its officers, employees, agents, Subcontractors and affiliated agencies shall not participate in any activity which constitutes a violation of the Massachusetts Conflict of Interest Law or which creates an appearance of a violation of the Massachusetts Conflict of Interest Law.

21.19 Non-Collusion

- A. By entering into the Contract with Owner, Contractor certifies under penalties of perjury that its bbd has been made and submitted in good faith and without collusion or fraud with any person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

21.20 Independent Contractor Status

- A. Contractor shall provide services under any Contract with Owner as an independent contractor with Owner and not as an employee of Owner. No employee, agent, or representative of Contractor shall be entitled to receive any benefits of employment with Owner, including without limitation salary, overtime, vacation pay, holiday pay, sick leave, health insurance, life insurance, pension or deferred compensation.

END OF SECTION

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SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Bedford Construction Contract (General Conditions). 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-2.03 Before Starting Construction

Pursuant to subparagraph 2.03.A.1 regarding Progress Schedule, do not include weekends in Work hours.

Pursuant to subparagraph 2.03.A.3 regarding the Schedule of Values, the prices in the Bid Form will constitute the minimum items for the preliminary Schedule of Values for this Project. Also see Section 01 11 05.

Add the following immediately after subparagraph 2.03.B.

- C. 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 2.03.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-2.05 Acceptance of Schedules

Add the following immediately after subparagraph 2.05.A.4.

5. Contractor's Construction Operations Plan submitted pursuant to Paragraph 2.03.C. will be acceptable to Engineer if it accurately and reasonably addresses all aspects of the Work.

SC-5.03 Subsurface And Physical Conditions

Pursuant to Paragraph 5.03.A,

1. the following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:
 - a. Report dated December 6, 2023 prepared by GZA GeoEnvironmental, Inc., entitled Geotechnical Engineering Memorandum, Richard Road Culvert, Bedford, Massachusetts consisting of 23 pages

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.

SC-4.05 Delays in Contractor's Progress

Add the following after Paragraph 4.05.A.

1. Neither party shall hold the other responsible or liable for damages in performance caused by acts of God, interruptions in the availability of labor, or other events beyond the control of the other party, or that could not have been reasonably foreseen or prevented. For this purpose, such acts or events shall include unusually severe weather affecting performance of services, riots, strikes,

lockouts, or other industrial disturbances, protest demonstrations, and Project Site conditions which could not have been reasonably anticipated. Should such acts or events occur, both parties shall use their best efforts to overcome the difficulties arising and to resume as soon as reasonably possible the normal pursuit of the services for the Project.

SC-7.04 Services, Materials, and Equipment

Add the following immediately after Paragraph 7.04.B.

1. All materials used on this Project shall be either American or Canadian made.

SC-7.09 Permits

Add the following immediately after Paragraph 7.09.E.

- B. Contractor shall comply with the following licenses and permits Owner has obtained for the Project included in Section 00 31 00.

SC-7.13 Safety and Protection

Add the following immediately after Paragraph 7.13.E.

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
 - 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-8.02 Coordination

Pursuant to Paragraph 8.02, Owner has not separately contracted for other work on the Project at the Site.

SC-10.03 Resident Project Representative

Add the following new Paragraph.

- C. 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:
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.
 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 on-Site 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 start-ups 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 start-ups.
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.

The RPR shall not:

- 14. Authorize any deviation from the Contract Documents or substitution of materials or equipment, including “or-equal” items.
- 15. Exceed limitations of Engineer’s authority as set forth in the Contract Documents.
- 16. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor’s superintendent.
- 17. 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.
- 18. 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.
- 19. Participate in specialized field or laboratory tests or inspections conducted off-Site by others except as specifically authorized by Engineer.
- 20. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
- 21. Authorize Owner to occupy the Project in whole or in part or determine operational protocol that may affect the compliant operation of existing facilities.

SC-11.08 Price adjustment clause in contracts for road, bridge, water and sewer projects awarded. M.G.L. c.30, §38A

Add the following immediately after Paragraph 11.08.A

- 1. **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 – \$665.00 per TON (May 2024)
Diesel – \$2.901 per GALLON (May 2024)
Gasoline – \$2.848 per GALLON (May 2024)
Portland Cement – \$425.53 per TON (June 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.

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.

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.

Period Price: The Period Price for this Contract shall be the Liquid Asphalt Period Price, per Ton.

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.

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.

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.

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.

Period Price: The Period Price for this Contract shall be the current Portland cement Period Price per Ton.

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.

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-15.08 Correction Period

Add the following immediately after subparagraph 15.08.A.4.

5. Maintain trench width pavement during the 1-year Warranty Period. Refill areas that have settled or are unsatisfactory for traffic.

SC-15.01 Progress Payments

Add the following language at the end of subparagraph 15.01.C.1.

For the purposes of this Paragraph, “Owner” shall mean “Owner’s approving authorities”.

SC-15.06 Final Payment

Add the following language at the end of subparagraph 15.01.C.1.

For the purposes of this Paragraph, “Owner” shall mean “Owner’s approving authorities”.

SC-20 Minimum Prevailing Wage Rates

Add the following at the end of the Article.

20.03 Prevailing Wage Requirements

- A. 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>.
- B. 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 as attachments are for information only.
- C. 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

Massachusetts Prevailing Wage Law forms (samples)

- A. Wage Determination Schedules

END OF SECTION

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 _____



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 Bedford, MA
Contract Number: **City/Town:** BEDFORD
Description of Work: Removal and replacement of culverts and headwalls; storm drain infrastructure replacement; sewer main replacement and service reconnection; site restoration
Job Location: Richard Road, Bedford, MA

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.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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 <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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 <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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 <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$39.28	\$9.65	\$17.80	\$0.00	\$66.73
	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	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) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$39.28	\$9.65	\$17.80	\$0.00	\$66.73
	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	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)	02/01/2024	\$60.26	\$11.49	\$22.90	\$0.00	\$94.65
BRICKLAYERS LOCAL 3 (LOWELL)	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	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
<i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN	06/01/2024	\$46.63	\$9.65	\$18.22	\$0.00	\$74.50
<i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2024	\$48.10	\$9.65	\$18.22	\$0.00	\$75.97
	06/01/2025	\$49.60	\$9.65	\$18.22	\$0.00	\$77.47
	12/01/2025	\$51.10	\$9.65	\$18.22	\$0.00	\$78.97
	06/01/2026	\$52.65	\$9.65	\$18.22	\$0.00	\$80.52
	12/01/2026	\$54.15	\$9.65	\$18.22	\$0.00	\$82.02

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING LABORER	06/01/2024	\$45.48	\$9.65	\$18.22	\$0.00	\$73.35
<i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	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 <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
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For apprentice rates see "Apprentice- LABORER"

CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	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	10/01/2023	\$25.55	\$7.02	\$4.80	\$0.00	\$37.37
<i>CARPENTERS-ZONE 3 (Wood Frame)</i>	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	01/01/2024	\$49.33	\$13.00	\$23.57	\$1.30	\$87.20
<i>BRICKLAYERS LOCAL 3 (LOWELL)</i>						

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
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For apprentice rates see "Apprentice- LABORER"

CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES OPERATING ENGINEERS LOCAL 4	06/01/2024	\$57.15	\$15.30	\$16.40	\$0.00	\$88.85
	12/01/2024	\$58.63	\$15.30	\$16.40	\$0.00	\$90.33
	06/01/2025	\$59.96	\$15.30	\$16.40	\$0.00	\$91.66
	12/01/2025	\$61.43	\$15.30	\$16.40	\$0.00	\$93.13
	06/01/2026	\$62.76	\$15.30	\$16.40	\$0.00	\$94.46
	12/01/2026	\$64.24	\$15.30	\$16.40	\$0.00	\$95.94

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2024	\$36.17	\$15.30	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.12	\$15.30	\$16.40	\$0.00	\$68.82
	06/01/2025	\$37.97	\$15.30	\$16.40	\$0.00	\$69.67
	12/01/2025	\$38.92	\$15.30	\$16.40	\$0.00	\$70.62
	06/01/2026	\$39.78	\$15.30	\$16.40	\$0.00	\$71.48
	12/01/2026	\$40.73	\$15.30	\$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
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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
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For apprentice rates see "Apprentice- LABORER"

DEMO: BURNERS LABORERS - ZONE 2	12/01/2023	\$45.23	\$9.65	\$18.07	\$0.00	\$72.95
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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
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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
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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
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For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
	For apprentice rates see "Apprentice- PILE DRIVER"					
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
	For apprentice rates see "Apprentice- PILE DRIVER"					
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
	For apprentice rates see "Apprentice- PILE DRIVER"					
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
	For apprentice rates see "Apprentice- PILE DRIVER"					
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2024	\$61.86	\$13.00	\$22.21	\$0.00	\$97.07
	09/01/2024	\$63.78	\$13.00	\$22.26	\$0.00	\$99.04
	03/01/2025	\$64.98	\$13.00	\$22.30	\$0.00	\$100.28
	09/01/2025	\$66.89	\$13.00	\$22.36	\$0.00	\$102.25
	03/01/2026	\$68.09	\$13.00	\$22.39	\$0.00	\$103.48
	09/01/2026	\$70.00	\$13.00	\$22.45	\$0.00	\$105.45
	03/01/2027	\$71.19	\$13.00	\$22.49	\$0.00	\$106.68
	09/01/2027	\$73.11	\$13.00	\$22.54	\$0.00	\$108.65
	03/01/2028	\$74.31	\$13.00	\$22.58	\$0.00	\$109.89

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ELECTRICIAN - Local 103

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$24.74	\$13.00	\$0.74	\$0.00	\$38.48
2	40	\$24.74	\$13.00	\$0.74	\$0.00	\$38.48
3	45	\$27.84	\$13.00	\$16.67	\$0.00	\$57.51
4	45	\$27.84	\$13.00	\$16.67	\$0.00	\$57.51
5	50	\$30.93	\$13.00	\$17.17	\$0.00	\$61.10
6	55	\$34.02	\$13.00	\$17.67	\$0.00	\$64.69
7	60	\$37.12	\$13.00	\$18.17	\$0.00	\$68.29
8	65	\$40.21	\$13.00	\$18.68	\$0.00	\$71.89
9	70	\$43.30	\$13.00	\$19.18	\$0.00	\$75.48
10	75	\$46.40	\$13.00	\$19.69	\$0.00	\$79.09

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$25.51	\$13.00	\$0.77	\$0.00	\$39.28
2	40	\$25.51	\$13.00	\$0.77	\$0.00	\$39.28
3	45	\$28.70	\$13.00	\$16.69	\$0.00	\$58.39
4	45	\$28.70	\$13.00	\$16.69	\$0.00	\$58.39
5	50	\$31.89	\$13.00	\$17.20	\$0.00	\$62.09
6	55	\$35.08	\$13.00	\$17.70	\$0.00	\$65.78
7	60	\$38.27	\$13.00	\$18.21	\$0.00	\$69.48
8	65	\$41.46	\$13.00	\$18.71	\$0.00	\$73.17
9	70	\$44.65	\$13.00	\$19.22	\$0.00	\$76.87
10	75	\$47.84	\$13.00	\$19.74	\$0.00	\$80.58

Notes :
 App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

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

Apprentice - ELEVATOR CONSTRUCTOR - Local 4

Effective Date - 01/01/2022

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

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
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For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

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

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2024	\$50.79	\$15.00	\$16.40	\$0.00	\$82.19
	11/01/2024	\$52.08	\$15.00	\$16.40	\$0.00	\$83.48
	05/01/2025	\$53.52	\$15.00	\$16.40	\$0.00	\$84.92
	11/01/2025	\$54.81	\$15.00	\$16.40	\$0.00	\$86.21
	05/01/2026	\$56.25	\$15.00	\$16.40	\$0.00	\$87.65
	11/01/2026	\$57.54	\$15.00	\$16.40	\$0.00	\$88.94
	05/01/2027	\$58.97	\$15.00	\$16.40	\$0.00	\$90.37

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2024	\$52.37	\$15.00	\$16.40	\$0.00	\$83.77
	11/01/2024	\$53.67	\$15.00	\$16.40	\$0.00	\$85.07
	05/01/2025	\$55.12	\$15.00	\$16.40	\$0.00	\$86.52
	11/01/2025	\$56.42	\$15.00	\$16.40	\$0.00	\$87.82
	05/01/2026	\$57.87	\$15.00	\$16.40	\$0.00	\$89.27
	11/01/2026	\$59.17	\$15.00	\$16.40	\$0.00	\$90.57
	05/01/2027	\$60.62	\$15.00	\$16.40	\$0.00	\$92.02

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2024	\$24.91	\$15.00	\$16.40	\$0.00	\$56.31
	11/01/2024	\$25.67	\$15.00	\$16.40	\$0.00	\$57.07
	05/01/2025	\$26.52	\$15.00	\$16.40	\$0.00	\$57.92
	11/01/2025	\$27.28	\$15.00	\$16.40	\$0.00	\$58.68
	05/01/2026	\$28.13	\$15.00	\$16.40	\$0.00	\$59.53
	11/01/2026	\$28.89	\$15.00	\$16.40	\$0.00	\$60.29
	05/01/2027	\$29.74	\$15.00	\$16.40	\$0.00	\$61.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	03/01/2024	\$61.86	\$13.00	\$22.21	\$0.00	\$97.07
	09/01/2024	\$63.78	\$13.00	\$22.26	\$0.00	\$99.04
	03/01/2025	\$64.98	\$13.00	\$22.30	\$0.00	\$100.28
	09/01/2025	\$66.89	\$13.00	\$22.36	\$0.00	\$102.25
	03/01/2026	\$68.09	\$13.00	\$22.39	\$0.00	\$103.48
	09/01/2026	\$70.00	\$13.00	\$22.45	\$0.00	\$105.45
	03/01/2027	\$71.19	\$13.00	\$22.49	\$0.00	\$106.68
	09/01/2027	\$73.11	\$13.00	\$22.54	\$0.00	\$108.65
03/01/2028	\$74.31	\$13.00	\$22.58	\$0.00	\$109.89	
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE <i>LOCAL 103</i> / COMMISSIONING <i>ELECTRICIANS</i>	03/01/2024	\$49.49	\$13.00	\$20.19	\$0.00	\$82.68
	09/01/2024	\$51.02	\$13.00	\$20.24	\$0.00	\$84.26
	03/01/2025	\$51.98	\$13.00	\$20.27	\$0.00	\$85.25
	09/01/2025	\$53.51	\$13.00	\$20.32	\$0.00	\$86.83
	03/01/2026	\$54.47	\$13.00	\$20.34	\$0.00	\$87.81
	09/01/2026	\$56.00	\$13.00	\$20.39	\$0.00	\$89.39
	03/01/2027	\$56.95	\$13.00	\$20.42	\$0.00	\$90.37
	09/01/2027	\$58.49	\$13.00	\$20.46	\$0.00	\$91.95
03/01/2028	\$59.45	\$13.00	\$20.49	\$0.00	\$92.94	
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$45.23	\$15.30	\$16.40	\$0.00	\$76.93
	12/01/2024	\$46.41	\$15.30	\$16.40	\$0.00	\$78.11
	06/01/2025	\$47.47	\$15.30	\$16.40	\$0.00	\$79.17
	12/01/2025	\$48.64	\$15.30	\$16.40	\$0.00	\$80.34
	06/01/2026	\$49.70	\$15.30	\$16.40	\$0.00	\$81.40
	12/01/2026	\$50.88	\$15.30	\$16.40	\$0.00	\$82.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$27.01	\$9.65	\$17.80	\$0.00	\$54.46
	12/01/2024	\$27.01	\$9.65	\$17.80	\$0.00	\$54.46
	06/01/2025	\$28.09	\$9.65	\$17.80	\$0.00	\$55.54
	12/01/2025	\$28.09	\$9.65	\$17.80	\$0.00	\$55.54
	06/01/2026	\$29.21	\$9.65	\$17.80	\$0.00	\$56.66
	12/01/2026	\$29.21	\$9.65	\$17.80	\$0.00	\$56.66
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FLOORCOVERER 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	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$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 <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$36.17	\$15.30	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.12	\$15.30	\$16.40	\$0.00	\$68.82
	06/01/2025	\$37.97	\$15.30	\$16.40	\$0.00	\$69.67
	12/01/2025	\$38.92	\$15.30	\$16.40	\$0.00	\$70.62
	06/01/2026	\$39.78	\$15.30	\$16.40	\$0.00	\$71.48
	12/01/2026	\$40.73	\$15.30	\$16.40	\$0.00	\$72.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	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 <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$16.40	\$0.00	\$94.68

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$30.82	\$15.30	\$0.00	\$0.00	\$46.12
2	60	\$33.62	\$15.30	\$16.40	\$0.00	\$65.32
3	65	\$36.42	\$15.30	\$16.40	\$0.00	\$68.12
4	70	\$39.22	\$15.30	\$16.40	\$0.00	\$70.92
5	75	\$42.02	\$15.30	\$16.40	\$0.00	\$73.72
6	80	\$44.82	\$15.30	\$16.40	\$0.00	\$76.52
7	85	\$47.63	\$15.30	\$16.40	\$0.00	\$79.33
8	90	\$50.43	\$15.30	\$16.40	\$0.00	\$82.13

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$31.61	\$0.00	\$0.00	\$0.00	\$31.61
2	60	\$34.49	\$15.30	\$16.40	\$0.00	\$66.19
3	65	\$37.36	\$15.30	\$16.40	\$0.00	\$69.06
4	70	\$40.24	\$15.30	\$16.40	\$0.00	\$71.94
5	75	\$43.11	\$15.30	\$16.40	\$0.00	\$74.81
6	80	\$45.98	\$15.30	\$16.40	\$0.00	\$77.68
7	85	\$48.86	\$15.30	\$16.40	\$0.00	\$80.56
8	90	\$51.73	\$15.30	\$16.40	\$0.00	\$83.43

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 103	03/01/2024	\$61.86	\$13.00	\$22.21	\$0.00	\$97.07
	09/01/2024	\$63.78	\$13.00	\$22.26	\$0.00	\$99.04
	03/01/2025	\$64.98	\$13.00	\$22.30	\$0.00	\$100.28
	09/01/2025	\$66.89	\$13.00	\$22.36	\$0.00	\$102.25
	03/01/2026	\$68.09	\$13.00	\$22.39	\$0.00	\$103.48
	09/01/2026	\$70.00	\$13.00	\$22.45	\$0.00	\$105.45
	03/01/2027	\$71.19	\$13.00	\$22.49	\$0.00	\$106.68
	09/01/2027	\$73.11	\$13.00	\$22.54	\$0.00	\$108.65
	03/01/2028	\$74.31	\$13.00	\$22.58	\$0.00	\$109.89

For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	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 (TESTING AND BALANCING -WATER) <i>PIPEFITTERS LOCAL 537</i>	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 <i>PIPEFITTERS LOCAL 537</i>	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 <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$39.28	\$9.65	\$17.80	\$0.00	\$66.73
	12/01/2024	\$40.61	\$9.65	\$17.80	\$0.00	\$68.06
	06/01/2025	\$42.00	\$9.65	\$17.80	\$0.00	\$69.45
	12/01/2025	\$43.38	\$9.65	\$17.80	\$0.00	\$70.83
	06/01/2026	\$44.82	\$9.65	\$17.80	\$0.00	\$72.27
	12/01/2026	\$46.26	\$9.65	\$17.80	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	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

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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 (BOSTON AREA)	03/16/2024	\$53.97	\$8.35	\$26.70	\$0.00	\$89.02
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Apprentice - IRONWORKER - Local 7 Boston

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$32.38	\$8.35	\$26.70	\$0.00	\$67.43
2	70	\$37.78	\$8.35	\$26.70	\$0.00	\$72.83
3	75	\$40.48	\$8.35	\$26.70	\$0.00	\$75.53
4	80	\$43.18	\$8.35	\$26.70	\$0.00	\$78.23
5	85	\$45.87	\$8.35	\$26.70	\$0.00	\$80.92
6	90	\$48.57	\$8.35	\$26.70	\$0.00	\$83.62

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
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For apprentice rates see "Apprentice- LABORER"

LABORER LABORERS - ZONE 2	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
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Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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)	06/01/2024	\$38.53	\$9.65	\$17.80	\$0.00	\$65.98
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$39.86	\$9.65	\$17.80	\$0.00	\$67.31
	06/01/2025	\$41.25	\$9.65	\$17.80	\$0.00	\$68.70
	12/01/2025	\$42.63	\$9.65	\$17.80	\$0.00	\$70.08
	06/01/2026	\$44.07	\$9.65	\$17.80	\$0.00	\$71.52
	12/01/2026	\$45.51	\$9.65	\$17.80	\$0.00	\$72.96

Apprentice - LABORER (Heavy & Highway) - Zone 2

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.12	\$9.65	\$17.80	\$0.00	\$50.57
2	70	\$26.97	\$9.65	\$17.80	\$0.00	\$54.42
3	80	\$30.82	\$9.65	\$17.80	\$0.00	\$58.27
4	90	\$34.68	\$9.65	\$17.80	\$0.00	\$62.13

Effective Date - 12/01/2024

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

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
LABORERS - ZONE 2						

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER	12/01/2023	\$38.36	\$9.40	\$16.89	\$0.00	\$64.65
LABORERS - ZONE 2						

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER	12/01/2023	\$37.95	\$9.65	\$17.20	\$0.00	\$64.80
LABORERS - ZONE 2						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	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 <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	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

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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	02/01/2024	\$62.42	\$11.49	\$23.56	\$0.00	\$97.47
BRICKLAYERS LOCAL 3 - MARBLE & TILE	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) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) <i>MILLWRIGHTS LOCAL 1121 - Zone 2</i>	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

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 <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
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For apprentice rates see "Apprentice- LABORER"

OILER (OTHER THAN TRUCK CRANES,GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$24.71	\$15.30	\$16.40	\$0.00	\$56.41
	12/01/2024	\$25.37	\$15.30	\$16.40	\$0.00	\$57.07
	06/01/2025	\$25.97	\$15.30	\$16.40	\$0.00	\$57.67
	12/01/2025	\$26.63	\$15.30	\$16.40	\$0.00	\$58.33
	06/01/2026	\$27.22	\$15.30	\$16.40	\$0.00	\$58.92
	12/01/2026	\$27.89	\$15.30	\$16.40	\$0.00	\$59.59

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OILER (TRUCK CRANES, GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$30.28	\$15.30	\$16.40	\$0.00	\$61.98
	12/01/2024	\$31.08	\$15.30	\$16.40	\$0.00	\$62.78
	06/01/2025	\$31.80	\$15.30	\$16.40	\$0.00	\$63.50
	12/01/2025	\$32.60	\$15.30	\$16.40	\$0.00	\$64.30
	06/01/2026	\$33.32	\$15.30	\$16.40	\$0.00	\$65.02
	12/01/2026	\$34.12	\$15.30	\$16.40	\$0.00	\$65.82

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	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

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2024	\$46.96	\$9.95	\$23.95	\$0.00	\$80.86
* 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	\$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)	01/01/2024	\$45.02	\$9.95	\$23.95	\$0.00	\$78.92
PAINTERS LOCAL 35 - ZONE 2	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)	01/01/2024	\$43.62	\$9.95	\$23.95	\$0.00	\$77.52
PAINTERS LOCAL 35 - ZONE 2	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)	06/01/2024	\$38.53	\$9.65	\$17.80	\$0.00	\$65.98
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2024	\$39.86	\$9.65	\$17.80	\$0.00	\$67.31
	06/01/2025	\$41.25	\$9.65	\$17.80	\$0.00	\$68.70
	12/01/2025	\$42.63	\$9.65	\$17.80	\$0.00	\$70.08
	06/01/2026	\$44.07	\$9.65	\$17.80	\$0.00	\$71.52
	12/01/2026	\$45.51	\$9.65	\$17.80	\$0.00	\$72.96

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

PANEL & PICKUP TRUCKS DRIVER	06/01/2024	\$39.78	\$15.07	\$18.67	\$0.00	\$73.52
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	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) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	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 <i>PIPEFITTERS LOCAL 537</i>	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
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For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

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

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

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.) <i>PIPEFITTERS LOCAL 537</i>	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 <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
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For apprentice rates see "Apprentice- LABORER"

PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21

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

POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.86	\$9.65	\$17.14	\$0.00	\$65.65
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For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$39.53	\$9.40	\$17.55	\$0.00	\$66.48
	12/01/2024	\$40.86	\$9.40	\$17.55	\$0.00	\$67.81
	06/01/2025	\$42.25	\$9.40	\$17.55	\$0.00	\$69.20
	12/01/2025	\$43.63	\$9.40	\$17.55	\$0.00	\$70.58
	06/01/2026	\$45.07	\$9.40	\$17.55	\$0.00	\$72.02
	12/01/2026	\$46.51	\$9.40	\$17.55	\$0.00	\$73.46

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$36.17	\$15.30	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.12	\$15.30	\$16.40	\$0.00	\$68.82
	06/01/2025	\$37.97	\$15.30	\$16.40	\$0.00	\$69.67
	12/01/2025	\$38.92	\$15.30	\$16.40	\$0.00	\$70.62
	06/01/2026	\$39.78	\$15.30	\$16.40	\$0.00	\$71.48
	12/01/2026	\$40.73	\$15.30	\$16.40	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 170 - J.G. MacLellan (Lowell)</i>	05/01/2024	\$30.00	\$11.17	\$6.55	\$0.00	\$47.72
	01/01/2025	\$30.00	\$11.57	\$6.55	\$0.00	\$48.12
	05/01/2025	\$30.50	\$11.57	\$6.65	\$0.00	\$48.72
	01/01/2026	\$30.50	\$11.97	\$6.65	\$0.00	\$49.12
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofing &Roofer Damproofg) <i>ROOFERS LOCAL 33</i>	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

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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	02/01/2024	\$50.28	\$12.78	\$21.45	\$0.00	\$84.51
ROOFERS LOCAL 33	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	02/01/2024	\$57.22	\$14.59	\$27.50	\$2.98	\$102.29
SHEETMETAL WORKERS LOCAL 17 - A	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

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	06/01/2024	\$40.24	\$15.07	\$18.67	\$0.00	\$73.98
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	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 <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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 <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2024	\$69.04	\$11.51	\$23.30	\$0.00	\$103.85
	10/01/2024	\$70.84	\$11.51	\$23.30	\$0.00	\$105.65
	03/01/2025	\$72.64	\$11.51	\$23.30	\$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	\$24.16	\$11.51	\$12.90	\$0.00	\$48.57
2	40	\$27.62	\$11.51	\$13.70	\$0.00	\$52.83
3	45	\$31.07	\$11.51	\$14.50	\$0.00	\$57.08
4	50	\$34.52	\$11.51	\$15.30	\$0.00	\$61.33
5	55	\$37.97	\$11.51	\$16.10	\$0.00	\$65.58
6	60	\$41.42	\$11.51	\$16.90	\$0.00	\$69.83
7	65	\$44.88	\$11.51	\$17.70	\$0.00	\$74.09
8	70	\$48.33	\$11.51	\$18.50	\$0.00	\$78.34
9	75	\$51.78	\$11.51	\$19.30	\$0.00	\$82.59
10	80	\$55.23	\$11.51	\$20.10	\$0.00	\$86.84

Effective Date - 10/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$24.79	\$11.51	\$12.90	\$0.00	\$49.20
2	40	\$28.34	\$11.51	\$13.70	\$0.00	\$53.55
3	45	\$31.88	\$11.51	\$14.50	\$0.00	\$57.89
4	50	\$35.42	\$11.51	\$15.30	\$0.00	\$62.23
5	55	\$38.96	\$11.51	\$16.10	\$0.00	\$66.57
6	60	\$42.50	\$11.51	\$16.90	\$0.00	\$70.91
7	65	\$46.05	\$11.51	\$17.70	\$0.00	\$75.26
8	70	\$49.59	\$11.51	\$18.50	\$0.00	\$79.60
9	75	\$53.13	\$11.51	\$19.30	\$0.00	\$83.94
10	80	\$56.67	\$11.51	\$20.10	\$0.00	\$88.28

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2024	\$49.49	\$13.00	\$20.19	\$0.00	\$82.68
	09/01/2024	\$51.02	\$13.00	\$20.24	\$0.00	\$84.26
	03/01/2025	\$51.98	\$13.00	\$20.27	\$0.00	\$85.25
	09/01/2025	\$53.51	\$13.00	\$20.32	\$0.00	\$86.83
	03/01/2026	\$54.47	\$13.00	\$20.34	\$0.00	\$87.81
	09/01/2026	\$56.00	\$13.00	\$20.39	\$0.00	\$89.39
	03/01/2027	\$56.95	\$13.00	\$20.42	\$0.00	\$90.37
	09/01/2027	\$58.49	\$13.00	\$20.46	\$0.00	\$91.95
	03/01/2028	\$59.45	\$13.00	\$20.49	\$0.00	\$92.94

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.27	\$13.00	\$0.67	\$0.00	\$35.94
2	45	\$22.27	\$13.00	\$0.67	\$0.00	\$35.94
3	50	\$24.75	\$13.00	\$16.16	\$0.00	\$53.91
4	50	\$24.75	\$13.00	\$16.16	\$0.00	\$53.91
5	55	\$27.22	\$13.00	\$16.57	\$0.00	\$56.79
6	60	\$29.69	\$13.00	\$16.97	\$0.00	\$59.66
7	65	\$32.17	\$13.00	\$17.38	\$0.00	\$62.55
8	70	\$34.64	\$13.00	\$17.78	\$0.00	\$65.42
9	75	\$37.12	\$13.00	\$18.18	\$0.00	\$68.30
10	80	\$39.59	\$13.00	\$18.58	\$0.00	\$71.17

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.96	\$13.00	\$0.69	\$0.00	\$36.65
2	45	\$22.96	\$13.00	\$0.69	\$0.00	\$36.65
3	50	\$25.51	\$13.00	\$16.16	\$0.00	\$54.67
4	50	\$25.51	\$13.00	\$16.16	\$0.00	\$54.67
5	55	\$28.06	\$13.00	\$16.57	\$0.00	\$57.63
6	60	\$30.61	\$13.00	\$16.97	\$0.00	\$60.58
7	65	\$33.16	\$13.00	\$17.38	\$0.00	\$63.54
8	70	\$35.71	\$13.00	\$17.78	\$0.00	\$66.49
9	75	\$38.27	\$13.00	\$18.18	\$0.00	\$69.45
10	80	\$40.82	\$13.00	\$18.58	\$0.00	\$72.40

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS	02/01/2024	\$61.34	\$11.49	\$23.59	\$0.00	\$96.42
BRICKLAYERS LOCAL 3 - MARBLE & TILE	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

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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

TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	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 <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2024	\$45.60	\$9.65	\$18.22	\$0.00	\$73.47
	12/01/2024	\$47.07	\$9.65	\$18.22	\$0.00	\$74.94
	06/01/2025	\$48.57	\$9.65	\$18.22	\$0.00	\$76.44
	12/01/2025	\$50.07	\$9.65	\$18.22	\$0.00	\$77.94
	06/01/2026	\$51.62	\$9.65	\$18.22	\$0.00	\$79.49
	12/01/2026	\$53.12	\$9.65	\$18.22	\$0.00	\$80.99

For apprentice rates see "Apprentice- LABORER"

TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2024	\$45.48	\$9.65	\$18.22	\$0.00	\$73.35
	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.41	\$15.30	\$16.40	\$0.00	\$87.11
	12/01/2024	\$56.85	\$15.30	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.13	\$15.30	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.57	\$15.30	\$16.40	\$0.00	\$91.27
	06/01/2026	\$60.85	\$15.30	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.29	\$15.30	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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	
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2024	\$57.71	\$9.65	\$19.00	\$0.00	\$86.36
	12/01/2024	\$59.18	\$9.65	\$19.00	\$0.00	\$87.83
	06/01/2025	\$60.68	\$9.65	\$19.00	\$0.00	\$89.33
	12/01/2025	\$62.18	\$9.65	\$19.00	\$0.00	\$90.83
	06/01/2026	\$63.73	\$9.65	\$19.00	\$0.00	\$92.38
	12/01/2026	\$65.23	\$9.65	\$19.00	\$0.00	\$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2024	\$59.71	\$9.65	\$19.00	\$0.00	\$88.36
	12/01/2024	\$61.18	\$9.65	\$19.00	\$0.00	\$89.83
	06/01/2025	\$62.68	\$9.65	\$19.00	\$0.00	\$91.33
	12/01/2025	\$64.18	\$9.65	\$19.00	\$0.00	\$92.83
	06/01/2026	\$65.73	\$9.65	\$19.00	\$0.00	\$94.38
	12/01/2026	\$67.23	\$9.65	\$19.00	\$0.00	\$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2024	\$49.78	\$9.65	\$19.00	\$0.00	\$78.43
	12/01/2024	\$51.25	\$9.65	\$19.00	\$0.00	\$79.90
	06/01/2025	\$52.75	\$9.65	\$19.00	\$0.00	\$81.40
	12/01/2025	\$54.25	\$9.65	\$19.00	\$0.00	\$82.90
	06/01/2026	\$55.80	\$9.65	\$19.00	\$0.00	\$84.45
	12/01/2026	\$57.30	\$9.65	\$19.00	\$0.00	\$85.95
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2024	\$51.78	\$9.65	\$19.00	\$0.00	\$80.43
	12/01/2024	\$53.25	\$9.65	\$19.00	\$0.00	\$81.90
	06/01/2025	\$54.75	\$9.65	\$19.00	\$0.00	\$83.40
	12/01/2025	\$56.25	\$9.65	\$19.00	\$0.00	\$84.90
	06/01/2026	\$57.80	\$9.65	\$19.00	\$0.00	\$86.45
	12/01/2026	\$59.30	\$9.65	\$19.00	\$0.00	\$87.95
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	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
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2024	\$38.78	\$9.65	\$17.80	\$0.00	\$66.23
	12/01/2024	\$40.11	\$9.65	\$17.80	\$0.00	\$67.56
	06/01/2025	\$41.50	\$9.65	\$17.80	\$0.00	\$68.95
	12/01/2025	\$42.88	\$9.65	\$17.80	\$0.00	\$70.33
	06/01/2026	\$44.32	\$9.65	\$17.80	\$0.00	\$71.77
	12/01/2026	\$45.76	\$9.65	\$17.80	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$56.03	\$15.30	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.48	\$15.30	\$16.40	\$0.00	\$89.18
	06/01/2025	\$58.78	\$15.30	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.23	\$15.30	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.53	\$15.30	\$16.40	\$0.00	\$93.23
	12/01/2026	\$62.98	\$15.30	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS & GASFITTERS LOCAL 12</i>	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.

SEALS PAGE

The engineering material and data contained in these Specifications were prepared under the supervision and direction of the undersigned, whose seal as registered professional engineer(s) is affixed below.

Date of Issue: June 19, 2024



Scott Salvucci, P.E.
Woodard & Curran, Inc. (Engineer)

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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. Special Requirements

1.02 PROJECT DESCRIPTION

- A. The Project is generally described as the Richard Road Culvert Replacement 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 Specifications and Drawings and includes, but is not limited to, the following principal features.
 - 1. Removal and replacement of culverts and associated headwalls;
 - 2. Replacement of storm drain infrastructure;
 - 3. Replacement of sewer main and reconnection of sewer services;
 - 4. Site restoration;
 - 5. and all materials, equipment, services and construction inherent to the Work.
- B. Work Site locations: generally as shown on the Drawings.
- C. Existing conditions and Site data: per the Drawings.

1.04 WORK SEQUENCE AND COORDINATION

1.05 SPECIAL REQUIREMENTS

- A. Portions of the Work are within the FEMA 100-year floodplain and within resource areas and are subject to the jurisdiction of the Conservation Commission. Comply with the special requirements of the Order of Conditions included in Section 00 31 00.

- B. Comply with the special requirements of the Army Corps of Engineers Pre-Construction Notification for the project which will be provided upon receipt.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 11 05

OVERALL GENERAL REQUIREMENTS (CONSTRUCTION)

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies the overall general requirements for execution of the Work, supplements some items in the General and Supplementary Conditions, and applies to all Specifications and Drawings, including:

1. Administrative and procedural requirements (relating to the process of contract administration, and the methods of communicating, controlling, and assuring quality);
2. Temporary facilities and controls (put into place for use only during the period of construction and that will be removed when no longer required for construction operations);
3. General execution requirements; and
4. Startup/commissioning and performance testing.

B. Section Includes

1.02 PRICE AND 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
Closeout Procedures

1.04 QUALITY REQUIREMENTS

Reference Standards and Regulatory Requirements
Qualifications

PART 2 - PRODUCTS

- 2.01 SOURCE QUALITY CONTROL
 - General
 - Independent Testing Agency Certification
 - Factory Testing
- 2.02 PRODUCT REQUIREMENTS
 - General
 - Transportation and Handling
 - Storage and Protection

PART 3 - EXECUTION

- 3.01 TEMPORARY CONSTRUCTION FACILITIES
 - Barriers
 - Protection of Work
 - Security
 - Safety Facilities
 - Access Roads
 - Parking
 - Field Offices
 - Project Identification
 - Progress Cleaning and Waste Removal
- 3.02 TEMPORARY UTILITIES
- 3.03 TEMPORARY CONTROLS
 - Dust Control
 - Water Control and Dewatering
 - Erosion and Sediment Control
 - Noise Control
 - Pollution Control
 - Traffic Regulation
- 3.04 REMOVAL OF TEMPORARY UTILITIES, FACILITIES,
AND CONTROLS

- 3.05 OVERALL EXECUTION REQUIREMENTS
 - Coordination
 - Existing Conditions
 - Field Engineering
 - Record Documents
 - Cutting and Patching
 - Electrolytic Corrosion Prevention
 - Quality Assurance and Control of Installation
 - Manufacturers' Field Services
 - Independent Testing

3.06 ATTACHMENTS

1.02 PRICE AND PAYMENT PROCEDURES

A. Schedule of Values

- 1. Submit preliminary and final Schedule of Values.
 - a. Number of hardcopies: **0**
 - b. Submit electronically by email in PDF format.
- 2. Provide sufficient detail to allow for determination of the value of the Work at any degree of completion.
- 3. For each line item, identify number and title of related specification section.
- 4. The unit price breakdown included in the Bid Form will constitute the preliminary Schedule of Values for this Project.

B. Payment Procedures

- 1. Submit Application for Payment using the form provided by Engineer or Owner. 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: 0
 - b. Submit electronically by email in PDF format.
- 2. Payment Period: at intervals stipulated in the Agreement.
- 3. Utilize Payment Application attached to this section.
- 4. Submit certified weigh slips for hot bituminous pavement ready mix concrete on a daily basis or as each truckload of pavement is placed.

C. Change Procedures

1. Utilize forms attached to this section.

Number of hardcopies: 0

Submit electronically by email in PDF format.

- a. Field Order: issued by Engineer or Owner to advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time.
- b. 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 using a Change Request.
 - 1) Engineer or Owner to 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 will be considered valid. Prepare and submit an estimate within 15 days.
 - 2) Contractor to 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). Document any requested substitutions.
- c. Work Change Directive: issued by Engineer or Owner, signed by Engineer or Owner and instructing Contractor to proceed with a change in the Work. Work authorized in a Work Change Directive will be included in a subsequent Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Price or Contract Time. Promptly execute the change.
- d. Change Order: issued by Engineer or Owner.
 - 1) *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.
 - 2) *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.

- 3) *Time and Material Change Order*: based on itemized account and supporting data after completion of change. Engineer or Owner and Contractor to determine the change allowable in Contract Price and Contract Time. Maintain detailed records of work done on this basis, provide full information required for evaluation of proposed changes, and substantiate costs for changes in the Work.
- e. Substitutes and "Or Equals": Request substitute items as a Change Request in accordance with subparagraph C.1.b. above, with complete data substantiating compliance of proposed substitution with Contract Documents.
 - 1) Substitute items will be processed in accordance with subparagraph 1.03.C.6 below.
 - 2) 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.

D. Measurement and Payment Procedures

1. Unit Prices
 - a. Take measurements in presence of Engineer and compute quantities. Engineer or Owner to verify and also take measurements and quantities. Notify Engineer or Owner in advance when measurements must be taken.
 - b. Unit quantities and measurements indicated in the Bid Form, if any, are for Contract purposes only. Actual quantities and measurements supplied or placed in the Work determine amount of payment.
2. Payment includes full compensation for required labor, material and equipment, tools, plant, transportation, services and incidentals; erection, application or installation and construction of an item of the Work; and overhead and profit, unless otherwise indicated.
3. 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 pre-construction conference.
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 and 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.
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:

Richard Road Culvert Replacement Project

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.
 - b. Attendance required by Owner, Contractor, Engineer, Contractor's Superintendent, Project Manager, Subcontractors and major Suppliers as needed.
 - c. 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 start-up
 - 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 prior to the next scheduled meeting to Owner and Contractor for review, then revise as required and distribute within 2 weeks 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 biweekly 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. Agenda:
 - Review minutes of previous meetings
 - Unresolved Issues
 - Review Work progress
 - Observations, problems, and decisions
 - Identification of problems which impede planned progress
 - Review of Schedule of Submittals and status of submittals
 - Review of off-Site fabrication and delivery schedules
 - Maintenance of progress schedule

- Corrective measures to regain projected schedules
 - Planned progress during succeeding Work period
 - Coordination of projected progress
 - Maintenance of quality and Work standards
 - Effect of proposed changes on Progress Schedule and coordination
 - Other business relating to Work
- d. Engineer will record minutes and distribute draft copies prior to the next scheduled meeting to Owner and Contractor for review, then revise as required and distribute within 2 weeks 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 approvals or convene coordination meetings as may be generally required.
 - b. Attendance required by parties directly affecting, or affected by, Work of the specific Specification section. Notify Owner and Engineer 5 days in advance of pre-installation conference. Party requesting general coordination meeting to notify other party.
 - c. Review conditions, preparation and procedures, and coordination with related Work.

B. Documentation of Progress

1. Submit preliminary and final Progress Schedules.

Number of hardcopies: 0

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. Submit weekly Safety Reports signed by the responsible on-Site person.
 4. Provide documentation of pre-construction conditions, using Digital Video Recording and with photographs. Identify date, time, orientation and Project identification.
 - a. Arrange for video recordings to be conducted by a professional video-photographer in digital videodisc (DVD) format in color and Provide photographs PDF or JPG format, minimum 300 dpi quality and a minimum resolution of 6.0 megapixels. Include clear and concise audio descriptions of the existing Project Site conditions.
 - 1) Video record and photograph all areas of the Project Site in the presence of the Engineer to establish a record of pre-construction conditions. Ensure existing conditions of roadway surfaces, curbing, berms, sidewalks, driveways, property bounds, landscaped areas, abutters' property and any other items that might be affected by the Work are clearly recorded.
 - 2) Video record and Photograph construction progress and submit monthly with Payment Application during progress of Work.
 - 3) Video record and Photograph all areas of the Project Site to document final conditions and submit with Application for Final aPayment.
 - b. Submit a copy of the first completed video recording and photographs to the Engineer for review of quality. Once approved, submit 2 copies of video recordings and photographs. Re-record any recording furnished and re-take any photograph furnished which, in the opinion of the Engineer, is of poor quality or incomplete at no additional cost to Owner.
- 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 indicated to Engineer (with copy to Owner where required) as follows. Coordinate submission of related items.

Engineer:

Woodard & Curran
40 Shattuck Road, Suite 110
Andover, MA 01810
Attention: Garrett Bergey
Telephone: 978-775-2035
Email: gbergey@woodardcurran.com

Owner:

Town of Bedford MA
10 Mudge Way
Bedford, MA 01730

2. Present submittals in a clear and thorough manner, in English and using English units. Use sheet size of not less than 8 1/2 by 11 inches and not more than 24 by 36 inches. Provide space for Contractor, Engineer, and Owner's review stamps.
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. Schedule of Submittals: Submit preliminary and final Schedule of Submittals. Include all submittals specified in Contract, General Conditions, Supplementary Conditions, 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 the Schedule of Submittals required in subparagraph 1.03.C.4 above.

Number of hardcopies: 0

Submit electronically by email in PDF format.

- a. Complete the submittal transmittal form included as an attachment to this Section 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 transmittal number in resubmittals. Do not combine new submittals with resubmittals.

- b. Attach a transmittal form to each group of Shop Drawings, manufacturer's literature, equipment data and Samples submitted. Use a sufficient number of transmittal forms so that: items on a single transmittal form pertain to the same equipment item, specification section or element of Work; items on a single transmittal form are either original submittals or the same number resubmittal; and each Sample is listed on a separate transmittal form. Data shown on the Shop Drawings shall 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.
- c. Submittals which do not have a fully completed transmittal form will be returned along with unreviewed attachments. Returned submittals, even though incomplete, will be counted as a submittal.
- d. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - 1) 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;
 - 2) determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - 3) 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
 - 4) 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.
- e. 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.
- f. 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 subparagraph C.6. below. Engineer's review and approval shall not relieve Contractor from errors or omissions in a Shop Drawing or Sample.

g. 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. Variations: Clearly identify requests for “Or-Equal” and substitute items and submit per subparagraph 1.02.C.1.b above.
 - a. 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.
 - b. 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 at no additional cost to Owner.. Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made and 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.”
 - c. “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. A proposed item of material or equipment will be considered functionally equal to an item so named:
 - 1) if in the exercise of reasonable judgment Engineer determines that it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics; 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 it has a proven record of performance and availability of responsive service; and
 - 2) Contractor certifies that, if approved and incorporated into the Work there will be no increase in cost to the Owner or increase in Contract Times and it will conform substantially to the detailed requirements of the item named in the Contract Documents.
 - d. Substitute Items: If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item subparagraph 6.a above, it will be considered a proposed substitute item. 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.

- 1) Contractor shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified.
 - 2) Contractor shall state the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time, 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 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) Contractor shall identify all variations of the proposed substitute item from that specified; available engineering, sales, maintenance, repair, and replacement services; and shall provide 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.
 - 4) Engineer will advise Contractor in writing of any negative determination. Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
7. Manufacturers' Installation Instructions and Certificates: Submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.

Number of hardcopies: 0

Submit electronically by email in PDF format.

- a. 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.
 - b. 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 record documents described in Paragraph 3.05.D. below and per Paragraph 1.03.D below.
- a. *As-Builts for Material and Equipment*:
Number of prints: **0**
Electronic format: PDF
Submit electronically by email.
Indicate "As-Supplied" in revision block and sign. Show all changes and revisions to Final Completion per Paragraph 3.05.D.
 - b. *Conformed to Construction Record Drawings*: for Engineer's use in preparing final Record Drawings.
Number of prints: **0**
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 per Paragraph 3.05.D.
 - c. *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. Assemble in three ring binders with durable plastic cover with a table of contents.

D. Closeout Procedures

1. Substantial Completion shall have been achieved when Work is complete, systems are successfully operating, and final testing has been successfully completed and Contractor considers the entire Work ready for its intended use; a full inventory of the spare parts and special tools purchased by the Owner are replenished and in the custody of the Owner; the Site has been restored to the satisfaction of the Owner; an inspection of the Work has been completed by the Engineer and the Owner; and an updated Punch List is provided. The Contractor shall have sole care, custody, and control of the Work until achievement of Substantial Completion.
2. Notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) using the Notice of Substantial Completion form attached to this section and request that Engineer issue a certificate of Substantial Completion. 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.
3. 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 attached to this section with Punch List attached. Owner shall have 7 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) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
4. 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.
5. 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.

6. 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.
7. Final Completion shall have been achieved when 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, documents including maintenance and operating instructions, schedules, guarantees, warranties, bonds, certificates or other evidence of insurance, certificates of inspection, marked up record documents, and other required documents, and Engineer has indicated that the Work is complete in accordance with the Contract Documents including the following.
 - a. Final cleaning has been conducted and Contractor equipment and supplies including waste materials have been removed from the Site and legally disposed of.
 - b. Inspections required by Laws and Regulations are complete. Certificates and permits to occupy and operate have been issued if required.
 - c. Spare parts, maintenance and extra materials have been delivered in quantities specified to Project Site and stored as directed.
 - d. 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 including:
 - 1) all documentation called for in the Contract Documents
 - 2) consent of the surety, if any, to final payment
 - 3) a list of all Claims against Owner that Contractor believes are unsettled
 - 4) 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.
8. If the final application for payment is acceptable, Engineer will give written notice to Owner and Contractor that the Work is acceptable using the Notice of Completion form attached to this section. Owner will thereafter make final payment and acceptance per the Contract.

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 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. 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.

B. Qualifications

1. Meet or provide capability to meet the criteria specified in connection with the Work of the Contract Documents as specified in Section 01 43 05.

C. 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. If specified, comply with the Massachusetts Department of Transportation - Highway Division's (referred to as "MassDOT") Standard and Supplemental 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>

PART 2 – PRODUCTS

2.01 SOURCE QUALITY CONTROL

- A. General
 - 1. Subject material and equipment furnished under these 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 in accordance with Paragraph 1.03.C above. Submission of certified test reports does not relieve Contractor of responsibility for material and equipment meeting requirements of the Contract Documents after installation.

2.02 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.
6. Provide products that earn the Energy Star® and meet the Energy Star® specifications for energy efficiency.

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.

PART 3 – EXECUTION

3.01 TEMPORARY CONSTRUCTION FACILITIES

- A. Barriers
1. 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.

2. 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.
 3. Furnish barricades required by governing authorities for public rights of way.
 4. Provide protection for plant life designated to remain. Replace damaged plant life.
 5. Protect non owned vehicular traffic, stored materials, Site and structures from damage.
 6. 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. Buildings and Enclosures
 - a. Furnish protective coverings at walls, projections, jambs, sills, and soffits of openings and protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
 - b. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
 6. 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.
 7. 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. Access Roads

1. Construct and maintain temporary roads accessing public thoroughfares to serve construction area. Control dust and water.
2. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
3. Provide for emergency access and maintain throughout the Work Site.

F. Parking

1. Construct temporary gravel surface parking areas to accommodate construction personnel. When Site space is inadequate, provide for off-Site parking.
2. Do not allow construction vehicle parking on existing pavement or sidewalks.

G. Field Offices – furnish as required.

H. Project Identification

1. Provide and erect sign(s) at the Project Site to identify the Project as required by the Order of Conditions included in Section 00 31 00.
2. Erect the sign in a prominent location as approved by Owner.
3. Do not place, or allow the placement of, other advertising sign boards at the Project Site or along rights-of-way furnished for the Project Work.
4. Remove the sign when the Work has been completed at no additional cost to the Owner.

- I. Progress Cleaning and Waste Removal
 - 1. Maintain areas free of waste materials, debris, and rubbish and maintain the Site in a clean and orderly condition.
 - 2. Remove debris and rubbish from spaces and other closed or remote spaces before enclosing the space.
 - 3. Collect and remove waste materials, debris, and rubbish from Site at least weekly and legally dispose off-Site.

3.02 TEMPORARY UTILITIES

- A. Arrange for, pay for and maintain suitable utilities as required for duration of Project.
- B. Furnish lighting for construction operations. Furnish lighting for exterior staging and storage areas and for security purposes. Maintain lighting and provide routine repairs.
- C. Furnish and pay for heat devices and heat and cooling devices as required to maintain specified conditions for construction operations.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. Furnish and maintain required sanitary facilities and enclosures. Do not use existing facilities.
- F. Fire Protection
 - 1. Provide temporary fire protection equipment and services during construction until the permanent system is serviceable 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.

3.03 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 to reduce the emission of air-borne soil particulates from the Project Site.
- C. Water Control and Dewatering
1. Comply with the requirements for submitting plans for pollution prevention, storm water management, erosion and sedimentation control; compliance with the Order of Conditions provided in Section 00 31 00.
 2. Methods for Water Control and Dewatering may include but are not limited to perimeter trenches and sump pumping, perimeter groundwater cutoff, well points, ejectors, deep wells and combinations thereof.
 3. Grade the Site to drain away from excavations to approved drainage collection facilities. Protect the Site from puddling, ponding and any other surface water.
 4. Ensure collected surface drainage water meets permitted criteria for sediment content prior to discharge.
 5. The Contractor shall be responsible for the proper design and execution of methods for controlling surface water and groundwater and for any damage to properties, buildings or structures, utilities, pavements, and new Work that may result from the dewatering or surface water control operations.
 - a. Design temporary dewatering systems as required to lower and control water levels to at least 1 foot below the bottom of excavations to allow for construction in the dry and to maintain a stable subgrade; legally dispose of pumped water; construct, maintain, observe and, except where indicated or required to remain in place, remove dewatering equipment and system at the completion of construction.
 - b. Furnish the services of a professional engineer registered in the State of the Project to prepare and stamp the water control and dewatering system designs and submittals. The Contractor's engineer shall have at least 5 years of relevant experience in the design, installation and monitoring of dewatering systems of similar size and scope to the Project.
 6. Dewatering may include lowering the water table, intercepting and collecting seepage which may penetrate the support of excavation, slopes or bottom of the excavations.

7. *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.
8. *Special dewatering* is defined as installing sump pumping, well points, deep wells, or eductor and ejector systems, or combinations thereof, to control groundwater and hydrostatic pressures to allow for installation of the Work.
9. Determine if additional subsurface information is required to complete design, the costs of which will be considered incidental to the Work.
10. Dewatering Operations and Procedures
 - a. 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. No work shall be performed by the Contractor below the pre-construction groundwater level during dewatering system failure.
 - b. Construction and backfilling shall proceed in the dry, and flotation of completed portions of the work shall be prohibited.
 - c. Provide suitable temporary pipes, flumes or channels for water that may flow along or across the Site of the Work.
 - d. Provide dewatering equipment with noise attenuation systems capable of meeting the governing noise regulation requirements.
 - e. Dewatering systems must be properly filtered to mitigate the pumping of silt and fine sand from the excavation.
 - f. Locate dewatering facilities to prevent loss of ground or disturbance to the soils that support adjacent utilities/structures and the construction work to be done by others.
 - g. For dewatering operations with relatively minor flows, direct pump discharges using filtration bag or system per Erosion and Sediment Control below, 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. Discharge of effluent shall conform to all applicable statutory and regulatory requirements.
 - h. 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.

- i. Utilize silt sacks in catch basins when excess silt is suspended in the discharge water per Erosion and Sediment Control below.
 - j. If siltation basin is used, size to effectively filter for the volume and discharge rate of water anticipated without overflow.
 - k. Provide treatment necessary to prevent discharge of silty and/or contaminated ground water caused by the Contractor's operations, or any contaminated ground water that may pass from excavated surfaces and/or through the excavation support system selected by the Contractor.
 - l. Dispose of water pumped or drained from the Work in accordance with permit requirements and in a manner to prevent undue interference with other work or damage to adjacent properties, pavements and other surfaces, buildings, structures and utilities.
 - m. Obtain necessary regulatory approvals for the disposal of dewatering flows, including, among others, approval by the Environmental Protection Agency under the National Pollutant Discharge Elimination System (NPDES) program for construction dewatering activities. Submit the completed and approved construction dewatering permit to the Engineer immediately upon receipt.
 - n. Remove temporary dewatering and drainage systems when no longer needed. Restore all disturbed areas.
11. Special Dewatering
- a. Special Dewatering methods may be necessary if Normal Dewatering methods are inadequate to ensure dry and stable excavation subgrade conditions.
 - b. Special Dewatering techniques may consist of a combination of sump pumps, one- or two-stage well point 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.
- D. Erosion and Sediment Control
- 1. Comply with the requirements for submitting plans for pollution prevention, storm water management, erosion and sedimentation control; compliance with state and Federal requirements.
 - 2. Submit erosion and sediment control plan to Engineer prior to the start of construction.

3. 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.
4. Install erosion and sediment controls as may be shown on the Drawings and as required by Laws and Regulations. Install additional erosion and sedimentation control measures beyond those shown on the Drawings as necessary to stabilize the Site. Coordinate temporary erosion controls with permanent erosion controls to the extent practical. Provide and maintain devices to control erosion, siltation, and sedimentation that occur during construction operations. Undertake reasonable precautions and measures to avoid erosion of soil and to prevent silting of drainage ditches, storm sewers, rivers, streams, and lakes.
5. Employ pollution prevention measures, erosion and sedimentation control before, during, and after soils are exposed. Implement measures prior to soil disturbance or soil storage to the extent possible to ensure that such measures are in place before activity occurs and employ additional measures as the Work progresses. Implement and maintain as necessary until the Site is permanently stabilized.
6. 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.
7. In the event that silt or debris breaches erosion control, immediately remove and clean silt or debris from drainage ditches and storm sewers and revise erosion control measures as required by the Conservation Commission or the Engineer. Should silt or debris breach erosion controls and reach rivers, streams or lakes, immediately notify local, state or Federal representatives as required and implement required remediation methods at no additional cost to Owner.
8. Limit duration of the exposure of soils on embankments, excavations, and graded areas to a minimum.
9. Provide temporary measures such as berms, dikes and drains to prevent water flow. Install erosion control measures in any ditch, swale or channel before water is allowed to flow in the waterway. Handle water pumped from trenches to minimize discharge of silty water to the maximum extent practicable.

10. Stabilize storm drain outfalls as shown on the Drawings before the discharge points become operational. Install inlet protection immediately upon construction of culverts.
11. 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. Exceptions to this time requirement include: a) where construction activities will resume on the particular portion of the Site within 21 days; and b) where snow cover delays initiation of stabilization measures.
12. Place stockpiled topsoil on the Site away from natural drainages, in piles with side slopes of 50 percent to 70 percent. Install siltation fence around the base of the pile to prevent eroding soil from washing into drainages. Cover topsoil piles which are to remain for a period of 21 days or more with temporary seed and mulch immediately following stockpiling.
13. Conduct pavement sweeping to remove sediment and soil debris accumulation on pavement resulting from construction activity
14. Siltation/Silt Fence
 - a. Filter fabric: suitable for erosion control.
 - b. Wood posts: oak, 2 inches by 2 inches in section, and at least 4.5 feet in length.
 - c. Erosion control fencing: heavy-duty filter fabric towed into the existing soil as shown on the Drawings.
 - d. Construct as shown on Drawings or as directed by Engineer. Install parallel to contours where possible, prior to Site clearing and grading activities.
 - 1) Dig a 6 inch by 6 inch minimum trench where the fence is to be installed. Position the fence in the trench with the fence posts set at 8 feet on center (maximum). Curve ends of fence uphill to prevent flow around ends.
 - 2) Staple sedimentation control fabric and the industrial netting to each post. When joints are necessary, splice filter fabric together only at support posts with 6-inch overlap and securely seal.
 - 3) Bury lower edge of fabric at least 6 inches below ground surface to prevent underflow. Backfill trench and compact soil over filter fabric.
 - 4) Installed height: minimum 2.5 feet and 36 inches maximum.

- 5) Inspect frequently; repair or replace any damaged sections.

15. Temporary Erosion Control Matting

- a. Rolled matting blanket consisting of curled wood excelsior, coconut fiber, straw or paper bound with a weave of twisted craft paper, cotton cord or plastic mesh.
- b. Provide staples for fastening matting to the ground. Staples: fabricated in a "U" shape from 11 gage or heavier stiff steel wire, 6 to 12 inches in length and 1 to 2 inches across.
- c. Surface Preparation and Installation
 - 1) Conform to grades and cross sections for slopes and ditches shown on the Drawings. Finish to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed. Loosen soil surface to permit bedding of the matting.
 - 2) Unless otherwise directed, apply seed prior to placement. When directed, spread additional seed over matting, particularly at those locations disturbed by building slots. Press matting onto the ground with a light lawn roller or by other similar means.
 - 3) Bury edges of matting around the edges of catch basins and other structures.

16. Seeding

- a. 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

- 1) Sow seed at the rates 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.

- 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.
17. 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 one year old and not older than three years, and cut with a 1/2 inch to 1 inch layer of soil.
- a. 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.
 - b. Staple sod strips at ends and at 3-foot intervals along the center of the strip.
 - c. Irrigate sodded area immediately after installation.
18. Catch Basin Silt Sacks
- a. Style: Silt Sack Regular Flow.
 - b. Test Method: ASTM D-4884 165.0 lbs./inch.
 - c. Silt sack seams: certified average wide width strength.
 - d. Meet the following ASTM D-4884 standards. Properties are Minimum Average Roll Values (MARV).

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D-4632	lbs.	315x300
Grab Elongation	ASTM D-4632	%	15x15
Puncture	ASTM D-4833	lbs.	125
Mullen Burst	ASTM D-3786	psi	650
Trapezoid Tear	ASTM D-4533	lbs	120x150
UV Resistance	ASTM D-4355	%	90
Apparent Opening	ASTM D-4751	US Sieve	40
Flow Rate	ASTM D-4491	gal/min/ft ²	40
Permittivity	ASTM D-4491	sec -1	0.55

- 1) Utilize silt sacks in catch basins as required when excess silt is suspended in discharge water.
19. Filtration Bag or System for Discharge from Trench Dewatering
- a. Meet the following standards. Properties are Minimum Average Roll Values (MARV).

Property	Test Method	Units	Test Results
Flow Rate	ASTM D-4491	gal/min/ft ²	40
Permittivity	ASTM D-4491	sec -1	0.55

- b. For discharge from trench dewatering, install filtration bag or system or dewatering siltation basin constructed of a hay bale barrier lined with filter fabric sized to handle the volume of dewatering without overflowing.
20. Compost Filter Socks
- a. Furnish and install biodegradable mesh “socks” filled with mature, clean compost per EPA National Pollutant Discharge Elimination System (NPDES) specifications.
 - 1) Install per EPA and manufacturers recommendations.
 - 2) Install parallel to contours where possible. Stake socks as needed to stabilize. Inspect frequently and repair as necessary.
21. Provide detention basins or water filtration systems for dewatering and coordinate locations with Engineer. See Dewatering in Paragraph 3.03.B. above.
22. Other Temporary Measures
- a. Provide and maintain temporary slope drains as required.
 - b. Employ other temporary erosion control measures as directed by the Engineer or local Conservation Commission.
23. Maintenance
- a. Inspect erosion control practices immediately after each rainfall and at least daily during prolonged rainfall or snowmelt for damage. Make appropriate repairs or replacement until Final Completion at no additional cost to the Owner.
 - b. Remove silt from siltation fence and/or haybale when it has reached one-quarter of the bale and/or fence height, or prior to expected heavy runoff or siltation.
 - c. Repair matting if any staples become loosened or raised, or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.
 - d. Maintain areas mulched or matted until Final Completion, at no additional cost to the Owner.

- e. Maintain sediment basins by removing silt that reaches a depth of over one foot, at no additional cost to the Owner, until Final Completion.
24. Removal of Temporary Erosion Control
- a. Remove temporary materials and devices upon completion of the Work when permanent soil stabilization has been achieved. Re-use materials in good condition if approved by Engineer.
 - 1) If silt socks are used, remove in paved areas or cut open and disperse media in unpaved areas.
 - b. Level and grade to preconstruction conditions and 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.
 - c. Remove siltation fences only when adequate grass growth has been established.
 - d. Repair areas damaged by silt fences and hay bales to preconstruction conditions to the satisfaction of the local Conservation Commission and the Engineer.
 - e. Remove unsuitable materials from Site and dispose of in a lawful manner.
- E. Noise Control
1. Provide methods, means, and facilities to minimize noise from construction operations.
 2. Provide noise attenuation systems capable of meeting the Department of Environmental Protection Division of Air Quality Control regulations governed by the following policy:

"A source of sound will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source:

 - *Increases the broadband sound level by more than 10 dB(A) above ambient, or*
 - *Produces a "pure tone" condition when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.*

"These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the Department."

3. Construct sound enclosures or utilize other noise reduction techniques if the equipment does not meet the noise level requirements.

F. Pollution Control

1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

a. Water Pollution Control

- 1) Assure that sediment, debris, petroleums, chemicals, or other contaminants will not enter existing drainage facilities and channels. Use construction methods that will prevent entrance of pollutants and wastes into existing streams, rivers, lakes, and flowing and dry watercourses.
- 2) Obtain legal disposal sites and dispose of pollutants and wastes in a legal manner.
- 3) Respond immediately to emergencies as directed when water quality of existing streams, rivers, lakes and flowing and dry watercourses is threatened. Take corrective action to remove or contain pollutants until a permanent solution is determined.

b. Air Pollution Control

- 1) Equipment and vehicles that exhibit excessive exhausts emissions due to poor engine adjustments or inefficient operation will not be permitted to operate until corrective repairs or adjustments are made.
- 2) Burning of materials from clearing or grubbing operations, combustible construction materials, and rubbish will not be allowed.

G. Traffic Regulation

1. Control and maintain traffic within the Project area. 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.
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.

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. The services of uniformed traffic police officers shall in no way relieve the Contractor of its responsibilities under the Contract.
5. Maintain minimum of one moving lane on roadways at all times.
 - 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.
6. Provide safe access/egress to businesses and abutting property owners within the Project area. In areas where the construction activity is in progress, install 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, the 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.

3.04 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.

3.05 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 in accordance with Paragraph 1.03.A above.
 - 2. Coordinate space requirements and installation of Work. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and repairs.
 - 3. Coordinate Work of the various Specifications with interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
 - 4. Coordinate related Work at the Site.
 - 5. 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.

6. 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.
7. Coordinate Work such that Work on each street is completed with minimum disruption to residents and businesses.
8. Regular working hours are 7:00 a.m. to 3:30 p.m., Monday through Friday.

B. Existing Conditions

1. Availability of Lands

- 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.

2. Subsurface and Physical Conditions

- a. Reports of explorations and tests of subsurface conditions at or contiguous to the Site and hazardous conditions, if any, are identified in the Supplementary Conditions.
- b. 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.
- c. Conduct test pits and other utility research and properly restore utilities interfered with or damaged during construction at no cost to the Owner.
- d. Engage a professional subsurface utility locator to verify the existence and location of underground utilities prior to starting Work.

3. Reference Points

- a. Surveys exist for the Project and are reflected on the Drawings.

C. Field Engineering

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. Record Documents

1. 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. and submitted at final completion per Paragraph 1.03.D above.
2. Store Record Documents separate from documents used for construction. Record information concurrent with construction progress.
3. Legibly mark each item to record description of actual equipment and material installed and actual construction on approved submittals, including the following.
 - a. Manufacturer's name and equipment and material model and number
 - b. Material and equipment substitutions or alternates utilized
 - c. Approved changes
 - d. Measured depths of foundations
 - e. Measured horizontal and vertical locations of Underground Facilities and appurtenances, referenced to permanent surface improvements
 - f. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work
 - g. Field changes of dimension and detail
 - h. Details not on original Contract Documents or Shop Drawings

4. Submit final record documents as specified in Paragraph 1.03.D above in accordance with subparagraph 1.03.C.8. above. 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 at final completion will be only be to determine generally that the 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. 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 .
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.

F. 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

	Electrode Potential Volts (Relative to Hydrogen)
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.

G. 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.

H. 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 in accordance Paragraph Paragraph 1.03.C above.
 - 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. Independent Testing
- 1. Employ and pay for specified services of an independent to perform inspection and testing as may be specified.
 - 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.

3.06 ATTACHMENTS

A. Project Forms

1. Submittal Transmittal (Form C-00 62 11)
2. Application for Payment (Form C-00 62 76)
3. Request for Interpretation/Information (Form C-00 63 15)
4. Field Order (Form C-00 63 36)
5. Work Change Directive (Form C-00 63 49)
6. Change Request (Form C-00 63 60)
7. Change Order (Form C-00 63 63)
8. Notice of Substantial Completion (Form C-00 65 15)
9. Notice of Completion (Form C-00 65 18)

END OF SECTION

SUBMITTAL TRANSMITTAL (Form C-00 62 11)

Owner:				Transmittal No.:	
Project:				Date:	
Contract No.:					
Contract Title:					
Specification Section No.:					
<i>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</i>					
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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**REQUEST FOR
INTERPRETATION/INFORMATION
(Form C-00 63 15)**

RFI #: _____ Attachment

To: _____

From: _____

Attn: _____

Issue Date: _____

Project: _____

Required Reply Date: _____

DISTRIBUTION:

<u>Contractor</u>	<u>Owner</u>	<u>Engineer</u>
<input type="checkbox"/> _____	<input type="checkbox"/> _____	<input type="checkbox"/> _____
<input type="checkbox"/> _____	<input type="checkbox"/> _____	<input type="checkbox"/> _____
<input type="checkbox"/> _____	<input type="checkbox"/> _____	<input type="checkbox"/> _____

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: _____

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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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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.

<p>Recommended By Engineer for Acceptance (subject to above comments if any)</p> <p><input type="checkbox"/> recommended for processing and approval under a separate Change Order</p> <p>NAME:</p> <hr/> <p><i>Signature</i> <i>Date</i></p>	<p><input type="checkbox"/> Approved by Owner (no schedule or cost impact)</p> <p><input type="checkbox"/> Acknowledged by Owner – to be processed and approved under a separate Change Order</p> <p>NAME:</p> <hr/> <p><i>Signature</i> <i>Date</i></p>
<p>Approved by Contractor</p> <p><input type="checkbox"/> Change Order to be requested</p> <p>NAME:</p> <hr/> <p><i>Signature</i> <i>Date</i></p>	

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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:

\$ _____

[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:

\$ _____

Contract Price prior to this Change Order:

\$ _____

[Increase] [Decrease] of this Change Order:

\$ _____

Contract Price incorporating this Change Order:

\$ _____

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. _____:

Substantial completion (days): _____

Ready for final payment (days): _____

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:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

Contract Times with all approved Change Orders:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

RECOMMENDED:

By: _____
 Engineer (Authorized Signature)

Date: _____

Approved by Funding Agency (if applicable):

Date: _____

ACCEPTED:

By: _____
 Owner (Authorized Signature)

Date: _____

Approved by Funding Agency (if applicable):

Date: _____

ACCEPTED:

By: _____
 Contractor (Authorized Signature)

Date: _____

Approved by Funding Agency (if applicable):

Date: _____

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

Owner's Auditor/Accountant (Name)

Date: _____

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.

Owner

Date: _____

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.

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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

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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
-------------------	------

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 of the Bid Form, which may also be referred to as “Pay Item”.
- B. Payment procedures are in accordance with the Agreement, General Conditions and Supplementary and the General Requirements.
- C. Measurement: as determined, verified, or approved by Engineer or Owner.
- 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. General Requirements EXCEPT those items included in Mobilization/Demobilization and included as separate Pay Items.
 - 2. 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 excluding test pits.
 - 3. Restoration of all areas disturbed by the Contractor within the limits of Work, including planting.
 - 4. 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, including water and fire 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. Police details will be direct billed by the police department to Owner. Provide daily detail slips to the Engineer. Police details scheduled and not used by the Contractor will be back-charged to Contractor.

1.02 MEASUREMENT AND PAYMENT BASIS

ITEMS:	
1A – 8-inch HDPE Drain Pipe	
1B – 12-inch HDPE Drain Pipe	
1C – 15-inch HDPE Drain Pipe	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on quantity installed, tested and accepted.
Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing the drain pipe regardless of depth including pipe connections, rubber sleeve connections and mortar sealing of pipe and structure; unclassified excavation; shoring and bracing; support of existing utilities as required; clearing and grubbing; dewatering; installation and compaction of backfill and bedding soils; geotextile fabric; material and pipe testing; re-connection to existing pipe and/or structures (including pipe couplings, coring of new penetrations and plugging abandoned penetrations in existing structures); crossing utilities; concrete encasement if required; provision and reconfiguration of brick invert of new and existing manholes; removal and disposal of existing storm drain; abandoning and flowable filling existing storm drain; plug and abandon existing storm drain; removal and off-Site disposal of unsuitable excess soil materials; import of suitable soils as required for backfilling; removal of existing pipe; and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another pay item.	

ITEM 2: 36" RCP Culvert Replacement	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on quantity installed, tested and accepted.
<p>Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing 36" RCP culvert, saw cutting, excavating and over excavating, removing and disposing of excess material, removing and disposing of existing culvert and headwalls, hauling and disposal of materials, temporary connections to existing drain, pipe connections, coring, coffer dam, turbidity curtain, dewatering, testing, shoring/bracing, culvert 3/4 inch crushed stone 1 foot bedding, blanket and backfill, flowable fill, compaction, testing, crossing utilities, support of existing utilities as required, tree trimming/removal, installation of trash racks, removing and replacing signs and fences, and all other incidentals necessary to furnish and install the culvert, complete in place, as specified, shown on the Drawings or required by field conditions and not explicitly included in another pay item.</p>	

Item 3: 8" PVC Gravity Sewer (SDR-35)	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly based on quantity installed, tested and accepted.
<p>Includes but is not limited to all labor, material and equipment required for installation of sewer pipe and removal and disposal of all sewer pipe shown on the Drawings and includes unmarked sewer pipe and replacement piping which, in the Engineer's judgment, could not be avoided by the Contractor. Also includes for installation, but is not limited to: Excavation, shoring/bracing and wood sheeting left-in-place, saw cutting, furnishing, handling and installation of materials, testing, couplings, tree trimming, removing and replacing signs, fences and mailboxes, pavement cutting, removal and disposal of pavement, clearing and grubbing, pipe bedding and blanket, marking tape, backfill and compaction, clay dams, wyes, ductile iron tees for chimneys, coring into existing manholes, concrete encasement if required, bricking and bulkheading of existing pipe where noted on Drawings, reconnection of sewer services, cleaning and flushing, and bypass pumping of sewer flows and/or hauling and disposal. Includes landscape restoration, removal and disposal of trees impacted by construction, protection of trees to be preserved, and loaming and seeding. This item shall also include post-installation CCTV for all pipe segments completed, normal dewatering as specified herein, and all other Work incidental to installing pipe not specified to be paid for under a separate Pay Item.</p>	

ITEM 4: Precast Concrete Catch Basin	
Measurement	Actual catch basin furnished and installed
Payment	Unit price per each
Schedule of Payment	Monthly based on quantity installed, tested and accepted.
<p>All labor, equipment, tools and materials to furnish and install precast concrete catch basins including; anti-floatation slab; pipe connections; coring, damp proofing hoods; butyl sealant; parging, hydraulic cement, flexible boots, excavation; shoring and bracing; stone bedding; stabilization fabric; dewatering; backfill and compaction; maintaining existing flows, testing; removal and offsite disposal existing catch basins and pipe; removal and offsite disposal of bituminous concrete pavement and excess soils crossing utilities; support of existing utilities as specified; and all other incidentals necessary to furnish and install the pipe, complete in place, as specified, shown on the Drawings or required by field conditions.</p>	

ITEMS: 5A – 4-foot Diameter Drain Manhole 5B – 5-foot Diameter Drain Manhole	
Measurement	Each installed, complete in place, as shown on Drawings and details.
Payment	Unit price per each (90% upon install and backfill, 10% after all testing)
Schedule of Payment	Monthly based on quantity installed.
<p>Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing drain manholes regardless of depth including: reinforced concrete design, anti-floatation slab; pipe connections; joint sealant; excavation, shoring and bracing; bituminous concrete pavement and concrete saw cuts; dewatering; provide, install and compact backfill and bedding soils; geotextile fabric; material and structure testing; provide & install brick invert; removal and off-Site disposal of unsuitable excess soil materials; removal of existing structures, anchors, and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another pay item.</p>	

ITEMS: 6A – Manhole Frames and Covers 6B – Frame and Grate	
Measurement	Sets installed
Payment	Unit price per set
Schedule of Payment	Monthly based on quantity installed and accepted.
<p>All labor, equipment, tools and materials to furnish and install manhole frames and covers and catch basin frames and grates to temporary and final grade including brick and mortar leveling courses or concrete grade rings as specified, and asphalt collar over frame base, and all other incidentals necessary to furnish and install the Items, complete in place, as specified, shown on the Drawings or required by field conditions. Includes setting manhole frames and covers and catch basin frames and grates to grade during temporary and final paving and all resetting, raising or lowering associated with roadway milling, reclaim and final pavement.</p>	

ITEM 7: Precast Concrete Headwalls	
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 associated with furnishing and installing headwalls complete including all excavating and over excavating, removing and disposing of excess and unsuitable material, removing and disposing of existing culvert and headwalls, hauling and disposal of materials, connections to culverts, coffer dam, dewatering, testing, shoring/bracing, 3/4 inch crushed stone and dense grade gravel, bedding, blanket and backfill, flowable fill, compaction, testing, concrete, 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 8: Storm Drain Clean Out	
Measurement	Sets installed
Payment	Unit price per set
Schedule of Payment	Monthly based on quantity installed and accepted.
All labor, equipment, tools and materials to furnish and install storm drain cleanouts including excavation, removal of excess materials, pipe connection to storm drain pipe, cover, concrete collar, backfill, compaction, and all other incidentals necessary to furnish and install the Items, complete in place, as specified, shown on the Drawings or required by field conditions. Includes setting clean out coverts to grade during temporary and final paving.	

ITEM 9: Storm Drain Bypass Pumping	
Measurement	Complete in place, as directed by the Engineer.
Payment	Unit price per lump sum
Schedule of Payment	Monthly based on percentage of storm drain installed, tested and accepted.
Includes but is not limited to all labor, materials required to provide pumps, pipe, hoses, fuel, plugs, raming, burying of bypass piping, bypassing stormwater flows and all other appurtenances required for stormwater bypass system as directed by the Engineer.	

ITEM 10: Sewer Bypass Pumping	
Measurement	Complete in place, as directed by the Engineer.
Payment	Unit price per lump sum
Schedule of Payment	Monthly based on percentage of storm drain installed, tested and accepted.
Includes but is not limited to all labor, materials required to provide pumps, pipe, hoses, fuel, plugs, raming, burying of bypass piping, bypassing sewer flows and all other appurtenances required for stormwater bypass system as directed by the Engineer.	

Item 11: Riprap Slope Stabilization	
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, material, handling, transportation and equipment associated with furnishing and installing riprapped slope stabilization at the locations and limits indicated on the Drawings furnishing riprap stone; placing/spreading and hand chinking of the materials; unclassified excavation; subgrade grading and compacting, preparation of areas for materials; 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 12: Pavement Removal	
Measurement	Per square yard of pavement removed with pay limits shown
Payment	Unit price per square yard.
Schedule of Payment	Monthly based on progress
Includes all labor, services, material, handling, transportation and equipment associated with saw cutting existing pavement, removal and disposal of existing pavements and subbase materials, including roadways, driveways, and sidewalks at the locations and limits indicated on the Drawings, and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another pay item.	

ITEMS:	
13A – Temporary Trench Pavement	
13B – Permanent Trench Pavement	
Measurement	Per square yard of trench patch installed with pay limits shown
Payment	Unit price per square yard.
Schedule of Payment	Monthly based on progress
All labor, tools, equipment and materials to furnish and install temporary or permanent trench pavement, including saw cutting, disposal of pavement, disposal of excess materials, gravel base to the depths specified on the Drawings, fine grading and compacting gravel base, emulsion, bituminous tack coat, adjusting of roadway castings, placement and compaction of binder course or surface course to the thickness specified on the Drawings, restoring pavement markings, and all other incidentals necessary to furnish and install temporary and permanent trench pavement.	

ITEMS:	
14A – Full-Width Binder Course Pavement	
14B – Full-Width Top Course Pavement	
Measurement	In place based on weigh slips submitted
Payment	Unit price per ton
Schedule of Payment	Monthly based on quantity installed
<p>All labor, tools, equipment and materials to furnish and install pavement in type and depth as shown on the Drawings for full-width paving; emulsion; key ways; repairing driveway abutments to meet new grade; butt joints; bituminous tack coat; joint sealant; placement and compaction of binder or top course pavement as specified on the Drawings; backing sides of pavement up with gravel base and loam and seed; coordination with all utilities and all other incidentals to furnish an install pavement.</p>	

ITEM 15: HMA Driveway	
Measurement	Units installed complete in place
Payment	Unit price per square yard
Schedule of Payment	Monthly based on quantity installed.
<p>All labor, tools, equipment and materials to furnish and install new bituminous driveways, driveway subgrade, gravel base and compaction, removing and resetting mailboxes, matching of bituminous asphalt driveway to adjacent existing materials as necessary to meet and match pre-construction conditions, ensure smooth transitions, surface finishing and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another pay item.</p>	

ITEM 16: HMA Sidewalk	
Measurement	Units installed complete in place
Payment	Unit price per square yard
Schedule of Payment	Monthly based on quantity installed.
<p>Includes all labor, services, material, handling, transportation and equipment associated with furnishing and installing the Work for new bituminous concrete sidewalks, sidewalk subgrade, gravel base and compaction, removing and resetting signs, fences and mail boxes, matching of new bituminous asphalt concrete sidewalk to adjacent existing materials as necessary to meet and match pre-construction or proposed conditions, feather sidewalk grade to meet surrounding sidewalk elevation, and ensure smooth transition, surface finishing, and all other Work incidental to the satisfactory completion of the Work and not explicitly included in another pay item.</p>	

ITEM 17: Loam and Seed	
Measurement	Units installed complete in place
Payment	Unit price per square yard
Schedule of Payment	Monthly based on quantity installed.
<p>Includes all labor, services, materials, handling, transportation, tools and equipment to provide and install loam borrow and grass seed disturbed areas within the limit of work including but not limited to: 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, 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 and not explicitly included in another pay item. Loam and seed pay item will not be paid for additional areas disturbed outside of the limit of work as shown on the Drawings.</p>	

ITEM 18: Site Clearing	
Measurement	By the lump sum
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress
<p>Includes all labor, services, material, handling, transportation and equipment associated with clearing and grubbing and remove and dispose all surface features as depicted on the Drawings. Item shall include the removal and disposal of all, trees, shrubs, roots and topsoil, and the razing of all 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 and not explicitly included in another pay item.</p>	

ITEM 19: Rigid Insulation	
Measurement	As encountered & as directed by the Engineer
Payment	Unit price per Square Yard (SY) as stated in the bid
Schedule of Payment	Upon completion of work
<p>Material and equipment, services, installation, construction and testing inherent to the Work for the placement of rigid insulation above utilities as required and approved by the Engineer where final grade is less than four (4) feet over utilities, where depicted on the plans, or where directed by the Engineer. If no rigid installation placement is required or approved by Engineer, no payment will be made for this bid item.</p>	

ITEM 20: Erosion and Sediment Control Devices	
Measurement	By the lump sum
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress
<p>Includes all labor, services, material, handling, transportation and equipment associated with furnishing, installing, and removal of sedimentation control devices in accordance with the Contract Documents; routine maintenance and removal of sediment accumulation; regular replacement of devices as required or directed; cleaning catch basin sumps of any sediment allowed to enter the drainage system due to negligence of maintenance; installation and maintenance of turbidity curtain; and all other incidentals necessary to furnish and install inlet sedimentation control devices for all catch basins within and adjacent to the Project area and not explicitly included in another pay item.</p>	

ITEM 21: Test Pits	
Measurement	Units complete
Payment	Unit price per each
Schedule of Payment	Monthly based on quantity installed
<p>All labor, equipment, tools and materials to determine location, depth, diameter and material type for uncharted utilities or to shut off existing utilities in locations shown on Drawings; excavation; removing and disposing of unsuitable materials; replacement of unsuitable materials with select backfill; backfilling and compacting in accordance with the Contract Documents; loam and seed; pavement patching; and all other incidentals necessary to excavate uncharted utilities or locations noted in Drawings to determine information required.</p>	

ITEM 22: Traffic Management and Controls	
Measurement	By the lump sum
Payment	Percent of lump sum price based on Schedule of Values
Schedule of Payment	Monthly based on progress.
<p>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.</p>	

ITEM 23: Removal and Disposal of Asbestos Pipe	
Measurement	As based on waste shipment record(s) from disposal facility
Payment	Unit price per linear foot of asbestos containing material, removed as directed by the industrial hygiene consultant
Schedule of Payment	Monthly based on progress: 75 percent upon removal, 25 percent upon receipt of completed (signed) waste shipment record(s) from disposal facility
<p>All labor, tools, equipment and materials to remove and dispose asbestos cement sewer main pipe and asbestos contaminated soils in accordance with Section 02 82 35, including, but not limited to, proper removal, transport, and disposal of identified asbestos-containing cement pipe and resultant asbestos-contaminated soils, asbestos abatement activities within fully enclosed negative pressure asbestos abatement work areas (glovebag), filing and payment for all notifications and permits necessary to complete the work, and providing all temporary connections, electrical cords, hoses, water heaters, and other equipment as required for asbestos abatement and air clearance sampling needs.</p>	

ITEM 24: Wetland Restoration	
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
<p>Includes all labor, services, tools, equipment, materials, handling, and transportation inherent to the Work for wetland restoration 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 all other incidental Work not covered in another Pay Item.</p>	

ITEM 25: Mobilization/Demobilization	
Measurement	Portion of Work completed and accepted
Payment	Percent of Total Contract Price based on Schedule of Values
Schedule of Payment	50% at Project Commencement; 45% at Substantial Completion; 5% at Final Completion
<p>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, coordination, and Site clean-up, restoration and closeout.</p>	

ITEM 26: Owner’s Contingency Allowance for Abutter Property Restoration	
Measurement	Portion of Owner’s contingency allowance amount authorized per Paragraph 11.02 of the General Conditions
Payment	Percent of <u>direct cost</u> (no markup) not to exceed contingency allowance amount authorized by Change Order
Schedule of Payment	Monthly based on progress and authorized by Change Order
Direct cost (no mark-up will be allowed) to provide compaction testing performed by a qualified technician certified in “soils” by the New England Transportation Technician Certification Program (NETTCP) using the methods specified. Testing to be performed at depths and locations determined by the Owner. Contractor shall not receive payment for any unused portion of the contingency allowance. Excluded: Additional compaction tests and Work performed at no additional cost to Owner to obtain desired compaction in trenches that failed initial compaction tests.	

ITEM 27: Owner’s Contingency Allowance for Materials Escalation Price Adjustment (Statutory Requirement)	
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 allowance 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 10. Contractor shall not receive payment for any unused portion of the contingency allowance for Materials Escalation.	

PART 2 - PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

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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. See qualification requirements in the following sections.
 - Section 01 57 31 – Temporary Sewage Bypass
 - Section 01 57 05 – Temporary Dewatering
 - Section 01 57 35 – Temporary Stream Bypass

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 5 years on at least 5 projects.
- B. 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;
 - 2. a project manager assigned full-time with at least 10 years' experience as project manager on comparable projects; and
 - 3. regularly engaged experienced engineers/design professionals licensed in the state the Project is located performing work similar to that specified.
- C. Contractor shall have successfully completed at least 5 projects involving construction of similar facilities in the same state as the Project covered by the Contract Documents within the last 5 years. "Similar facilities" means similar in type, character, physical size, and complexity to that required by the Contract Documents.

1.03 SPECIAL REQUIREMENTS

- A. Contractor shall have successfully completed:
 - 1. at least 10 projects that included either or a combination of stormwater and sewerage utilities within public streets within the last 10 years;

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 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
 - 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.
- 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 Richard Road Culvert, Bedford, Massachusetts," prepared by GZA GeoEnvironmental, Inc., dated December 6, 2023.
 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 plan.

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 location of the Project at least 45 calendar days prior to commencement of dewatering Work.

2. Minimum contents of Dewatering Plan

- a. Design calculations and analysis data demonstrating adequacy of proposed dewatering system and compliance with performance requirements specified. Include calculations to estimate quantity of discharge. Include calculations addressing excavation base stability and uplift.
- b. Cofferdam design. Include calculations to estimate height of dam.
- c. Local Best Management Practices (BMP) for 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 discharge points and method for conveying effluent.
- g. Complete description of equipment and materials, and sequencing for installation, operation, and maintenance in relation to sequence of excavation and backfilling and grouting work.
- h. Methods to be used for drilling, construction, and development of dewatering wells.
- i. Number, location, and screened depths of proposed piezometers and flow-measuring devices for monitoring performance of dewatering system. Install piezometers at locations shown on the Drawings or as specified in Dewatering Plan. Minimum number of groundwater observation wells to install are specified but additional wells may be required by Owner.
- j. Standby equipment and standby power supply with contingency plan for loss of power to dewatering system.
- k. Proposed locations of points of effluent treatment equipment, effluent flow equalization tanks, if any, and discharge of water.
- l. Discharge metering and reading schedules and details of settling tank and oil/water separator.
- m. Forms proposed for use during inspection and monitoring of dewatering system.

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.

1.06 QUALITY ASSURANCE

- A. Provide in accordance with Division 01 General Requirements.
- B. Qualifications
 1. Installer: specialized in dewatering work continuously for minimum 5 years in similar subsurface conditions.

2. Designer: registered professional civil/geotechnical engineer with minimum 5 years' experience who has successfully designed dewatering systems in similar conditions.

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. Use piezometers installed as part of the geotechnical instrumentation program to confirm groundwater elevation prior to the start of excavation.
- b. 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.
- c. Locate groundwater control facilities where they will not interfere with the Work or the work of other contracts.
- d. Provide for prevention of surface water from entering excavations by grading, dikes, or other means.
- e. Provide for dewatering without damaging adjacent streets, utilities, existing buildings, structures, and site improvements adjacent to excavation.
- f. 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.
- g. 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.
- F. Coordinate sequence of installation with Work for support of excavation system and grouting.
- G. Continuously monitor groundwater levels inside and outside excavation.

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
- 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 31

TEMPORARY SEWAGE BYPASS

PART 1 – GENERAL

1.01 SUMMARY

- A. Provide, operate, and maintain a functional bypass pumping system capable of bypassing each area of Work without leakage or spillage of sewage upon the ground or streets or back up of sewage into any building or onto any property for the duration of the Project.
- B. Design Requirements:
 - 1. Provide a bypass pumping plan designed by a professional engineer registered in the state where Project is located.

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, stamped by a professional engineer registered in the state in which the Project is located, prior to implementation and prior to the start of construction
 - 2. Minimum contents of sewage bypass pumping plan:
 - a. Standard Operating Procedure: Describe the normal sequence of events to be followed while pumping and setting up and breaking down pumping equipment. Plan must address strategies and safeguards to ensure that public safety and environmental health is maintained at all times, the possibility of property damage and wetlands impacts, and overall level of inconvenience is minimized.
 - b. Layout drawing showing locations of equipment on Site and how access to the Site is maintained
 - c. Equipment lists

- d. Pump curves and motor and engine data demonstrating equipment is sufficiently sized to meet all specified and anticipated operating conditions
 - e. Notification form
 - f. Emergency Response Plan: Describe the intended means of handling the following situations, including response and clean-up measures, and emergency backup power or backup fuel storage. List equipment to be used and where it will be stored.
 - Break or failure of bypass line (pipe)
 - Failure of bypass pump
 - Overflow
 - Back up into dwelling or onto private property
 - Failure of bypass pumping system to accommodate flow
3. Shop Drawings for equipment and materials including, but not limited to:
- Pumps
 - Engines and/or Motors
 - Sound Enclosures
 - Pipe or hose
 - Joints/couplings
 - Plugs and/or bladders
4. Statement of Qualifications demonstrating experience of the firm in accordance with Article 1.04 and listing a minimum of 20 successful bypass pumping projects conducted in the last ten years. Provide contact information for no fewer than 5 of these projects which:
- Have been completed in the last 5 years,
 - Involved similar equipment to that proposed for this Project, and
 - Had duty capacities of not less than 3 mgd.

1.05 QUALITY ASSURANCE

- A. Provide in accordance with Division 01 General Requirements.
- B. Qualifications: per Division 01 General Requirements and as follows.
 1. Bypass pumping system shall be provided, operated, and maintained by a firm which has been regularly engaged in providing bypass pumping for a minimum of 10 years.

1.06 SITE CONDITIONS

- A. Existing Conditions: per Division 01 General Requirements.
- B. The Project area consists of active sanitary sewers; therefore, flows and flow data are variable depending on location and conditions. Visit the Work locations prior to start of Work to visually inspect flow conditions as necessary.
- C. Portions of the Project are subjected to infiltration and inflow. Account for infiltration and inflow volume in the planning and conduct of the Work.

PART 2 – PRODUCTS

2.01 BYPASS PUMPING SYSTEM

- A. Godwin Pumps (a Xylem brand)
- B. Griffin Dewatering
- C. Rain for Rent
- D. Or equal

2.02 PUMPS, PIPES & FITTINGS

- A. Provide pumps suitable for use with raw, unscreened sewage and capable of conveying the volume of flow anticipated with a sufficient margin of safety. Provide for 100 percent redundancy (2 pumps the Site for every 1 pump required) if flow cannot be returned to the sewer at any time if pumping system failure occurs.
 - 1. Redundant pumping: suction and discharge piping with quick connect couplings to facilitate change out of pumps.

PART 3 – EXECUTION

3.01 GENERAL

- A. Maintain flows under all flow conditions. Adequately handle flows, even instantaneous peak flows, without damage or overflow, providing for potential large instantaneous flow contributors connected to the sewer under repair.
- B. Allow for passage of traffic and protect bypass piping at driveway and street crossings.
- C. Coordinate bypassing with low-flow times to the extent possible. Prevent overflows or backups.
- D. If Contractor determines bypass pumping is not required at a location due to lack of flow or determines that a Work item does not require bypass pumping to be

performed, and Engineer agrees, protect flows from construction debris and ensure no debris enters the sewer system.

- E. Repair damage to existing pipes and structures to the satisfaction of the Engineer.
- F. Prevent sanitary flow from discharging into salt or fresh water body by means of overflow, bypass pumping, or other methods.
- G. Restore normal service to entire system at end of normal working hours each day.

3.02 SHUTDOWN

- A. Shutdown is not permitted. Maintain flow of wastewater at all times with no interruption of service.

3.03 TEMPORARY POWER

- A. Provide fuel and power to run bypass pumps at no additional cost to Owner.

3.04 PIPING

- A. Provide that piping system has adequate water tightness. Perform a leakage test with clean water at Engineer's direction, at no additional cost to Owner.
- B. Lay temporary piping along the general lines of streets or roadways in a manner that causes the minimum amount of disruption and is least likely to be damaged. Use temporary bituminous pavement, cold patch, or other approved material to form a ramp on each side of the pipe or depress the pipe at driveways to allow for property owners to drive over the temporary pipe as directed by the Engineer.

3.05 OPERATION AND MAINTENANCE

- A. Continuously monitor bypassing operations regardless of duration or timing of bypassing. Unattended bypass pumping is prohibited.
- B. Arrange for bypass pumping past working hours with Engineer and provide adequate sound attenuation and an attendant.
- C. Do not allow leaks in bypass pumping systems. Clean and disinfect leaks at no additional cost to Owner.

END OF SECTION

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.
- 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 57 35

TEMPORARY STREAM BYPASS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. Furnish, install, and maintain temporary measures for Mongo Brook flow 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. 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 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, culverts and drainage structures, drainage pipes, sewer pipes, 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 32 90 00 – Planting

1.02 PRICE AND PAYMENT PROCEDURES

- A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. Massachusetts Department of Transportation (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 101.
- 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, stack, store and protect field stone masonry wall sections to be reinstalled as necessary to construct drainage improvements or other parts of Work.

- D. Remove and stack fencing, lamp posts, letter boxes, signs, guardrails, bike racks, poles and other usable materials to be reinstalled.
- E. 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.
- F. Remove and stockpile top soil, curb stones, utility castings and other materials for reuse as shown or directed by Engineer.
- G. Stockpile recovered materials acceptable to Engineer to be reused on Project and protect against damage or deterioration.
- H. 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.
- I. 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.

- J. 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.
- K. If cobblestones are encountered, carefully stack excavated cobblestone.
- L. 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.
- M. 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.
- N. 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.
- C. Re-plant trees designated on Drawings in accordance with Section 32 90 00.

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 02 82 35

ASBESTOS CEMENT PIPE REMOVAL AND DISPOSAL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Removal and legal disposal of asbestos cement (AC) pipe encountered by a licensed asbestos abatement contractor 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. U.S. EPA Regulation 40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants (NESHAP) Paragraph 61.145, Standard for Demolition and Renovation, and Part 763, Asbestos
2. U.S. Department of Labor; Occupational Safety and Health Act of 1970 (Particular attention is drawn to the Asbestos Regulations of 29 CFR, Part 1926.1001 General Industry Standard for Asbestos, Part 1910.134 Respirator Regulations, and Part 1910.1200 Hazard Communication Program)
3. U.S. Department of Transportation regulations, 49 CFR Parts 171-181; Hazardous Materials Regulations
4. Commonwealth of Massachusetts
 - a. 453 CMR 6.00, Current Asbestos Regulations
 - b. MGL Chapter 149, Sections 6A-6G
 - c. MGL Chapter 21E, Massachusetts Oil and Hazardous Material Release Prevention and Response Act
5. Massachusetts Department of Environmental Protection (Mass DEP)
 - a. 310 CMR 7.00, 7.09, 7.15, 19.00, 22.00, 33.00, 40.00 and all related amendments and policy statements
 - b. Asbestos Cement Pipe Guidance Documents latest version

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. Submit Asbestos Notification Form, ANF-001 10 working days prior to beginning abatement activities to Owner and Mass DEP (see instructions at <https://www.mass.gov/guides/massdep-asbestos-construction-demolition-notifications>).
- C. Asbestos Work Plan prior to commencement of removal of AC pipe including the following:
 - 1. Notification procedures when asbestos concrete pipe is encountered
 - 2. Worker training, certifications, personal protective equipment, and monitoring
 - 3. Sequence of work and operating procedures for the excavation, removal, handling, storage and disposal of asbestos concrete pipe
 - 4. Description of containment systems
 - 5. Emergency response procedures
 - 6. Name, location and certification of proposed disposal location
- 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. Qualifications: per statutory requirements for licensed asbestos works.
- C. Regulatory approvals: per statutory requirements and Department of Environmental Protection.

1.07 SITE CONDITIONS

- A. Per Division 01 General Requirements and as shown on the Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

- A. Provide that Work is performed by and under the direction of an asbestos abatement Subcontractor duly licensed per Laws and Regulations.
- B. Provide that exposed asbestos cement pipe is handled in accordance with Laws and Regulations.
- C. Provide that personnel handling AC pipe are trained and certified. Provide personal protective equipment to handle such material per Laws and Regulations.
- D. Legally dispose of AC pipe per Laws and Regulations.

3.02 ATTACHMENTS

- A. Mass DEP Asbestos Cement Pipe Guidance Documents

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

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 and obtained by Contractor to include, but not be limited to: wall layout and elevations, and leveling pad. All drawings shall show locations and sizes of penetrations and related appurtenances. Shop Drawings shall be signed and sealed by a Professional Engineer licensed in the Project State.

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 Professional Engineer registered 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. The Engineer who seals the calculations and Shop Drawings shall be responsible for the design.
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. The materials covered by this Specification are intended to be standard materials of proven ability as manufactured by reputable concerns. Materials shall be designed and constructed in accordance with Industry Practice, and shall be installed in accordance with the manufacturer's recommendations. The Specifications call attention to certain features, but do not purport to cover all details entering into the construction of the materials.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Provide in accordance with Division 01 General Requirements.
- B. Products shall be shipped, stored, and handled in a manner consistent with the written recommendations of the manufacturer so as not to degrade quality, serviceability, and/or appearance. Any unit found to be defective, either before or after installation, shall be removed from the Project Site and replaced 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. All precast structures shall have exterior dimensions as shown on the 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. All areas indicated in the drawings to be grouted shall be made with a non-shrinking, nonmetallic grout. The concrete surface shall be cleaned and roughened; and then shall be kept 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 seven 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, H₂SO₄, NaOH, KOH, and H₂S
- 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 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 shall be responsibility of the Contractor.

7. Patching of imperfections at the plant by the Manufacturer shall require the Owner's and Engineer's approval before the unit is shipped from the 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 manufacture's 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 manufacture's recommendations.
12. Repair damage to existing utilities and properties adjacent to the proposed headwalls to satisfaction of Engineer. Such damages shall be repaired by the Contractor to the satisfaction of the Engineer at no additional cost.
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 31 10 00 – Site Clearing
3. Section 31 05 19.13 – Geotextiles for Earthwork
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 REFERENCES

A. Reference Standards

1. American Association of State Highway and Transportation Officials (AASHTO)
 - a. AASHTO M85 Standard Specification for Portland Cement
 - b. AASHTO M 295 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/ft³ (600 kN-m/m³))
 - 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 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 329 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.

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 coarse 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 coarse 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. 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.
- O. 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 Article 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. 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 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 structural fill for support of footings and foundations and against below grade walls in loose lift thicknesses not exceeding 10 inches. Compact to minimum 95 percent maximum dry density in accordance with ASTM D1557.
- 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 temporary erosion control measures in accordance with Section 01 57 13.

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

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.

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: equivalent to the following.
 - 1. Non-Woven Geotextile – Mirafi 180N
 - 2. Woven – Mirafi HP270
- 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
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. Woven Geotextile

PROPERTY	TEST METHOD	STANDARD	SPECIFIED VALUE
Material	--	--	Polypropylene
Tensile Modulus @ 5% strain	ASTM D4595	MARV	1,272 lbs/ft
Flow Rate	ASTM D4491	MARV	40 gal/min/ft ²
Permittivity	ASTM D4491	MARV	0.6 sec ⁻¹
Apparent Opening Size	ASTM D4751	MARV	No. 30 U.S. Sieve
UV Resistance	ASTM D4355	MARV	80%

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 in the table in Article 2.01 above 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 in the table in Article 2.01 above.
- 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-slope 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 32 90 00 – Planting
 - 2. 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. 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

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

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 and 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 verify 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.
- 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. Fill voids immediately with approved backfill compacted to density specified in accordance with Section 31 00 00.
- C. 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. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.
- C. 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

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, and miscellaneous patching 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 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 Supplements, 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.
- 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.

3.01 PERMANENT TRENCH PAVEMENT

- A. Comply with the construction method requirements of MassDOT Section 420 and MassDOT Section 460.
- 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.

3.02 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.

3.03 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 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

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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 – Site Clearing

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. Association of Official Agriculture Chemists International (AOAC)
 - 3. ASTM International (ASTM)
 - a. ASTM D75 Standard Practice for Sampling Aggregates
 - b. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
 - c. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - 4. MassDOT
 - a. Standard Specifications and Supplements, 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 Woods End

Research Laboratory, PO Box 297, Mt. Vernon, Maine, 04352
(207)-293-2457.

- 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 771.
- 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. 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*)
- C. 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 pennsylvanicum*)
 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.

3.05 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.

3.06 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.

3.07 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

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SECTION 32 92 19

SEEDING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Provide seeding and landscape development 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 pennsylvanicum*)
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 TenCate MiraMesh.
- 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 1-1/2 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 31 11

PUBLIC SANITARY SEWERAGE GRAVITY PIPING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Provide gravity sewer pipe and appurtenances in accordance with this Section and applicable reference standards listed in Article 1.03.
- B. Related Requirements
 - 1. Section 01 57 31 – Temporary Sewage Bypass
 - 2. Section 33 39 13 – Sanitary Utility Sewerage Manholes, Frames, and Covers

1.02 PRICE AND PAYMENT PROCEDURES

- A. Measurement and payment requirements: per Division 01 General Requirements.

1.03 REFERENCES

- A. Referenced Standards
 - 1. ASTM International (ASTM)
 - a. ASTM C923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
 - b. ASTM C1173 Standard Specification for Flexible Transition Couplings for Underground Piping Systems
 - c. ASTM D1784 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - d. ASTM D2241 Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
 - e. ASTM D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - f. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

- g. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- 2. American Water Works Association (AWWA)
 - a. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution
- 3. Uni-Bell PVC Pipe Association (UBPPA)
 - a. UNI-B-06 Recommended Low-Pressure Air Testing of Installed Sewer Pipe
 - b. UNI-TR-1 Deflection: The Pipe/Soil Mechanism
 - c. Uni-Bell Handbook of PVC Pipe Design and Construction

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination, sequencing, and scheduling: per Division 01 General Requirements.
- B. Schedule police details and coordinate traffic management for all Work locations with Owner.

1.05 SUBMITTALS

- A. Submit in accordance with Division 01 General Requirements.
- B. Product data
- C. Shop Drawings: catalog cuts for testing equipment, including go-no-go mandrel and air leakage testing equipment.
- D. Source and field quality control submittals: weekly construction records of installed Work.
- E. Closeout and maintenance material submittals: per Division 01 General Requirements.
 - 1. Record pipe material and classes. Record depth and take ties to location of the following for construction records.
 - a. Building service capped ends, cleanouts, bends, connection points to sewer main
 - b. Repairs to existing pipes
 - c. Pipe stub capped ends

- d. Chimneys and other pipe appurtenances

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.
 - 1. Verify existing pipe material as shown on Drawings.
 - 2. Notify Owner immediately if Site conditions prevent access to manholes or pipes identified as part of the Work.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Provide sanitary sewer gravity pipe and fittings of type and class as indicated on the drawings and specified herein.

2.02 PVC GRAVITY SEWER PIPE

- A. Furnish ASTM D3034 with push-on joints per ASTM D3212. Pipe gaskets: ASTM F477 elastomeric seals or nitrile gaskets. Materials: equal or exceed cell class 12454 or 12364 in accordance with ASTM D1784.
- B. Pipe with less than 4-feet of cover or more than 16-feet of cover: ASTM D2241 standard dimension ratio (SDR) 21.
- C. Pipe 4-feet to 16-feet of cover: SDR 35.

2.03 DUCTILE IRON PIPE AND FITTINGS

- A. Ductile Iron Drainage Pipe: ASTM A746-03, Class 52, push-on joint.
 - 1. Thickness: Class 52.
 - 2. Joint type: Rubber gasketed, push-on conforming to AWWA C111.
 - 3. Interior lining: Ceramic epoxy lining of equal quality and performance as Protecto 401™ or Ceramapure™ PL90.
 - 4. Exterior coating: Bituminous coating conforming to AWWA C151.

2.04 COUPLINGS

- A. Type A solid sleeve coupling: AWWA C219, ROMAC Model No. 501, Smith-Blair Model No. 411, Dresser Style 38, or equal.
- B. Type B neoprene sleeve: ASTM 1173. Acceptable level of quality: of equivalent to Fernco.
- C. Type C neoprene sleeve with stainless steel wrap: ASTM 1173. Acceptable level of quality: equivalent to Fernco Strongback.
- D. Type D PVC repair coupling: of same type and class of materials as pipe with single piece gasket. Provide with center stop or friction clamp.

2.05 FITTINGS

- A. Furnish single piece gasket of same type and class of materials as pipe except as otherwise specified. Provide wyes or tee wyes for service connections and manhole inside drop connections.

2.06 INSULATION

- A. Furnish 2-inch thick, 4-foot wide, extruded closed-cell rigid formed polystyrene. Acceptable level of quality: equivalent to Dow Styrofoam Highload 60.

2.07 NON-WOVEN FILTER FABRIC FOR WORKING MAT

- A. Acceptable level of quality: equivalent to TenCate Mirafi 160N.

2.08 DETECTABLE WARNING AND IDENTIFICATION TAPE FOR BURIED UTILITY LINES

- A. Acceptable level of quality: equivalent to Trumbull Manufacturing.
- B. Aluminum core plastic encased tape: 6-inch minimum width, with warning and identification imprinted in bold black letters continuously over the entire tape length.
- C. Warning tape color code: Green - Sanitary Sewer Systems
- D. Color and printing: permanent and unaffected by moisture or soil.
- E. Minimum thickness: 0.003 inches.
 - 1. Minimum strength: 1,500 pounds per square inch lengthwise, and 1,250 pounds per square inch crosswise, with a maximum 350 percent elongation.

2.09 PRECAST CONCRETE MANHOLE CONNECTIONS

- A. Acceptable level of quality of sleeve seal for pipe less than 6 inches in diameter: equivalent to Link-Seal Model S-316 by Thunderline Corp.
- B. Boot type flexible connector with rubber gasket or boot, metal expansion ring and double metal take-up clamps: ASTM C923. Acceptable level of quality: equivalent to Kor-N-Seal.

2.10 SOURCE QUALITY CONTROL

- A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Provide bypass pumping in accordance with Section 01 57 31.

3.02 INSTALLATION

- A. Install PVC pipe in accordance with manufacturer's recommendations. Use laser beam for line and grade unless alternate methods are approved.
- B. Secure each length of pipe with bedding before placing next length. Bed pipe as shown on Drawings. Plug open ends whenever Work is suspended.
- C. Provide 30-inch minimum cover over top of pipe before trench is wheel-loaded.
- D. Lay pipe to line and grade shown on Drawings. If grade is not shown, determine elevations of start and finish points for each run of pipe. Lay pipe to a uniform grade between these points. Line and grade may be adjusted by Engineer as required by field conditions.
- E. Lay pipe in the dry. Dewater trench in accordance with Division 01 General Requirements. Do not use installed pipe to remove water from Work area.
- F. Flush pipes and remove debris using method approved by Engineer. Do not use gravity flushing.
- G. Install piping with less than 4-feet of cover or greater than 16-feet of cover complete from manhole to manhole. Do not mix pipe class, splicing or couplings. Use and location of flexible couplings: approved by Engineer.
- H. Use center stop or restrain by friction clamp for Type D PVC repair coupling to prevent movement of coupling during backfilling or alternate method approved by Engineer.
- I. Use nitrile gaskets in contaminated soil areas.

- J. Connections to New Precast Concrete Manholes
 - 1. Use link seal for pipe less than 6 inches in diameter.
 - 2. Use boot type flexible connector for pipe greater than or equal to 6-inch diameter.
- K. Connections to Existing Precast Concrete Manholes
 - 1. Core existing manhole and repair manhole penetration to install flexible connector.
 - 2. Repair manhole brick invert and bench to provide smooth transition from manhole to pipe.
- L. Connections to Existing Non-Precast Concrete Manholes
 - 1. Core existing manhole and provide new boot type flexible connector. Repair manhole penetration to install flexible connector.
 - 2. Minimize size of penetration and provide non-shrink grout surrounding pipe to seal. Provide watertight pipe connection if manhole cannot be cored.
 - 3. Repair manhole brick invert and bench to provide smooth transition from manhole to pipe.
- M. Service Laterals and Fittings
 - 1. Verify location and size of service laterals.
 - 2. Provide tee wye or wye fittings on main line pipe and connect existing service connections to main line.
- N. Vertical Separation from Water and Storm Drain lines
 - 1. Elevation where sewer piping crosses water or storm drain lines: minimum 18 inches below bottom of water or drain line. Provide protection as shown on Drawings and as follows when elevation of sewer piping cannot be buried as specified above.
 - a. Provide adequate structural support to prevent excessive deflection of joints.
 - b. For water pipe, center 1 full length of water pipe at crossing point so joints are equal distance and as far as possible from sewer piping.
- O. Parallel Separation from Water and Storm Drain Lines

1. Lay sewer piping, sewer services and sewer manholes at least 10-feet horizontally, edge to edge, from water and drain lines. When conditions do not permit a horizontal separation of 10-feet, a sewer line may be laid closer to a water or drain line as shown on Drawings, and ensure bottom of water or drain line is at least 18 inches above top of sewer piping wherever possible.

3.03 INSULATION

- A. Install insulation when gravity sewer pipe depth is less than 4-feet or as directed by Engineer.
- B. Provide minimum 4-inch sand layers directly above and below insulation.

3.04 TESTING OF SANITARY SEWERS

- A. Test sanitary sewer pipes after backfilling. Install house service leads on main pipe before testing. Perform tests in presence of Engineer. A maximum of 1,000-feet of pipe may be installed, but not tested.

1. Perform deflection test for PVC pipe prior to installation of replacement culvert. Test 100 percent of pipe with go/no-go mandrel with outside dimension to permit no more than a 7.5 percent deflection. Base mandrel dimensions on a base pipe ID from ASTM D3034 SDR 35/SDR 21 or AWWA C900 DR 18 as appropriate, and the following calculation: per UNI-TR-1.

$$\text{Mandrel O.D.} = ((100-7.5)/100) \times \text{base pipe ID}$$

2. Repair or replace pipes not passing test using approved materials and methods and retest.
3. Clean and flush sewer pipe after Work is completed and before final acceptance.

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 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.
- B. Related Requirements
 - 1. Section 01 50 00 – Temporary Facilities and Controls
 - 2. 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 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 330 Standard Specification for Polypropylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
 - 2. ASTM International (ASTM)
 - a. ASTM A746 Standard Specification for Ductile Iron Gravity Sewer Pipe
 - b. ASTM C1173 Standard Specification for Flexible Transition Couplings for Underground Piping Systems
 - c. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics
 - d. ASTM D6226 Standard Test Method for Open Cell Content of Rigid Cellular Plastics

- e. ASTM F2306, Standard Specification for 12”to 60”(300 to 1500 mm) Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications
 - f. ASTM D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications
 - g. ASTM F477, Standard Specifications for Elastomeric Seals (Gaskets) for joining Plastic Pipe
 - h. ASTM D3212, Standard Specification for joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric joints
 - i. ASTM F2648/F2648M-07, Standard Specification for 2” to 60” (50 to 1500 mm) Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications
- 3. American Water Works Association (AWWA)
 - a. AWWA/ANSI C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
 - b. AWWA/ANSI C151 - Class 52, Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
 - 4. Massachusetts Department of Transportation (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. Certificates
 - a. Manufacturer's notarized certificate certifying conformance with the Specifications to accompany shipments
 - 3. Design Data/Submittals

- a. Pipe manufacturer's anti-floatation calculations for each pipe material and details, signed and stamped by engineer licensed in the state where Project is located based on the following criteria.
 - 1) Groundwater elevation shall be set at grade above the pipe.
 - 2) 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.
 - 3) The pipe shall be considered empty. Calculations shall not consider the weight of internal water.
4. Manufacturer Instructions
5. Field Quality Control Submittals
 - a. Test results
 - b. Logs of inspection and testing
- B. Closeout and maintenance material submittals: per Division 01 General Requirements.
 1. Record depth and take ties to the location of the following.
 - 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. Provide that each shipment of pipe, pipefittings and appurtenances includes manufacturers' Certificate of Conformance.
 2. 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 Standard Specifications Section 230.
- 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 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

- A. Corrugated HDPE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.
 - 1. Solid wall pipe: watertight joints in accordance with ASTM D3212, corrugated, matching tube and fittings.
- B. Corrugated HDPE Drainage Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.
 - 1. Watertight Joints: ASTM D3212, corrugated, matching pipe and fittings.

2.03 REINFORCED CONCRETE PIPING AND FITTINGS

- A. Reinforced-Concrete Drainage Pipe and Joints: ASTM C76.
 - 1. Bell-and-spigot ends and gasketed joints with ASTM C443, soil tight, rubber gaskets.
 - 2. ASTM C76 Class III, D-load, B-Wall.
 - 3. Minimum $f'c = 4,000$ psi.

2.04 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. Make joints in dry trench according to manufacturer's recommendations and best practices for class of exterior pipe laid. Wipe ends of pipe clean with dry cloth before making joint.
- B. Lay pipe to line and grades shown on Drawings. Line and grade may be adjusted by Engineer to meet field conditions.
- C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- D. 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.
- E. Backfill trenches in accordance with the Drawings and Section 31 00 00.
- F. Use solid sleeves only where approved by Engineer.
- G. Pre-Insulated Pipe
 - 1. Cover straight joints with HDPE jacket. Wrap with acceptable level of quality: equivalent to Polyken tape covered with an HDPE rock shield.
 - 2. Place pre-insulated pipe on 6-inch layer of sand, tamped to provide a stable and uniform bedding and carefully backfill and covered with 12-inches of sand, compacted in 6-inch maximum lifts.
- H. 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.

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 according to ASTM standards. Pipes may be rejected at Site if non-conforming or damaged, regardless of prior factory acceptance.

- C. Remove and replaced damaged pipe found or encase in a Class A concrete collar or envelope as directed.
- D. Clean interior of piping of dirt and superfluous materials. Flush with water.

3.03 CLOSEOUT ACTIVITIES

- A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 33 49 00

STORMWATER STRUCTURES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Provide storm drainage catch basins, manholes, inverts and castings 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 42 20 – Stormwater 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 C478 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
 - e. ASTM C923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
 - f. ASTM C990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 - g. ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
 - h. ASTM D4101 Standard Specification for Polypropylene Injection and Extrusion Materials
3. Massachusetts Department of Transportation (MassDOT)
- a. Standard Specifications for Highways and Bridges, Supplemental Specifications, and Construction Details
 - 1) M4.02.15 – Cement Mortar

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 descriptive data, technical literature, catalog cuts, and installation instructions
 - 2. Dimensional data for each structure
 - 3. Product data for manholes, joint sealants, catch basins, inverts, risers, frames, covers, grates and frost barriers
- C. Shop Drawings
 - 1. Precast manholes, catch basins and precast concrete items showing components to be used, elevations of top of precast sections, base and intermediate levels and pipe inverts, rim elevation, location of pipe penetrations, cutouts, and steps for each manhole, and finish grade elevation at each proposed manhole location

- D. Certification by engineer licensed in the state where Project is located certifying precast structures, including anti-flotation slabs (whether provided separately or as a monolithic unit) have been designed to withstand all forces including soil, traffic and hydrostatic loads in accordance with applicable Laws, Regulations, rules and codes
- E. Design Data for precast structures including anti-flotation slabs
- F. Qualification Statements
- G. 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.
- H. 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. Handle and place concrete units in accordance with manufacturer's written rigging instructions.
 - 2. Provide slings, straps, and other devices for handling and support of 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 1.1 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 1.1 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. Manhole cover: 32 inches in diameter labeled DRAIN in 3-inch-high raised letters.
 - a. Minimum 30 inches clear opening. Gray iron cover and frame per Drawings, meeting ASTM A48, AASHTO-M 306, heavy duty design load rated for H-20 traffic loading. Provide frame and cover from same manufacturer.
 - b. Cover: minimum weight 200 pounds

- c. Manhole frame: minimum weight 240 pounds.
- D. Catch basin frames and grates: heavy duty, bicycle safe, cascading type frame and grate; nominal 24 inches square grate.
 - 1. Provide standard 4 flange, 3 flanges when adjacent to curb, gray iron catch basin square frame with square hole grate per Drawings, meeting ASTM A48, frame meeting AASHTO-M 306, heavy duty design load rated for H-20 traffic loading. Engraved letters: DUMP NO WASTE/DRAINS TO WATERWAYS or similar.
- E. Acceptable level of quality for cast iron catch basin trap: equivalent to Neenah Foundry product number R-3704 with vent holes, mounted in accordance with manufacturer specifications.

2.03 CATCH BASINS AND MANHOLES

- A. Precast structures: ASTM C478 and as shown on Drawings, capable of supporting H-20 and HL-93 loading.
- B. Precast concrete base and first riser: monolithic.
 - 1. Include crystalline waterproofing additive in concrete prior to casting of riser section.
- C. Precast bases and top slabs: same construction as precast riser sections (define) of dimensions shown on Drawings.
- D. Anti-floatation slab: ASTM C139 precast monolithic base unit or cast-in-place, based on manufacturer’s recommendation and as approved.
- E. Wall Thickness
 - 1. Meet minimum thickness requirements for structure base and walls.

Internal Structure Diameter (Feet)	Minimum Wall Thickness (Inches)	Minimum Base Thickness (Inches)
4	5	6
5	6	8
6	7	8
7	8	8
8	9	9

- F. Base section: 4-foot minimum precast monolithic construction, including minimum 36-inch riser with shiplap joints and steps. Shorter base sections may be permitted based on field conditions. Submit request for approval to engineer for review.
- G. Embed cast openings for pipe and materials in structure wall during manufacture.

- H. Cone sections: precast sections of similar manufacture with varying heights to meet construction requirements.
- I. Lift holes: maximum 2 cast or drilled in any section, with suitable rubber or concrete stopper or other approved device for plugging holes.
- J. Clearly mark date of manufacture and name or trademark of manufacturer on inside of riser structure.
- K. 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.
- L. All-weather joint sealant: butyl rubber material in flexible rope form, ASTM C990 Section 6.2.1. Factory seal joints between precast sections with watertight, shiplap-type seal.
- M. Steps: positioned and embedded in concrete. Manufacture from deformed 1/2-inch steel reinforcement rod per ASTM A615 and encased in polypropylene per ASTM D4101 with pattern design to prevent lateral slippage off step. Size: 12 inches on center with minimum width of 16 inches and 7 inches from wall for full height of manhole.

2.04 PIPE CONNECTIONS (MANHOLES AND CATCH BASINS)

- A. Compression type connector: ASTM C923 single rubber gasket constructed solely of synthetic or natural rubber.
- B. Boot type connector: ASTM C923 rubber gasket or boot with metal expansion ring and double metal take-up clamps.

2.05 TRASH RACKS

- A. It is the responsibility of the Contractor to ensure that the trash rack is compatible with the proposed culvert.
- B. Fittings and Fasteners: Same material and alloy as parts being joined, unless otherwise indicated. Do not use materials that will be corrosive or incompatible with materials being fastened; do not use pop-rivets, sheet metal screws, adhesives or cast fittings.

2.06 SOURCE QUALITY CONTROL

- A. Provide in accordance with Division 01 General Requirements

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Remove existing structures.
- B. Set catch basin and manhole frames to finished lines and grades as specified
- C. 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.
- D. Touch up damp proofing in field prior to backfilling.
- E. Adjust existing drainage structures as specified in Drawings or as directed. Refill excavated area with gravel and set casting into concrete collar. Engineer will determine new elevation of structure.
- F. 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.

- 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 REPAIRS

- A. Repair leaks after determining cause. Perform earthwork according to Section 31 00 00 required for repairs if manhole has already been backfilled.
 - 1. Perform repairs by approved methods to bring leakage within allowable rate if less than 3 gallons per vertical foot per 24 hours but more than 1 gallon per vertical foot per 24 hours.
- B. Perform repairs using approved methods and materials. Remove and replace or reconstruct if necessary. Remove and replace defective sections if required.

3.03 FIELD QUALITY CONTROL

- A. Provide in accordance with Division 01 General Requirements.
- B. Site/Field Tests and Inspections
 - 1. Provide structures are complete except for shelf and invert brickwork.
 - 2. Make pipe connections prior to testing. Plug pipes and other openings in structure walls prior to test.
 - 3. Test precast concrete manholes immediately after installation and prior to backfilling. Provide for Engineer to observe tests.
 - 4. Vacuum Tests for Manholes
 - a. Conduct manhole acceptance test using vacuum test procedure in accordance with ASTM C1244, except as modified.
 - 1) Plug lift holes with approved non-shrink grout.
 - 2) Plug pipes entering manhole, securely bracing plug from being drawn into manhole.
 - 3) Place test head at inside of top section and inflate seal in accordance with manufacturer's recommendations.
 - b. Passing determined by time for vacuum to drop from 10 inches of mercury to 9 inches of mercury regardless of diameter.

Greater than	Manhole depth
2.0 minutes	0 feet – 10 feet
2.5 minutes	10 feet to 15 feet
3.0 minutes	15 feet and over

- c. Locate leak, make repairs, and retest structure if vacuum drops in excess of prescribed rate.
- d. Conduct water exfiltration test if unit fails repeat of vacuum test after repair as directed.
 - 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 test. Provide means of determining GWT level at any time throughout 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) Infiltration test may be required if results of exfiltration test are not satisfactory.

e. Inspections

- 1) Make manhole accessible for inspection by Engineer prior to backfilling.

3.04 CLEANING

- A. Clean manholes and catch basins of silt, debris and foreign matter prior to final inspection.

3.05 CLOSEOUT ACTIVITIES

- A. Provide in accordance with Division 01 General Requirements.

END OF SECTION