

DIVISION 1

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work covered by the Contract, listing of Owner, Project location, Engineer. Sequence requirements, the Contractor's use of the premises and Owner's occupancy requirements.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work includes, but is not necessarily limited to the construction of approximately:

- Install approximately 260 linear feet of HDPE sanitary sewer pipe
- Install approximately 360 linear feet of PVC sanitary sewer pipe
- Install approximately 330 linear feet of 8-inch D.I.C.L. water main
- Install approximately 100 linear feet of PVC sanitary sewer laterals
- Install approximately 260 linear feet of PE water service piping
- All related civil/site work as more particularly indicated, shown or described in the Drawings, Specifications, and other Contract Documents.

1.03 OWNER

- A. Town of Wareham, MA
Water Pollution Control Authority
Memorial Town Hall
54 Marion Road
Wareham, MA 02571
Telephone: (508)-291-3100
Contact: Derek Sullivan, Town Administrator

1.04 PROJECT LOCATION

- A. Wankinquoah Avenue, Wareham, MA 02571.

1.05 ENGINEER

- A. BETA Group, Inc
701 George Washington Highway
Lincoln, RI 02360
Ryan Greenway, P.E.
Project Manager

Telephone: (401)-333-2382
Email: rgreenway@beta-inc.com

1.06 PROPOSED SCRIBING OF ASBESTOS CEMENT PIPE

- A. **It is understood by all parties including the Town of Wareham, the Contractor and the Engineer that the proposed scribing method to replace the existing 8-inch asbestos cement sewer pipe in Wankinquoah Avenue is currently being reviewed by the Department of Environmental Protection Agency (DEP). The DEP is currently reviewing proposed specifications for the scribing methodology. No work shall commence until approval is received from the DEP and the specifications are reviewed and approved by the Town/Engineer at which time the specifications will be added to these contract documents.**

1.07 WORK SEQUENCE

- A. In order that Work may be conducted with minimum inconvenience to the public and, work under this Contract may be coordinated with other work which may be under construction or contemplated. The Engineer may determine the point or points and time or times when portions of work will commence or be carried on and may issue orders pertaining to the work sequence, relative to the rate of progress on several portions of the work.

1.08 CONTRACTOR USE OF PREMISES

- A. The Contractor's use of premises shall be within the limits shown on the Drawings and as defined in Section 00500 – Contract Agreement, for the performance of the Work.
- B. The Contractor shall maintain access to utilities and to the existing water, sanitary sewer, combined sewer and drainage systems at all times.
- C. The Contractor shall assume full responsibility for security of all materials and equipment on the site, including those of his subcontractor's.
- D. If directed by the Owner, the Contractor shall move any stored items that interfere with operations of the Owner.
- E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.09 OWNER OCCUPANCY REQUIREMENTS

- A. The existing water, sanitary sewer, and drainage systems, must remain in full service at all times, throughout the duration of the project. Contractor shall conduct his operations in accordance with Section 02149 - Maintaining Existing Flow.

END OF SECTION

SECTION 01015

SPECIAL CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Supplementary requirements governing schedule, work hours, temporary bypass systems, and traffic requirements, excavations, contractor's use of water, water specifications and coordination with police and fire.

B. Related sections

1. Section 00700 – General Conditions
2. Section 00800 – Supplementary Conditions
3. Section 01570 – Traffic Regulations
4. Section 02149 – Maintaining Existing Flow
5. Section 02668 – Temporary Water Bypass

1.02 SCHEDULE

A. Contract Time

1. The total Contract Time to complete the project shall be 40 working days starting on or before the date stated in the Notice to Proceed.

1.03 WORK HOURS

- A. Regular working hours are defined as 8 hours per day, Monday through Friday, excluding federal and state holidays, between the hours of 7:00 AM and 7:00 PM. The Contractor shall also abide by work hour restrictions set forth in or required under permits obtained by the Contractor or Owner in connection with the Project. 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.

1.04 BYPASS PIPING AND MAINTAINANCE OF EXISTING FLOWS

A. Water Work

1. The Contractor shall be required to submit a water temporary bypass plan for review and approval to the Engineer depicting the bypass sizes, locations, proposed connections to existing water supply systems, and an associated

sequence of operation associated with said plan. The Contract shall refer to Section 02668 – Temporary Water Bypass, of these Specifications.

2. The Engineer shall retain the right to request any additional information or changes to the bypass plan that he or she feels ensures the integrity of the existing system, and consequently, should be incorporated into the submittal. The Contractor shall not receive any additional compensation for changes made by the Engineer to ensure the integrity of the water supply system.
3. At locations where hydrants are out of service due to work under this contract, the Contractor shall provide temporary hydrants. A hydrant or water main being used to feed **temporary hydrants must be fed by a 6-inch bypass pipe**. All hydrants temporarily out of service must be bagged.
4. The submittal shall be in the form of a shop drawing and no work may proceed without the approval of said shop drawing by the Engineer.

B. Disruption of Existing Water Supply System

1. The Contractor will not be allowed to operate any hydrants or gate valves without approval from the Wareham Water District.
2. It is the intent of this Contract to relay all water services on within the limits of work, with new polyethylene pipe from the main to approximately 1 foot from the property line/ back of sidewalk and set a new curb stop unless otherwise directed by the Engineer. All lead water services shall be replaced from the main to the foundation of the dwelling.

C. Sewer Work

1. **It is understood by all parties including the Town of Wareham, the Contractor and the Engineer that the proposed scribing method to replace the existing 8-inch asbestos cement sewer pipe in Wankinquoah Avenue is currently being reviewed by the Department of Environmental Protection Agency (DEP). The DEP is currently reviewing proposed specifications for the scribing methodology. No work shall commence until approval is received from the DEP and the specifications are reviewed and approved by the Town/Engineer at which time the specifications will be added to these contract documents.**
2. The Contractor shall be required to submit a sewer construction sequence of operation and phasing plan for review and approval to the Engineer depicting how existing sewer will be maintained at all times. The Contract shall refer to Section 02149 – Maintaining Existing Flow, of these Specifications.
3. The Contractor shall be required to submit a sewer construction detailed plan for review and approval to the Engineer depicting method of operation and installation for scribing of the AC sewer main, adequately designing and implementation of excavation support system of the launching/receiving shafts, and adequately designing and implementation of the dewatering system.

1.05 TRAFFIC REQUIREMENTS

- A. Residential access/egress must be maintained and emergency traffic must be able to pass at all times.
- B. Excavated water and sewer services must be plated at all times prior to backfilling.
- C. Comply with the requirements of Section 01570.

1.06 EXCAVATIONS

A. Test Pits

- 1. Prior to the start of any construction, the Contractor must conduct test pits as shown on the Contract Drawings and at locations where conflicts between existing piping and/or utilities may occur.
- 2. Test pits to be conducted to field verify exact size, material, location, elevation, alignment (vertical and horizontal) of existing piping and utilities
- 3. The Contractor is to provide record of utility elevation, size, material, and alignment to the Engineer upon completion of the test pits. The Contractor shall notify the Engineer of any conflicts between the proposed piping and existing piping or utilities prior to starting installation of the proposed piping.

B. Hand Digging

- 1. Due to the potential of conflict between existing utility infrastructure and the proposed work within the municipal right-of-way, the Contractor may be required to hand dig in locations where conflict exists between the proposed piping and existing utilities. The Contractor should expect hand digging to be required and will not receive additional compensation for hand digging.

C. Excavation Support

- 1. The Contractor shall furnish and install, as required, temporary excavation support including sheeting, shoring, and bracing of shallow trench excavations as necessary to comply with Applicable Safety Code; to accommodate traffic; to permit access to adjacent occupied properties; to protect adjacent buildings, pavements, structures and all existing utilities; to provide an opening of proper depth and width in which to install the proposed pipes and other underground structures; and to protect his workmen, employees of the Owner and Engineer, State and the public, from death or injury from bank failure, earth collapse or earth movement of any nature whatsoever.

1.07 CONTRACTOR'S USE OF WATER

- A. The Contractor must contact the Wareham Fire District (WFD) prior to use of any water for this project. The Town of Wareham's potable water distribution system is operated and maintained by the WFD. The Contractor shall coordinate directly with and comply with all provisions of the WFD for usage of water for this project

Wareham Fire District contact information:

Andy Cunningham
Operations Supervisor
2550 Cranberry Highway
Wareham, MA 02571
Phone: (508) 295-0450

1.08 WATER SPECIFICATIONS

- A. The Wareham Fire District's water specifications are included in Appendix A and were incorporated into the contract specifications. If there are any discrepancies between the contract specifications and Appendix A, Appendix A will govern.

1.09 COORDINATION WITH POLICE & FIRE

1. The Contractor is required to coordinate his work daily with the Town of Wareham Police and Fire Departments.

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Contingencies and their respective value which have been established in the BID as an estimated lump sum to facilitate comparison of bids only.

B. Related Sections

1. Section 00300 - Bid Forms
2. Section 01025 - Measurement and Payment

1.02 ALLOWANCES

A. Disposal of Contaminated Material - Bid Item No.20B

1. Remove and dispose of contaminated soil as shown on the Contract Documents or as directed by the Engineer.

B. Uniformed Traffic Officers - Bid Item No. 21

1. Coordinate and schedule uniformed traffic officers prior to commencement of work on public ways.

1.03 PAYMENT PROCEDURES

A. Under these items, the Contractor shall be reimbursed for charges for the allowances required and authorized by the Owner and Engineer, as detailed in Section 01025 - Measurement and Payment.

B. The lump-sum price for allowances is established in Section 00300 - Bid Forms as an estimated figure to facilitate comparison of bids only. The actual amount to be paid under this item shall constitute full compensation for services rendered.

C. The lump-sum price for this item shall NOT include any costs associated with services rendered for routine utility markings, repair damages incurred as a result of the Contractor's operations, relocations of utilities done at the Contractor's request and/or convenience, or any other unauthorized services rendered by utility companies. The purpose of this item is strictly for the Contractor's reimbursement for those services authorized by the Owner or Engineer prior to the work being performed.

D. The Contractor will be paid based on the actual PAID invoiced amount from the authority in question as approved by the Engineer. If the total cost for such charges is greater or less than the allowance amount stated under this item of the BID, a debit or credit of the difference in cost shall be to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials as required and ordered by the Engineer shall conform to the Contract Documents.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation, relocation, or repair of utilities, shall be performed in accordance with the Contract Documents.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Measurement and payment criteria applicable to the Work performed under a unit price and/or lump sum payment method of Items listed in the BID.

B. RELATED SECTIONS

1. Section 00300 – Bid
2. Section 00500 – Contract Agreement

1.02 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements indicated in SECTION 00300 are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit price contracted.

1.03 MEASUREMENTS OF QUANTITIES

A. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

B. Measurement by Area: Measured by square dimension using mean length and width or radius.

C. Linear Measurement: Measured by linear dimension, along the horizontal projection of the centerline or mean chord.

D. At appropriate points in this text, specifications are given with respect to measuring or estimating certain quantities and the sums due for the same. Except as otherwise provided, the Engineer shall determine the appropriate method for measuring and computing each quantity, and for estimating the sums due for the various kinds of work and material, using such methods, tools and degrees of precision as are suitable for the particular measurement, Item or computation. When so requested by the Engineer, assistance in measuring or determining quantities, shall be provided by furnishing the help of unskilled laborers on the site, by furnishing copies of invoices, or by other means.

- E. For estimating quantities in which the computations of areas by analytic and geometric methods would be laborious, as determined by the Engineer, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas and may be used for this purpose.

1.04 UNIT PRICES

- A. Payment will be computed on the basis of the unit price bid in SECTION 00300 for each Item and the quantity of units completed. Unit prices are to include cost of all necessary materials, labor, equipment, overhead, profit and other applicable costs. (See Par. 1.06, this Section.)
- B. The Owner reserves the right to increase or decrease the scope of the Contract work by twenty-five percent (25%) of the original scope.

1.05 LUMP SUM PRICES

- A. Payment will be computed on the basis of the percentage of work completed on each Item in the contract BID as determined by the Engineer. Lump sum prices are to include the cost of all necessary materials, labor, equipment, overhead, profit and other applicable costs. (See Par. 1.06, this Section.)

1.06 PRICES INCLUDE

- A. The prices stated in the Proposal include full compensation not only for furnishing all the labor, equipment and material needed for, and for performing the work and building the structures contemplated by, the Contract, but also for assuming all risks of any kind for expenses arising by reason of the nature of the soil, ground water, or the action of the elements; for all excavation and backfilling; for the removal of and delay or damage occasioned by trees, stumps, tracks, pipes, ducts, timber, masonry or other obstacles; for removing, protecting, repairing, or restoring, without cost to the Owner, all pipes, ducts, drains, sewers, culverts, conduits, curbs, gutters, walks, fences, tracks, or other obstacles, road pavements and other ground surfacing whether shown on plans or not for draining, damming, pumping or otherwise handling and removing, without damage to the work or to other parties, and without needless nuisance, all water or sewage from whatever source which might affect the work or its progress, or be encountered in excavations made for the work; for furnishing, inserting and removing all sheeting, shoring staging, cofferdams, etc.; for all signs, fencing, lighting, watching, guarding, temporary surfacing, bridging, snow removal, etc., necessary to maintain and protect travel on streets, walks and private ways; for making all provisions necessary to maintain and protect buildings, fences, poles, trees, structures, pipes, ducts and other public or private property affected or endangered by the work; for the repair or replacement of such things if injured by neglect of such provisions for removing all surplus or rejected materials as may be directed; for replacing, repairing and maintaining the surfaces of streets, highways, public and private lands if and where disturbed by work performed under the Contract or by negligence in the performance of work under the Contract; for furnishing the requisite filling materials in case of any deficiency or lack of suitable materials; for

obtaining all permits and licenses and complying with the requirements thereof, including the cost of furnishing any security needed in connection therewith; for any and all expense on account of the use of any patented device or process; for protection against inclement or cold weather; for all expenses incurred by or on account of the suspension; interruption or discontinuance of work; for the cost of the surety bond and adequate insurance; for all taxes, fees, union dues, etc., for which the Contractor may be or become liable, arising out of his operations incidental to the Contract; for providing equipment on the site and off site; for providing a field office and its appurtenances and for all general and incidental expenses; for tools, implements and equipment required to build and put into good working order all work contemplated by the Contract; for maintaining and guaranteeing the same as provided; and for fulfilling all obligations assumed by the Contractor under the Contract and its related documents.

- B. The Owner shall pay and the Contractor shall receive the prices stipulated in the BID made a part hereof as full compensation for everything performed and for all risks and obligations undertaken by the Contractor under and as required by the Contract.
- C. The prices for those Items which involve excavation shall include compensation for disposal of surplus excavated material and handling water.
- D. In all Items involving excavation, the price shall be based on doing the entire excavation in earth. Where rock is excavated, the price, therefore, shall be in addition to the cost of excavating earth and no deduction will be made in the amount for earth excavation.
- E. The prices for all pipe Items (i.e. sewers, service connections, drains, etc.) shall constitute full compensation for furnishing, laying, jointing and testing; earth excavation, backfill and compaction; materials for bedding pipe as specified; and cleaning up.

1.07 PAYMENT

- A. In general, payment will be made for all Contract work satisfactorily completed through the end of the previous month. The payment will include any additional work which has been completed and approved and change order work agreed upon by the Owner and Contractor which has been completed and approved (See SECTION 00500).
- B. Each application for payment will indicate the total of a minimum percent retainage as defined in SECTION 00500, held by the Owner on the total of all work completed under the contract and approved for payment to-date.
- C. Monthly applications for payment may also indicate reduction or increase of the total Contract price when an approved change order results in a net reduction or net increase in the cost and quantity of work to be performed under the Contract.

- D. Special billings and charges against the Contract as credit or payment to the Owner, that are not for change order work, may be subtracted from monies due on any monthly application for payment but shall not serve to reduce the total Contract price.
- E. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit price for work which is incorporated in or made necessary by the Work.

1.08 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

SEWER AND DRAIN WORK

BID ITEM NO. 1 INVESTIGATION OF SEWER LATERALS

1. The number of investigated sewer laterals to be paid for under this Item shall be measured by the number of working days of actual investigation.
2. The unit price for Item 1 shall constitute full compensation for the number of working days spent investigating the location and depth of sewer laterals, as indicated on the Drawings and as specified herein, including all incidental work not specifically included for payment under other Items.
3. The unit price shall constitute full compensation saw cutting existing pavement, removal and disposal of excavated bituminous concrete road base, excavation and backfill, disposal of excess material, as indicated on the Drawings and as specified, and all work incidental thereto, and all work not specifically included for payment under other items.

BID ITEM NO. 2A FURNISH AND INSTALL 8-INCH PVC SEWER PIPE 2B FURNISH AND INSTALL 12-INCH D.I. DRAIN PIPE

1. The length of sewer/drain pipe to be paid for under these Items shall be measured by the linear foot along the horizontal projection of the centerline of the completed sewer/drain pipe excluding the length of manholes measured to the limits of the manhole inside diameter.
2. The unit prices for these Items shall constitute full compensation for furnishing sewer/drain pipe, wyes branches, tees, sewer/drain main bypass pumping, excavation, locating, cutting and capping of existing service connections, maintaining existing flows or providing sufficient notice for interruption of flows, reestablishing services each day, removal and proper disposal of existing sewers/drains, and constructing new sewers/drains, furnishing and installation of backfill material, furnishing and installation of filter fabric, complete, as indicated on the Drawings and as specified, including all incidental work not specifically included for payment under other Items.
3. The unit price for this item shall also constitute full compensation for public notification and coordination of service interruptions with private and public users, bypassing individual service connections if required, traffic control requirements and all other work incidental thereto and not specifically included for payment under other items.

4. The unit price shall constitute full compensation saw cutting existing pavement, removal and disposal of excavated bituminous concrete road base, excavation and backfill, disposal of excess material, as indicated on the Drawings and as specified, and all work incidental thereto, and all work not specifically included for payment under other items.

BID ITEM NO. 2C FURNISH AND INSTALL SEWER SERVICE CONNECTIONS

1. The length of sewer service pipe connections to be paid for under this Item shall be measured by the linear foot along the top of the completed pipeline over its centerline to the location where it is connected to the existing service connection.
2. The unit price shall constitute full compensation for furnishing new service pipe, connecting the new service with the existing service complete, as specified, and all other work incidental to construction of the service connection and not specifically included for payment under other Items.
3. The unit price shall constitute full compensation saw cutting existing pavement, removal and disposal of excavated bituminous concrete road base, excavation and backfill, disposal of excess material, as indicated on the Drawings and as specified, and all work incidental thereto, and all work not specifically included for payment under other items

BID ITEM NO. 3 REMOVAL AND DISPOSAL OF ASBESTOS CEMENT PIPE (ALL DIAMETERS)

1. The lengths of pipe to be paid for under this Item shall be measured by the linear foot along the horizontal projection of the centerline of the existing asbestos cement pipe (all diameters) actually removed.
2. The unit price for this Item shall constitute full compensation for the removal, handling and proper disposal of the asbestos cement pipe, as specified, including compliance with all regulatory requirements associated therewith.
3. The unit price for this Item shall also constitute full compensation for notifying all federal, state, and local agencies having jurisdiction over the work, securing permits, procuring and supplying workforce with appropriate personal protective equipment, and all other work incidental to proper handling and disposal of the pipe as required and as specified in specification 02076 and not specifically included for payment under other Items.
4. The Contractor will be eligible for up to 75% of the unit price when material is transported off site. The remaining 25% of the unit price will be paid upon the Owner's receipt of all signed transportation and disposal documents.

BID ITEM NO. 4 FURNISH AND INSTALL SEWER MANHOLE INSIDE DROP CONNECTION

1. The length of pipe for be paid for under this Item shall be measured by the vertical foot along the vertical projection of the centerline of the drop connection pipe installed.
2. The unit price for this Item shall constitute full compensation for management of flow, cutting of existing piping, installing new fittings, drop connection bowls, rebuilding existing manhole bench and invert to accommodate drop connection, pipe supports and piping including all appurtenances required to join the pipe, complete, as indicated and specified, or as otherwise ordered by the Engineer.

PIPE SCRIBING

BID ITEM NO. 5 PIPE SCRIBING

1. The length of pipe scribing to be paid for under this item shall be measured by the linear foot along the centerline over the pipe from end to end as installed.
2. The unit price for this Item shall include full compensation for furnishing all labor, materials, tools and equipment necessary for scribing construction method to replace the existing asbestos cement sewer pipe.
3. The unit price shall include full compensation for furnishing all labor, materials, connections, coring of existing manhole, repairs to the existing manhole due to coring/installation, tools and equipment necessary to install and connect the new pipe to existing pipe and/or manholes.
4. The unit price for this Item shall constitute full compensation for furnishing all labor, materials, tools and equipment necessary for installation and fusing the HDPE pipe including handling, fusing equipment including heat plates, and electronic monitoring devices and pressure testing of HDPE pipe in accordance with standard practices.
5. The unit price shall include full compensation for a video inspection showing after installation conditions of the HDPE sewer main in accordance with Section 01381, Audio Video Recording, of these specifications for video recording requirements.

BID ITEM NO. 6 PIPE SCRIBING LAUNCHING AND RECEIVING PITS

1. The quantity of launching/receiving pits to be paid for shall be the actual number of pits installed in place and complete by the Contractor in accordance with the plans and specifications.
2. The unit bid price for this item shall include full compensation for furnishing all labor, materials, tools and equipment necessary for earth excavation, adequately designing and implementation of excavation support system, installation/removal of the access pit; backfilling; supporting existing utilities in place within the shaft excavation for the duration of the excavation; preparation of the shaft for the pipe scribing operations,

adequately designing, implementation, and installation/removal of dewatering system and drainage, disposal of excess material, fencing, barricades and signs, saw cutting of the existing pavement, removal and disposal of existing pavement, handling of surplus materials, exaction, bedding, backfill, compaction, dense graded crushed stone, **temporary pavement, permanent pavement**, dust control measures, and all other work incidental thereto, and all work not specifically included under other items.

3. The unit price shall also include 2 soil compaction tests per pit or as directed by the Engineer. Soil Compaction tests shall be performed prior to the installation of the permanent binder pavement course.

WATER WORK

BID ITEM NO. 7A FURNISH AND INSTALL 6-INCH D.I.C.L. WATER MAIN
7B FURNISH AND INSTALL 8-INCH D.I.C.L. WATER MAIN

1. The length of water main to be paid for under these Items shall be measured by the linear foot along the horizontal projection of the centerline of the completed water main, the lengths of valves or fittings not being deducted.
2. The unit prices shall constitute full compensation for furnishing and installing the water main with a minimum depth of cover of 5-feet, unless otherwise directed by the Engineer, including restrained joints and thrust blocks for pipe as required and directed by the Engineer, for sizes and classes specified, for saw cutting existing pavement, concrete or reinforced concrete road base, if encountered, furnishing and installing all fittings as shown on the Drawings including but not limited to any bends, tees, anchor tees for fire hydrants, cutting in of new tees, reducers, adaptors, caps and any other fittings, complete, including all restraint devices as needed and directed by the Engineer to complete the work, cutting, removal and disposal of excavated bituminous concrete, concrete or reinforced concrete road base, if encountered, excavation and backfill, designing and constructing earth support, dewatering and drainage, disposal of excess material, laying and jointing pipe, furnishing and installing gravel borrow bedding, connections to the existing water mains (including dresser and solid sleeve couplings), services, removal, disposal and dewatering of existing water main and valves, all types of sidewalk reconstruction, resetting or replacing of all types of curbing disturbed, loaming and seeding of disturbed areas, dust control measures, disinfection, pressure testing and sampling performed by separate independent and qualified companies and laboratories, as indicated on the Drawings and as specified, and all work incidental thereto, and all work not specifically included for payment under other items.
3. The unit price for this Item shall constitute full compensation for the removal of each existing gate box removed complete, any pavement repair as required and as directed by the Engineer, required to complete the work, and any work not specifically included for payment under other Items.
4. The unit price for this Item shall include payment for furnishing and installing water main associated with hydrant installation.

5. The unit price shall constitute full compensation for excavation of all depths required for installation to accommodate existing utilities or structures.
6. The unit price shall include a reasonable amount of delays encountered for shut-downs of existing water mains required to prosecute the work.
7. The unit price shall include full compensation for a pre-construction video inspection showing pre-construction conditions of the entire work area in accordance with section 01381, Audio Video Recording, of these specifications for video recording requirements.
8. The furnishing, installation and removal of caps shall be considered incidental and be included in the price under the appropriate pipe cost.
9. The unit price for this item shall constitute full compensation for cutting and capping the existing water main in preparation for abandonment, ensuring all necessary valves are closed, detachment of all existing connections to active water mains and abandonment of the existing main.
10. The unit price shall include full compensation for furnishing and installing caps, excavation, dewatering, backfilling, cutting & capping, restraint, thrust blocks, sidewalks and roadway restoration, and all other incidental work not included under other Items.

BID ITEM NO. 8A FURNISH AND INSTALL 6-INCH GATE VALVE
 8B FURNISH AND INSTALL 8-INCH GATE VALVE

1. The number of valves to be paid for under these Items shall be equal to the actual number of valves, per size, installed. The unit price shall constitute full compensation for furnishing and installing valves and valve boxes complete including all restraint devices required and as directed by the Engineer, and all work not specifically included for payment under other items.
2. The unit price for this Item shall include payment for gate valves associated with hydrant installation.
3. The unit price shall constitute full compensation for ensuring gate valves are in the specified position, removal and disposal of valve boxes and all other work necessary and as directed by the Engineer to complete the work, and all work not specifically included for payment under other items.
4. Gate valves removed and disposed as part of the installation process of the proposed main shall not be paid for under this Item but shall be paid for under Item 7.

BID ITEM NO. 8C FURNISH AND INSTALL 8-INCH INSERTION GATE VALVE

1. The number of valves to be paid for under these Items shall be equal to the actual number of valves, per size, installed. The unit price shall constitute full compensation for furnishing and installing valves and valve boxes complete including all restraint devices required and as directed by the Engineer, working the valve to ensure a complete

shutdown of water, and all work not specifically included for payment under other items.

2. The unit price shall constitute full compensation saw cutting existing pavement, removal and disposal of excavated bituminous concrete road base, excavation and backfill, disposal of excess material, as indicated on the Drawings and as specified, and all work incidental thereto, and all work not specifically included for payment under other items.

BID ITEM NO. 9 FURNISH AND INSTALL FIRE HYDRANT

1. The number of Fire Hydrants to be paid for under this Item shall be equal to the actual number of Fire Hydrants furnished and installed.
2. The unit price shall constitute full compensation for furnishing and installing new hydrant complete as specified, and as shown on the Contract Drawings, including all materials, thrust block, design and construction of excavation support, excavating, dewatering, bedding, filter fabric, backfilling, compacting, gravel fill, crushed stone for drain, loaming and seeding, all types of sidewalk reconstruction, resetting or replacing of all types of curbing disturbed.
3. Payment for anchor tees, 6-inch connection pipe, gate valves, fittings, adapters, valve boxes and thrust restraint shall be paid for under the appropriate pipe, valve and fittings Items. The unit price shall include furnishing and installing hydrant extensions as necessary.

BID ITEM NO. 10 FURNISH AND INSTALL ADDITIONAL WATER FITTINGS

1. The quantity of additional fittings to be paid for under this Item shall be equal to the actual number of pounds of fittings furnished and installed as directed and approved by the Engineer exclusive of those identified on the Drawings.
2. The unit price for additional fittings shall include cutting main and furnishing and installing all restraint devices as required and directed by the Engineer.
3. Any fittings used for the Contractor's convenience shall be at his own expense. If a different fitting must be used in lieu of the fitting shown on the Drawings, payment shall be made on the basis of the difference in weights.
4. The quantity identified in the Bid is an indeterminate quantity to be utilized for comparison of bids. The unit price for this Item shall be utilized for the entire project.

BID ITEM NO. 11A FURNISH AND INSTALL 1-INCH WATER SERVICE PIPE
11B FURNISH AND INSTALL 2-INCH WATER SERVICE PIPE

1. The length of service connections to be paid for under the appropriate Item shall be measured by the linear foot along the horizontal projection of the centerline of the completed connection, the lengths of valves or fittings shall not be deducted.

2. The unit price shall constitute full compensation for furnishing and installing polyethylene tubing service pipe (up to and including 2-inch diameter) at a minimum depth of 4-feet, unless otherwise directed by the Engineer, from the corporation stop to the curb stop with fittings and adapters as necessary and shown on the Drawings, including connection to the existing service. Excavation, including saw cutting existing pavement, concrete or reinforced concrete road base, if encountered, removal and disposal of bituminous concrete, concrete or reinforced concrete road base, if encountered, removal and disposal of existing water service, dewatering, bedding, backfill and restoration of property to include loaming, seeding, curbing (granite or concrete reset in concrete), bituminous berm, all types of sidewalk reconstruction and dust control measures and all other incidental work not included under other Items.

BID ITEM NO. 11C FURNISH AND INSTALL 1-INCH CORPORATION STOP
11D FURNISH AND INSTALL 2-INCH CORPORATION STOP

1. The number of Corporation Stops to be paid for under the appropriate Item shall be equal to the actual number of Corporation Stops furnished and installed.
2. The unit price shall constitute full compensation for tapping the water main, furnishing and installation corporation stops of all sizes up to 2-inch diameter, complete, as indicated on the Drawings.
3. The unit price for this Item shall also include furnishing and installing saddles where necessary. The unit price shall include removing existing corporations where required and cleaning the exterior of existing and new water main requiring service connection saddles.

BID ITEM NO. 11E FURNISH AND INSTALL 1-INCH CURB STOP
11F FURNISH AND INSTALL 2-INCH CURB STOP

1. The number of Curb Stops to be paid for under the appropriate Item shall be equal to the actual number of Curb Stops furnished and installed. The unit price shall include excavation, including removal and disposal of bituminous concrete, removal and disposal of existing curb stop and valve box, bedding, backfill and restoration of property to include loaming, seeding, and curbing (granite or concrete reset in concrete), bituminous berm and in-kind sidewalk restoration.
2. The unit price for curb stops with boxes for all sizes up to 2-inch diameter shall constitute full compensation for furnishing and installing curb stops, curb stop boxes, and all necessary restraint devices, as required, and directed by the Engineer to complete the work, and all work not specifically included for payment under other items.

BID ITEM NO. 12 FURNISH AND INSTALL TEMPORARY WATER MAIN
BYPASS

1. The length of Water Temporary Bypass to be paid for under this Item shall be measured by lump sum for the completed and operational bypass pipe. The Contractor shall be required to submit to the Town/Engineer his bypass plan for review and comments. Any

changes to the bypass plan shall be considered incidental and be included in the original cost of the temporary bypass.

2. The unit price shall constitute full compensation for furnishing temporary bypass plans and any corrections necessary for plan approval, furnishing all piping, fittings, valves, labor, equipment and materials to install, maintain and remove an approved temporary potable water bypass system that adequately and temporarily serves all water customers with domestic and fire service lines, complete, including connections to existing hydrants for feed and connections to individual house water services (no temporary house service piping will be measured for payment under this Item), wye fittings at sill cocks, check valves and pressure reducing valves as required, disinfection and testing, temporary fire protection (hydrants), testing of fire sprinklers systems for pressure readings before and after installation of by-pass, coordination of pressure test with the buildings fire alarm company, saw cutting pavement, excavation and backfilling; furnishing, installing and disposal of cold patch material for ramping; and all work not specifically included for payment under other items.
3. The unit price shall also include the installation and connection to any existing below ground water mains or services, including furnishing and installing tapping sleeves and valves, couplings, required to be installed and removed or left-in-place, excavation and backfilling.
4. The unit price shall constitute full compensation for any below street grade crossings, driveway crossing and handicap ramps including backfill, gravel base course, trench width temporary pavement (where applicable), trench width binder course, and permanent trench width pavement (where applicable).
5. The unit price shall include all costs associated with flushing of the newly connected service to properties, coordination with property owners, removing of existing meter and flushing of the newly connected service line.

EXCAVATION MATERIALS

BID ITEM NO. 13 EARTH EXCAVATION BELOW NORMAL DEPTH

1. The quantity of earth excavation below normal depth (limit of normal excavation) to be included for payment under this Item shall be the number of cubic yards of unsuitable material excavated, as determined by the Engineer, measured to the depths and lengths ordered, and to the width between payment limits for normal excavation as indicated on the Drawings.
2. The unit price shall constitute full compensation for excavation below normal depth and proper disposal of unsuitable material. Replacement of excavated material shall be paid for under the appropriate material Item as directed by the Engineer.
3. The quantity identified in the Bid is an indeterminate quantity to be utilized for comparison of bids. The unit price for this Item shall be utilized for the entire project (i.e.

base bid work and any bid alternate work included in the Contract) should the Item be required.

BID ITEM NO. 14 ROCK EXCAVATION AND DISPOSAL

1. Where rock is encountered, it shall be uncovered but not excavated until measurements have been made by the Engineer, unless in the opinion of the Engineer, satisfactory measurements can be made in some other manner.
2. The quantity of rock to be paid for under these Items shall be the number of cubic yards of rock, measured in place before excavation, within the trench width payment limits indicated on the Drawings, or limits of actual excavation, whichever is smaller, and as defined in the Specifications, unless rock excavation beyond such limits has been authorized by the Engineer, in which case, measurements shall be made to the authorized limits.
3. Excavated rock which in the opinion of the Engineer has not been properly disposed of shall not be included for payment.
4. The bidder shall include in his bid for items involving excavation, the cost of doing the entire excavation as earth, the price for these Items being intended to cover the difference between the cost of rock excavation and the cost of earth excavation. The unit price for this item shall be paid in addition to any payment made for earth excavation.
5. The unit price for this Item shall constitute full compensation for rock excavation and disposal, for all necessary backfilling, and for furnishing all additional material needed to replace removed rock for backfilling. All additional material to be used as backfill shall be suitable as determined by the Engineer in accordance with Specification Section 02200.
6. The quantity identified in the Bid is an indeterminate quantity to be utilized for comparison of bids. The unit price for this Item shall be utilized for the entire project (i.e. base bid work and any bid alternate work included in the Contract) should the Item be required.

ADDITIONAL MATERIALS

BID ITEM NO. 15 ADDITIONAL 3/4-INCH CRUSHED STONE

1. Crushed stone backfill below normal depth shall be paid for under this Item. The quantity of crushed stone backfill below normal depth to be paid for shall be the same as that number of cubic yards of earth excavation below normal depth measured for payment under the Item "Excavation Below Normal Depth", which said stone replaces.
2. Additional crushed stone used for support of existing utilities or ordered by the Engineer to be used at other locations shall be paid for under this Item. The quantity to be paid for shall be the number of cubic yards measured in place after compaction, of additional crushed stone within the limits directed by the Engineer.

3. Crushed stone used for bedding pipe, to backfill authorized excavations, for any drainage purpose, or as indicated on the Drawings for work for which appropriate payment Items have been provided, shall not be measured for payment under this Item.
4. Crushed stone used to backfill rock excavations will not be measured for payment under this Item but shall be included as part of the unit price for "Rock Excavation and Disposal".
5. Crushed stone used to backfill and/or fill around and/or beneath the structures will not be measured for payment under this Item but shall be included as part of the appropriate lump sum price for the structures.
6. The unit price shall constitute full compensation for furnishing, placing, and compacting crushed stone, as specified.

BID ITEM NO. 16 ADDITIONAL GRAVEL BORROW

1. Gravel borrow backfill below normal depth shall be paid for under this Item. The quantity of gravel borrow backfill below normal depth to be paid for shall be the same as the number of cubic yards of earth excavation below normal depth measured for payment under the Item "Excavation Below Normal Depth", which said gravel replaces.
2. Gravel borrow ordered by the Engineer for backfill of trenches above normal depth shall be paid for under this Item. The quantity of gravel used as backfill for trenches above normal depth shall be measured by the cubic yards to the depth and length ordered by the Engineer and to the width between payment limits for normal excavation as indicated on the Drawings. Gravel borrow outside the limits of normal excavation shall be furnished, placed, and compacted at the Contractor's expense, and no measurement will be made for such gravel.
3. Gravel borrow ordered to be used at other locations shall be measured after compaction and paid for under this Item as the number of cubic yards of gravel actually placed and compacted as directed.
4. Gravel borrow used to backfill rock excavations will not be measured for payment under this Item but shall be included as part of the unit price for "Rock Excavation and Disposal".
5. Gravel borrow used to backfill and/or fill around and/or beneath structures will not be measured for payment under this Item but shall be included as part of the appropriate lump sum price for the structures.
6. The unit price shall constitute full compensation for furnishing, placing, and compacting gravel borrow, as specified.

PAVEMENT RESTORATION

1. The unit prices for pavement restoration shall constitute full compensation for saw cutting, removal and disposal of all existing pavement including any existing bituminous, concrete or reinforced concrete base, if encountered; excavation to the required depth; special compaction requirements; removal and disposal of any temporary pavement; casting and valve box adjustments, as directed; cutting and matching existing pavement; furnishing and applying required prime coats and emulsions; removal and replacement; safety precautions including construction warning signs and barricades during the project; trench closing and openings ordered by the Engineer; obtaining all necessary roadway permits and/or approvals from state and local agencies; and constructing the pavement complete, including sidewalks and driveways, as specified and as indicated and not specifically included for payment under other Items.
2. The unit prices for pavement restoration shall also include the costs to remove and replace inductance loop vehicle detector wiring (traffic loops), and the cost to replace pavement markings which existed prior to construction as specified.

BID ITEM NO. 17A PROCESSED AGGREGATE BASE COURSE (12-INCH)

1. The quantity of processed aggregate base course to be paid for under this Item shall be equal to the amount of processed aggregate base course installed, measured by the cubic yard to the payment limits indicated on the Drawings.
2. The unit price shall constitute full compensation for furnishing and installing the processed aggregate base course, complete as specified and/or detailed on the Drawings.
3. Material taken from excavations deemed suitable by the Engineer, for use as processed aggregate base course shall not be included for payment under this Item.
4. Processed aggregate base course for the pipe scribing launching and receiving pits shall be paid for under Item 6.

BID ITEM NO. 17B TEMPORARY TRENCH WIDTH BITUMINOUS PAVEMENT (2-INCH)

1. The quantity of temporary trench width bituminous pavement to be paid for under this item shall be equal to the actual amount of bituminous concrete, furnished and installed, measured by the linear foot installed along the horizontal projection of the trench as determined by the Engineer.
2. The unit price for temporary trench width bituminous pavement shall constitute full compensation for furnishing and installing the bituminous pavement, saw cutting, removal and disposal of any temporary and existing pavement, excavation to the required depth, additional bedding materials, special compaction requirements; grading and matching existing pavement; applying required prime coats and tack coats; hand work necessary for sidewalks and driveways; and constructing the pavement complete, as specified and as indicated and not specifically included for payment under other items.

3. Total tonnage slips must be submitted from the production plant.
4. Temporary trench width bituminous pavement (2-inch) for the pipe scribing launching and receiving pits shall be paid for under Item 6.

BID ITEM NO. 17C PERMANENT TRENCH WIDTH BITUMINOUS PAVEMENT
BINDER COURSE (2-1/2-INCH)

1. The quantity of permanent trench width bituminous pavement binder course to be paid for under this item shall be equal to the actual amount of bituminous concrete, furnished and installed, measured by the linear foot installed along the horizontal projection of the trench as determined by the Engineer.
2. The unit price for permanent trench width bituminous pavement binder course shall constitute full compensation for furnishing and installing the bituminous pavement, saw cutting, removal and disposal of any temporary and existing pavement, excavation to the required depth, additional bedding materials, special compaction requirements; grading and matching existing pavement; applying required prime coats and tack coats; hand work necessary for sidewalks and driveways; and constructing the pavement complete, as specified and as indicated and not specifically included for payment under other items.
3. Total tonnage slips must be submitted from the production plant.
4. The unit price shall also include soil compaction test every 50 feet for each utility trench or as directed by the Engineer. Soil Compaction tests shall be performed prior to the installation of the permanent binder pavement course.
5. Permanent trench width bituminous pavement binder course (2-1/2-inch) for the pipe scribing launching and receiving pits shall be paid for under Item 6.

BID ITEM NO. 17D PERMANENT TRENCH WIDTH BITUMINOUS PAVEMENT
SURFACE COURSE (1-1/2-INCH)

1. The quantity of permanent trench width bituminous pavement surface course to be paid for under this item shall be equal to the actual amount of bituminous concrete, furnished and installed, measured by the linear foot installed along the horizontal projection of the trench as determined by the Engineer.
2. The unit price for permanent trench width bituminous pavement surface course shall constitute full compensation for furnishing and installing the bituminous pavement, saw cutting, removal and disposal of any temporary and existing pavement, excavation to the required depth, additional bedding materials, special compaction requirements; grading and matching existing pavement; applying required prime coats and tack coats; hand work necessary for sidewalks and driveways; and constructing the pavement complete, as specified and as indicated and not specifically included for payment under other items.
3. Total tonnage slips must be submitted from the production plant.

4. Permanent trench width bituminous pavement surface course (1-1/2-inch) for the pipe scribing launching and receiving pits shall be paid for under Item 6.

MISCELLANEOUS

BID ITEM NO. 18 STAKED STRAW WATTLES

1. The quantity of staked straw wattles to be paid for under this Item shall be equal to the actual amount of staked straw wattles furnished and installed, measured by the linear foot along a horizontal projection of the centerline, complete, as indicated on the Drawings or as otherwise directed by the Engineer.
2. The unit price shall constitute full compensation for furnishing and supplying all labor, materials and equipment for installing staked straw wattles, maintenance of straw wattles as shown and specified, removal and disposal of same, and restoration of property to its original condition.
3. There shall be no additional payment for replacement due to maintenance.

BID ITEM NO. 19 CATCH BASIN EROSION CONTROL PROTECTION

1. The quantity of catch basin erosion control protection to be paid for under this Item shall be equal to the actual amount of catch basins protected, complete, as indicated on the Drawings or as otherwise directed by the Engineer.
2. The unit price for this item shall constitute full compensation for furnishing, placing, and maintaining catch basin erosion control protection as indicated on the Drawings throughout the duration of this Contract.
3. The unit price shall also include removal and disposal thereof, complete or as otherwise ordered by the Engineer.

BID ITEM NO. 20A MANAGEMENT OF SOILS/FILL AND SUSPECT MATERIALS

1. Under this Item the Contractor shall be paid for management of soil/fill and suspect materials at the lump sum price stated in the Bid Schedule.
2. The lump sum price shall constitute full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for soil/fill and suspect material; segregating, handling, staging, and characterization of all soil and fill material prior to final transport and disposal as well as the costs associated with characterizing the destination site as required to assess background conditions; all controls necessary to maintain compliance with regulatory requirements relative to handling contaminated soils and materials; submittal and approval of all required and specified Plans; characterization of all excavated soil and fill material handled; health and safety equipment; securing a staging area for stockpiling soil pending analytical testing, reuse, or disposal; protecting the stockpile areas. All costs related to transporting soils to and, if not disposed of offsite,

from the staging area, if reused, shall be included for payment in this item; air monitoring; controlling the spread of airborne contaminants; all notifications, fees, permits, and taxes; and all other requirements specified in other sections of the Contract Documents; and all other requirements specified in other sections of the Contract Documents and any other work not covered by other Bid Items.

3. The Contractor will be eligible for payment for a portion of the lump sum price based on the Schedule of Values submitted in accordance with Section 00700, as approved by the Engineer.

BID ITEM NO. 20B CONTAMINATED MATERIAL

1. Under this item the Contractor shall be reimbursed for certain charges authorized by the Engineer for the services to remove, test, store and dispose of Contaminated soil.
2. The allowance for this item established in the Bid is an estimated figure to facilitate the comparison of bids only. The actual amount to be paid under this item shall constitute full compensation for wages paid, premiums on Workers' Compensation Insurance, payment on account of Social Security and other direct assessments on payroll, as may be required and all other costs incidental to the services rendered.
3. The quantity of contaminated material to be paid for under this Item shall be the actual number of tons of contaminated material disposed, as verified by the actual certified weight slips provided by the approved disposal facility. In the event that contaminated material is disposed at an approved disposal facility not having the ability to provide certified weight slips, tonnage shall be determined by volumetric measurement (in cubic yards) by the Engineer and converted to tonnage based on a conversion of 1.50 tons per cubic yard of material. The quantity of excess contaminated material disposed of shall be limited to the trench width payment limits indicated on the Drawings, or limits of actual excavation, whichever is smaller. Excess contaminated soils removed and disposed of outside the trench width payment limits will be determined by volumetric measurement (in cubic yards) by the Engineer and converted to tonnage based on a conversion of 1.50 tons per cubic yard of material, and subtracted from total tonnage for payment.
4. Payment will be based on the actual paid invoiced amount without allowance for mark up, overhead or profit.

BID ITEM NO. 21 UNIFORMED TRAFFIC OFFICERS ALLOWANCE

1. Under this Item the Contractor shall be reimbursed for certain charges for the services rendered of uniformed traffic officers to provide traffic control as specified.
2. The allowance for this item established in the Bid is an estimated figure to facilitate the comparison of bids. The actual amount to be paid under this item shall constitute full compensation for wages paid, premiums on workers' compensation insurance, payment on account of social security and other direct assessments on payroll, and all other costs incidental to the employment of such uniformed officers.
3. Payment will be based on the actual paid invoiced amount from the Police Department

without allowance for mark up, overhead or profit.

4. If the total cost for uniformed traffic officers is greater or less than the amount stated in the Bid, a debit or credit of the difference in cost shall be to the Owner.
5. Payment shall be made to the Police department no later than the 20th day of the month following that month in which services were rendered.

BID ITEM NO. 22 MOBILIZATION AND DEMOILIZATION

1. The lump sum price for this Item shall constitute full compensation for initiating the contract, exclusive of the cost of materials, for mobilizing all machinery, plant, tools, and other equipment necessary to carry on and complete the work.
2. The lump sum shall also include full compensation for furnishing the performance or surety bond and other securities required, all preliminary bidding and organizational expenses, necessary permits, construction of temporary roads, etc., and for all other materials, supplies, tools, equipment, labor financing, supervision, temporary structures, field offices, sanitary conveniences, and any and all other expenses incurred in carrying out the work and furnishing the material, keeping records and making reports required, and assuming risks, which have not been included in the prices in other Items of the Proposal.
3. The lump sum price shall also include the cost of demobilization once the work, as detailed in the Drawings and Documents, is complete.
4. The lump sum price for this Item shall not exceed five percent (5%) of the total amount of this bid, with payment as follows:
 - a. 50% when the Contractor has commenced Work on the Site in a diligent and continuous manner.
 - b. 50% when the Contractor has completed all Work, removed all equipment and satisfied all requirements as detailed in the contract documents.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION NOT USED

END OF SECTION

SECTION 01035

MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Procedures for making modifications to the Contract by change orders or other means.

B. Related Sections

1. Document 00500 - Agreement

1.02 CHANGE ORDERS

- A. In general Change Orders will be issued for modification of Contract documents which will incorporate changes in the Contract requirements, including additions or deletions in the Work; for unforeseen field conditions which will necessitate changes in the Work; changes in code provisions or other requirements of federal, state or local authority requiring changes in the Work; changes in the availability of products or for incorporating new products into the work and for changes directed by the Engineer for the benefit of the Owner.
- B. Authority to execute Change Orders shall be that of the Engineer and not of the Contractor. Changes Orders will, in general, originate by a "Change Order Proposal Request" or by issuance of a "Construction Change Authorization".
- C. Unless authorized by the Engineer, no work shall be performed that is involved in the change until a formal Change Order is issued.
- D. To initiate a Change Order, the Engineer will forward a Change Order proposal request describing the proposed changes and if required, include additional or revised drawings and specifications soliciting a formal quotation of cost and time to complete the proposed Change Order work. Upon reaching mutual agreement on the cost and time, the Engineer will sign his approval of the Change Order and submit it to the Contractor for his full signature of acceptance.

1.03 FIELD ORDERS

- A. The Engineer may, to avoid costly removal of, or alterations to, present on-going work, issue a Work Directive Change authorizing the Contractor to proceed, subject to later negotiation of the price of the change.

1.04 PRICE AGREEMENTS

- A. Prices agreed upon to cover the Change Orders may be either by mutual acceptance of a lump sum or by unit prices as stated in the Contract bid proposal or actual direct cost plus a percentage for overhead, profit and other expenses consistent with Section 00500 – Contract Agreement.
- B. Work done by a subcontractor entitles the General Contractor a percentage of the sum of the actual direct cost, not including the subcontractor's overhead and profit, consistent with Section 00500 – Contract Agreement.
- C. Method for computing the cost of the change shall be based on the net additional increase. No overhead and profit shall be deducted from prices for changes deleting work.
- D. The Change Order form document shall indicate the net adjustment (+/-) to the total Contract price as a result thereof including extension or reduction of time when applicable.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01040

COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for coordinating the various parts of Work under this Contract.

1.02 REQUIREMENTS

- A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.
- C. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- D. Coordinate work with all utility companies necessary for completion of work under this contract.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION NOT USED

END OF SECTION

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SECTION 01050

FIELD ENGINEERING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Survey work and other field engineering responsibilities of the Contractor.

1.02 REQUIREMENTS

- A. The Contractor shall be responsible for layout of the work and the establishing of lines and grades.
- B. Establish elevations, lines, levels, reference marks, batter boards, etc., required during the progress of the Work. Verify such marks by instrument to confirm accuracy.
- C. Locate and protect survey control and reference points.
- D. Make, check, and be responsible for all measurements and dimensions necessary for the proper construction of the Work.
- E. The Engineer will be permitted to check the lines, elevations, reference marks, batter boards, etc., set by the Contractor. The Contractor shall correct any errors found in lines, elevations, reference marks, batter boards, etc. Such a check shall not be construed as approval of the Contractor's work and shall not relieve or diminish the responsibility of the Contractor for the accurate construction and completion of the Work.
- F. Control datum for survey as shown on Drawings.

1.03 QUALITY ASSURANCE

- A. Qualifications
- B. Qualifications
 - 1. Employ a Civil Engineer or Land Surveyor registered within the State of Massachusetts, acceptable to the Engineer.
- C. Certifications
 - 1. Submit certificate signed by the Contractor's Engineer or Land Surveyor stating elevations and locations of the Work are in conformance with the Contract Documents.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building codes, Mechanical codes, and Electrical codes, Regulations, Permits and Fees applicable to the project.

1.02 PERMITS BY CONTRACTOR

- A. The Contractor shall secure all necessary permits from the state, city or town authorities having jurisdiction, for digging of trenches in the streets or highways and all other building and construction operations requiring permits.
- B. As a minimum the following permits are required:
 - 1. Street Opening Permit – Town of Wareham, Dept. of Public Works.

1.03 CODES

- A. The Contractor shall conform to the requirements of and pay all fees imposed by local and State Building Authorities having jurisdiction over the Work. The Contractor is responsible to conform to all building, mechanical, electrical and plumbing code requirements.
- B. The Contractor shall conform to the latest requirements of the following codes:
 - 1. Federal, State and Municipal Laws
 - 2. Any prevailing rules and regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations.

1.05 FEES

- A. The cost of all permits secured by the Contractor shall be borne by him and shall be considered as having been included in the price or prices stated in the Bid. Copies of all required permits shall be filed with the Engineer prior to starting work for which a permit is required.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01067

STATE OF MASSACHUSETTS AND LOCAL REQUIREMENTS

PART 1 - GENERAL

TABLE OF CONTENTS

- 1.01 Excerpts from Massachusetts Statutes
- 1.02 Minimum Wage Rates
- 1.03 Safety and Health

LIST OF ATTACHMENTS

- Massachusetts Minimum Wage Rates.

1.01 EXCERPTS FROM MASSACHUSETTS STATUTES

- A. In addition to the requirements as set forth under "Compliance with Laws" in the AGREEMENT, particular attention is directed to certain stipulations of Chapter 149 of the General Laws of Massachusetts, as amended to date as follows:

Section 25. "Every employee in public work shall lodge, board, and trade where and with whom he elects; and no person or his agents or employees under contract with the commonwealth, a county, city or town, or with a department, board, commission or officer acting therefore, for the doing of public work shall directly or indirectly require, as a condition of employment therein, that the employee shall lodge, board or trade at a particular place or with a particular person. This section shall be made a part of the contract for such employment."

Section 26. "In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works by the commonwealth, or by a county, town or district, or by persons given to citizens of the commonwealth who have been residents of the commonwealth for at least six months at the commencement of their employment who are male veterans as defined in clause forty-three of section seven of chapter four and who are qualified to perform the work to which the employment relates;

and secondly, to citizens of the commonwealth generally who have been residents of the commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers then to citizens of the United States, and every contract for such work shall contain a provision to this effect."

Section 34. "Every contract, except for the purchase of, material or supplies, involving the employment of laborers, workmen, mechanics, foremen, or inspectors, to which the commonwealth or any county or any town, subject to section thirty, is a party, shall contain a stipulation that no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, subcontractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than 48 hours in any one week, or more than six days in any one week, except in cases of emergency, or in case any town subject to section thirty-one is a party to such a contract, more than eight hours in any one day, except as aforesaid..."

Section 34A. "Every contract for the construction, alteration, maintenance, repair or demolition of or addition to, any public building or other public works for the commonwealth or any political subdivision thereof shall contain stipulations requiring that the contractor shall, before commencing performance of such contract, provide by insurance for the payment of compensation and the furnishing of other benefits under chapter one hundred and fifty-two to all persons to be employed under the contract, and that the contractor shall continue such insurance in full force and effect during the term of the contract. No officer or agent contracting in behalf of the commonwealth or any political subdivision thereof shall award such a contract until he has been furnished with sufficient proof of compliance with the aforesaid stipulations. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of contract and shall operate as an immediate termination thereof. No cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the officer or agent who awarded the contract at least fifteen days prior to the intended effective date thereof, which date shall be expressed in said notice. Notice of cancellation sent by the party proposing receipt of the addressee requested, shall be a sufficient notice..."

Section 34B. "Every contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public works for the commonwealth or any political subdivision thereof shall contain stipulations requiring that the contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wage paid to regular police officers employed by him in such city or town."

Attention is directed to Chapter 774 of the Acts of 1972 amending Section 39F of Chapter 30 to read as follows:

Section 39F. "(1) Every contract awarded shall contain the following subparagraphs and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

"(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(b) Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to sub-paragraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontractor work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered

or mailed prior to the seventieth day after the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontractor including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment for a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor."

Attention is also directed to Chapter 774 of the Acts of 1972 further amending Chapter 30 by adding after Section 39M the following section:

Section 39M. (b) Specifications for such contracts, and specification 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 therefore, 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 (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.

Section 39N. "Every contract subject to section forty-four A of chapter one hundred forty-nine or subject to section thirty-nine M of chapter thirty shall contain the following paragraph in its entirety and an awarding authority may adopt reasonable rules or regulations in conformity with that paragraph concerning the filing, investigation and settlement of such claims:

If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party

making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly."

Attention is also directed to Chapter 1164 of the Acts of 1973 further amending Chapter 30 by adding after Section 39N the following two sections:

Section 39O. "Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety...

"(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more due to a failure of the awarding authority shall make an adjustment in the contract but shall not include any profit to the general contractor on such increase; and provide further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) 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 general contractor notified the awarding authority of the act or failure to act involved in the claim."

Section 39P. "Every contract subject to section thirty-nine M of this chapter or section forty-four A of chapter one hundred forty-nine which requires the awarding authority, any official, its architect or engineer to make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event no later than thirty days after the written

submission for decision; but if such decision required extended investigation and study, the awarding authority, the official, architect or engineer shall, within thirty days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the data by which the decision will be made."

Attention is also directed to Chapter 30, Section 39R of the General Laws of Massachusetts as amended to date as follows:

Section 39R. (a) The words defined herein shall have the meaning stated below whenever they appear in this section:

(1) "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to section thirty-nine M of chapter thirty, sections forty-four A through forty-four H, inclusive, of chapter one hundred forty-nine and sections thirty B through thirty P, inclusive, of chapter seven.

(2) "Contract" means any contract awarded or executed pursuant to sections thirty B through thirty P, inclusive, of chapter seven and any contract awarded or executed pursuant to section thirty-nine M of chapter thirty, or sections forty-four A through forty-four H, inclusive, of chapter one hundred forty-nine, which is for an amount or estimated amount greater than one hundred thousand dollars.

(3) "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memorandum invoices, computer printouts, tapes, discs, papers and other documents transcribed information of any type, whether expressed in ordinary or machine language.

(4) "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.

(5) "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 delineation to express an opinion for stated reasons.

(6) "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 she/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 a financial condition of the contractor.

(7) "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.

(8) Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principals and auditing standards.

(b) Subsection (a) (2) hereof notwithstanding, every agreement or contract awarded or executed pursuant to sections 30B through 30P, inclusive, of chapter seven, and pursuant to section 39M of chapter 30 or to section 44A through 44H, inclusive, of chapter 149, shall provide that:

(1) The contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the contractor, and

(2) until the expiration of six years after final payment, the awarding authority, office of inspector general, and the deputy commissioner of capital planning and operations 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, and

(3) if the agreement is a contract as defined herein, the contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his/her description the date of the change and reasons therefore, and shall accompany said description with a letter from the contractor's independent certified public accountant approving or otherwise commenting on the changes, and

(4) if the agreement is a contract as defined herein, the contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and

(5) if the agreement is a contract as defined herein, the contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.

(c) Every contractor awarded a contract shall file with the awarding authority a statement of management as to whether the system of internal accounting controls of the contractor and its subsidiaries reasonably assures that:

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

(2) transactions are recorded as necessary

i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

ii. To maintain accountability for assets;

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

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

Every contractor awarded a contract shall also file with the awarding authority a statement prepared and signed by an independent certified public accountant, stating that she/he has examined the statement of management on internal accounting controls, and expressing an opinion as to

(1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and

(2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

(d) Every contractor awarded a contract by the commonwealth or by any political subdivision thereof shall annually file with the awarding authority during the term of the contract a financial statement prepared by an

independent certified public accountant on the basis of an audit by sub accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report.

(e) The office of inspector general, the deputy commissioner for capital planning and operations and any other awarding authority shall enforce the provisions of this section. The deputy commissioner of capital planning and operations may after providing an opportunity for the inspector general and other interested parties to comment, promulgate pursuant to the provisions of chapter thirty A such rules, regulations and guidelines as are necessary to effectuate the purposes of this section. Such rules, regulations and guidelines may be applicable to all awarding authorities. A contractor's failure to satisfy any of the requirements of this section may be grounds for disqualification pursuant to section forty-four C of Chapter one hundred forty-nine.

1.02 MINIMUM WAGE RATES

- A. Minimum Wage Rates as determined by the Commissioner of Department of Labor and Industries under the provision of the Massachusetts General Laws, Chapter 149, Sections 26 to 27D, as amended, apply to this project. It is the responsibility of the contractor, before bid opening, to request if necessary, any additional information of Minimum Wage Rates for those trades-people who may be employed for the proposed work under this contract. Minimum wage rates are included at the end of this section.

1.03 SAFETY AND HEALTH

- A. This project is subject to the Safety and Health regulation of the U.S. Department of Labor set forth in 29 CFR Part 1926, Commonwealth of Massachusetts Regulations CMR 454, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction operations (Chapter 454 CMR 10.00 et. seq.)". Contractors shall be familiar with the requirements of these regulations.

END OF SECTION



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 Wareham, MA Water Pollution Control
Contract Number: **City/Town:** WAREHAM
Description of Work: Installation of approximately:
600 feet of 8" gravity sewer
100 feet of 6" gravity sewer laterals (6 connections)
Job Location: Wankinquoah Avenue area

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

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

Issue Date: 05/05/2023

Wage Request Number: 20230505-007

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>	12/01/2021	\$35.95	\$13.41	\$16.01	\$0.00	\$65.37
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2021	\$36.02	\$13.41	\$16.01	\$0.00	\$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2021	\$36.14	\$13.41	\$16.01	\$0.00	\$65.56
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>	12/01/2022	\$37.91	\$9.10	\$16.64	\$0.00	\$63.65
	06/01/2023	\$38.81	\$9.10	\$16.64	\$0.00	\$64.55
	12/01/2023	\$39.71	\$9.10	\$16.64	\$0.00	\$65.45
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$37.31	\$9.35	\$16.89	\$0.00	\$63.55
	06/01/2023	\$38.21	\$9.35	\$16.89	\$0.00	\$64.45
	12/01/2023	\$39.11	\$9.35	\$16.89	\$0.00	\$65.35
	06/01/2024	\$40.44	\$9.35	\$16.89	\$0.00	\$66.68
	12/01/2024	\$41.77	\$9.35	\$16.89	\$0.00	\$68.01
	06/01/2025	\$43.16	\$9.35	\$16.89	\$0.00	\$69.40
	12/01/2025	\$44.54	\$9.35	\$16.89	\$0.00	\$70.78
	06/01/2026	\$45.98	\$9.35	\$16.89	\$0.00	\$72.22
	12/01/2026	\$47.42	\$9.35	\$16.89	\$0.00	\$73.66
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)</i>	12/01/2020	\$38.10	\$12.80	\$9.45	\$0.00	\$60.35
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.91	\$9.10	\$16.64	\$0.00	\$63.65
	06/01/2023	\$38.81	\$9.10	\$16.64	\$0.00	\$64.55
	12/01/2023	\$39.71	\$9.10	\$16.64	\$0.00	\$65.45
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$37.31	\$9.35	\$16.89	\$0.00	\$63.55
	06/01/2023	\$38.21	\$9.35	\$16.89	\$0.00	\$64.45
	12/01/2023	\$39.11	\$9.35	\$16.89	\$0.00	\$65.35
	06/01/2024	\$40.44	\$9.35	\$16.89	\$0.00	\$66.68
	12/01/2024	\$41.77	\$9.35	\$16.89	\$0.00	\$68.01
	06/01/2025	\$43.16	\$9.35	\$16.89	\$0.00	\$69.40
	12/01/2025	\$44.54	\$9.35	\$16.89	\$0.00	\$70.78
	06/01/2026	\$45.98	\$9.35	\$16.89	\$0.00	\$72.22
	12/01/2026	\$47.42	\$9.35	\$16.89	\$0.00	\$73.66
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2023	\$47.37	\$7.07	\$20.31	\$0.00	\$74.75
	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 - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$30.79	\$7.07	\$13.22	\$0.00	\$51.08
2	65	\$30.79	\$7.07	\$13.22	\$0.00	\$51.08
3	70	\$33.16	\$7.07	\$14.23	\$0.00	\$54.46
4	75	\$35.53	\$7.07	\$15.24	\$0.00	\$57.84
5	80	\$37.90	\$7.07	\$16.25	\$0.00	\$61.22
6	85	\$40.26	\$7.07	\$17.28	\$0.00	\$64.61
7	90	\$42.63	\$7.07	\$18.28	\$0.00	\$67.98
8	95	\$45.00	\$7.07	\$19.32	\$0.00	\$71.39

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)	02/01/2023	\$60.35	\$11.49	\$22.34	\$0.00	\$94.18
BRICKLAYERS LOCAL 3 (NEW BEDFORD)	08/01/2023	\$62.40	\$11.49	\$22.34	\$0.00	\$96.23
	02/01/2024	\$63.65	\$11.49	\$22.34	\$0.00	\$97.48
	08/01/2024	\$65.75	\$11.49	\$22.34	\$0.00	\$99.58
	02/01/2025	\$67.05	\$11.49	\$22.34	\$0.00	\$100.88
	08/01/2025	\$69.20	\$11.49	\$22.34	\$0.00	\$103.03
	02/01/2026	\$70.55	\$11.49	\$22.34	\$0.00	\$104.38
	08/01/2026	\$72.75	\$11.49	\$22.34	\$0.00	\$106.58
	02/01/2027	\$74.15	\$11.49	\$22.34	\$0.00	\$107.98

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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

Effective Date - 02/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.18	\$11.49	\$22.34	\$0.00	\$64.01
2	60	\$36.21	\$11.49	\$22.34	\$0.00	\$70.04
3	70	\$42.25	\$11.49	\$22.34	\$0.00	\$76.08
4	80	\$48.28	\$11.49	\$22.34	\$0.00	\$82.11
5	90	\$54.32	\$11.49	\$22.34	\$0.00	\$88.15

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.20	\$11.49	\$22.34	\$0.00	\$65.03
2	60	\$37.44	\$11.49	\$22.34	\$0.00	\$71.27
3	70	\$43.68	\$11.49	\$22.34	\$0.00	\$77.51
4	80	\$49.92	\$11.49	\$22.34	\$0.00	\$83.75
5	90	\$56.16	\$11.49	\$22.34	\$0.00	\$89.99

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$43.73	\$9.35	\$17.97	\$0.00	\$71.05
	06/01/2023	\$44.73	\$9.35	\$17.97	\$0.00	\$72.05
	12/01/2023	\$45.98	\$9.35	\$17.97	\$0.00	\$73.30
	06/01/2024	\$47.46	\$9.35	\$17.97	\$0.00	\$74.78
	12/01/2024	\$48.93	\$9.35	\$17.97	\$0.00	\$76.25
	06/01/2025	\$50.43	\$9.35	\$17.97	\$0.00	\$77.75
	12/01/2025	\$51.93	\$9.35	\$17.97	\$0.00	\$79.25
	06/01/2026	\$53.48	\$9.35	\$17.97	\$0.00	\$80.80
	12/01/2026	\$54.98	\$9.35	\$17.97	\$0.00	\$82.30

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2023	\$45.12	\$9.33	\$19.97	\$0.00	\$74.42

Apprentice - CARPENTER - Zone 2 Eastern MA

Effective Date - 03/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.56	\$9.33	\$1.73	\$0.00	\$33.62
2	60	\$27.07	\$9.33	\$1.73	\$0.00	\$38.13
3	70	\$31.58	\$9.33	\$14.78	\$0.00	\$55.69
4	75	\$33.84	\$9.33	\$14.78	\$0.00	\$57.95
5	80	\$36.10	\$9.33	\$16.51	\$0.00	\$61.94
6	80	\$36.10	\$9.33	\$16.51	\$0.00	\$61.94
7	90	\$40.61	\$9.33	\$18.24	\$0.00	\$68.18
8	90	\$40.61	\$9.33	\$18.24	\$0.00	\$68.18

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 \$30.71/ 3&4 \$36.93/ 5&6 \$56.82/ 7&8 \$63.06

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME <i>CARPENTERS-ZONE 3 (Wood Frame)</i>	04/01/2023	\$24.16	\$7.21	\$4.80	\$0.00	\$36.17
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All Aspects of New Wood Frame Work

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CARPENTER (Wood Frame) - Zone 3

Effective Date - 04/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$14.50	\$7.21	\$0.00	\$0.00	\$21.71
2	60	\$14.50	\$7.21	\$0.00	\$0.00	\$21.71
3	65	\$15.70	\$7.21	\$0.00	\$0.00	\$22.91
4	70	\$16.91	\$7.21	\$0.00	\$0.00	\$24.12
5	75	\$18.12	\$7.21	\$3.80	\$0.00	\$29.13
6	80	\$19.33	\$7.21	\$3.80	\$0.00	\$30.34
7	85	\$20.54	\$7.21	\$3.80	\$0.00	\$31.55
8	90	\$21.74	\$7.21	\$3.80	\$0.00	\$32.75

Notes:
 % Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$17.86/ 3&4 \$20.22/ 5&6 \$27.57/ 7&8 \$29.94

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING	01/01/2023	\$49.45	\$12.75	\$22.74	\$0.87	\$85.81
BRICKLAYERS LOCAL 3 (NEW BEDFORD)	07/01/2023	\$50.59	\$12.75	\$22.74	\$0.87	\$86.95
	01/01/2024	\$51.73	\$12.75	\$22.74	\$0.87	\$88.09

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.73	\$12.75	\$15.49	\$0.00	\$52.97
2	60	\$29.67	\$12.75	\$17.99	\$0.87	\$61.28
3	65	\$32.14	\$12.75	\$18.99	\$0.87	\$64.75
4	70	\$34.62	\$12.75	\$19.99	\$0.87	\$68.23
5	75	\$37.09	\$12.75	\$20.99	\$0.87	\$71.70
6	80	\$39.56	\$12.75	\$21.99	\$0.87	\$75.17
7	90	\$44.51	\$12.75	\$22.99	\$0.87	\$81.12

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.30	\$12.75	\$15.49	\$0.00	\$53.54
2	60	\$30.35	\$12.75	\$17.99	\$0.87	\$61.96
3	65	\$32.88	\$12.75	\$18.99	\$0.87	\$65.49
4	70	\$35.41	\$12.75	\$19.99	\$0.87	\$69.02
5	75	\$37.94	\$12.75	\$20.99	\$0.87	\$72.55
6	80	\$40.47	\$12.75	\$21.99	\$0.87	\$76.08
7	90	\$45.53	\$12.75	\$22.99	\$0.87	\$82.14

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

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
<i>LABORERS - ZONE 2</i>	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95

For apprentice rates see "Apprentice- LABORER"

CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/01/2022	\$54.68	\$14.25	\$16.05	\$0.00	\$84.98
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$55.95	\$14.25	\$16.05	\$0.00	\$86.25
	12/01/2023	\$57.23	\$14.25	\$16.05	\$0.00	\$87.53
	06/01/2024	\$58.55	\$14.25	\$16.05	\$0.00	\$88.85
	12/01/2024	\$60.03	\$14.25	\$16.05	\$0.00	\$90.33
	06/01/2025	\$61.36	\$14.25	\$16.05	\$0.00	\$91.66
	12/01/2025	\$62.83	\$14.25	\$16.05	\$0.00	\$93.13
	06/01/2026	\$64.16	\$14.25	\$16.05	\$0.00	\$94.46
	12/01/2026	\$65.64	\$14.25	\$16.05	\$0.00	\$95.94

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 4	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

DELEADER (BRIDGE) PAINTERS LOCAL 35 - ZONE 2	01/01/2023	\$56.06	\$8.65	\$23.05	\$0.00	\$87.76
	07/01/2023	\$57.26	\$8.65	\$23.05	\$0.00	\$88.96
	01/01/2024	\$58.46	\$8.65	\$23.05	\$0.00	\$90.16
	07/01/2024	\$59.66	\$8.65	\$23.05	\$0.00	\$91.36
	01/01/2025	\$60.86	\$8.65	\$23.05	\$0.00	\$92.56

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$8.65	\$0.00	\$0.00	\$36.68
2	55	\$30.83	\$8.65	\$6.27	\$0.00	\$45.75
3	60	\$33.64	\$8.65	\$6.84	\$0.00	\$49.13
4	65	\$36.44	\$8.65	\$7.41	\$0.00	\$52.50
5	70	\$39.24	\$8.65	\$19.63	\$0.00	\$67.52
6	75	\$42.05	\$8.65	\$20.20	\$0.00	\$70.90
7	80	\$44.85	\$8.65	\$20.77	\$0.00	\$74.27
8	90	\$50.45	\$8.65	\$21.91	\$0.00	\$81.01

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$8.65	\$0.00	\$0.00	\$37.28
2	55	\$31.49	\$8.65	\$6.27	\$0.00	\$46.41
3	60	\$34.36	\$8.65	\$6.84	\$0.00	\$49.85
4	65	\$37.22	\$8.65	\$7.41	\$0.00	\$53.28
5	70	\$40.08	\$8.65	\$19.63	\$0.00	\$68.36
6	75	\$42.95	\$8.65	\$20.20	\$0.00	\$71.80
7	80	\$45.81	\$8.65	\$20.77	\$0.00	\$75.23
8	90	\$51.53	\$8.65	\$21.91	\$0.00	\$82.09

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN LABORERS - ZONE 2	12/01/2022	\$43.33	\$9.10	\$17.57	\$0.00	\$70.00
	06/01/2023	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	12/01/2023	\$45.58	\$9.10	\$17.57	\$0.00	\$72.25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2022	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	06/01/2023	\$45.33	\$9.10	\$17.57	\$0.00	\$72.00
	12/01/2023	\$46.58	\$9.10	\$17.57	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS <i>LABORERS - ZONE 2</i>	12/01/2022	\$44.08	\$9.10	\$17.57	\$0.00	\$70.75
	06/01/2023	\$45.08	\$9.10	\$17.57	\$0.00	\$71.75
	12/01/2023	\$46.33	\$9.10	\$17.57	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 2</i>	12/01/2022	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	06/01/2023	\$45.33	\$9.10	\$17.57	\$0.00	\$72.00
	12/01/2023	\$46.58	\$9.10	\$17.57	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2022	\$44.08	\$9.10	\$17.57	\$0.00	\$70.75
	06/01/2023	\$45.08	\$9.10	\$17.57	\$0.00	\$71.75
	12/01/2023	\$46.33	\$9.10	\$17.57	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER <i>LABORERS - ZONE 2</i>	12/01/2022	\$43.33	\$9.10	\$17.57	\$0.00	\$70.00
	06/01/2023	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	12/01/2023	\$45.58	\$9.10	\$17.57	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$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 223</i>	09/01/2022	\$46.35	\$11.50	\$16.18	\$0.00	\$74.03
	09/01/2023	\$47.87	\$11.75	\$16.86	\$0.00	\$76.48

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ELECTRICIAN - Local 223

Effective Date - 09/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.54	\$11.50	\$0.56	\$0.00	\$30.60
2	45	\$20.86	\$11.50	\$0.63	\$0.00	\$32.99
3	50	\$23.18	\$11.50	\$0.70	\$0.00	\$35.38
4	55	\$25.49	\$11.50	\$7.35	\$0.00	\$44.34
5	60	\$27.81	\$11.50	\$7.86	\$0.00	\$47.17
6	65	\$30.13	\$11.50	\$8.37	\$0.00	\$50.00
7	70	\$32.45	\$11.50	\$8.89	\$0.00	\$52.84
8	75	\$34.76	\$11.50	\$9.40	\$0.00	\$55.66

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.15	\$11.75	\$0.57	\$0.00	\$31.47
2	45	\$21.54	\$11.75	\$0.65	\$0.00	\$33.94
3	50	\$23.94	\$11.75	\$0.72	\$0.00	\$36.41
4	55	\$26.33	\$11.75	\$7.79	\$0.00	\$45.87
5	60	\$28.72	\$11.75	\$8.31	\$0.00	\$48.78
6	65	\$31.12	\$11.75	\$8.65	\$0.00	\$51.52
7	70	\$33.51	\$11.75	\$9.38	\$0.00	\$54.64
8	75	\$35.90	\$11.75	\$9.90	\$0.00	\$57.55

Notes:

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86
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Apprentice - ELEVATOR CONSTRUCTOR - Local 4

Effective Date - 01/01/2022

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

Notes:

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY OPERATING ENGINEERS LOCAL 4	05/01/2023	\$49.91	\$14.25	\$16.05	\$0.00	\$80.21
	11/01/2023	\$51.15	\$14.25	\$16.05	\$0.00	\$81.45
	05/01/2024	\$52.39	\$14.25	\$16.05	\$0.00	\$82.69
	11/01/2024	\$53.68	\$14.25	\$16.05	\$0.00	\$83.98
	05/01/2025	\$55.12	\$14.25	\$16.05	\$0.00	\$85.42
	11/01/2025	\$56.41	\$14.25	\$16.05	\$0.00	\$86.71
	05/01/2026	\$57.85	\$14.25	\$16.05	\$0.00	\$88.15
	11/01/2026	\$59.14	\$14.25	\$16.05	\$0.00	\$89.44
	05/01/2027	\$60.57	\$14.25	\$16.05	\$0.00	\$90.87
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY OPERATING ENGINEERS LOCAL 4	05/01/2023	\$51.47	\$14.25	\$16.05	\$0.00	\$81.77
	11/01/2023	\$52.72	\$14.25	\$16.05	\$0.00	\$83.02
	05/01/2024	\$53.97	\$14.25	\$16.05	\$0.00	\$84.27
	11/01/2024	\$55.27	\$14.25	\$16.05	\$0.00	\$85.57
	05/01/2025	\$56.72	\$14.25	\$16.05	\$0.00	\$87.02
	11/01/2025	\$58.02	\$14.25	\$16.05	\$0.00	\$88.32
	05/01/2026	\$59.47	\$14.25	\$16.05	\$0.00	\$89.77
	11/01/2026	\$60.77	\$14.25	\$16.05	\$0.00	\$91.07
	05/01/2027	\$62.22	\$14.25	\$16.05	\$0.00	\$92.52
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY OPERATING ENGINEERS LOCAL 4	05/01/2023	\$25.05	\$14.25	\$16.05	\$0.00	\$55.35
	11/01/2023	\$25.78	\$14.25	\$16.05	\$0.00	\$56.08
	05/01/2024	\$26.51	\$14.25	\$16.05	\$0.00	\$56.81
	11/01/2024	\$27.27	\$14.25	\$16.05	\$0.00	\$57.57
	05/01/2025	\$28.12	\$14.25	\$16.05	\$0.00	\$58.42
	11/01/2025	\$28.88	\$14.25	\$16.05	\$0.00	\$59.18
	05/01/2026	\$29.73	\$14.25	\$16.05	\$0.00	\$60.03
	11/01/2026	\$30.49	\$14.25	\$16.05	\$0.00	\$60.79
	05/01/2027	\$31.34	\$14.25	\$16.05	\$0.00	\$61.64
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER ELECTRICIANS LOCAL 223	09/01/2020	\$43.66	\$10.90	\$14.66	\$0.00	\$69.22
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING ELECTRICIANS LOCAL 223	09/01/2020	\$36.86	\$10.90	\$12.45	\$0.00	\$60.21
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$43.54	\$14.25	\$16.05	\$0.00	\$73.84
	06/01/2023	\$44.56	\$14.25	\$16.05	\$0.00	\$74.86
	12/01/2023	\$45.57	\$14.25	\$16.05	\$0.00	\$75.87
	06/01/2024	\$46.63	\$14.25	\$16.05	\$0.00	\$76.93
	12/01/2024	\$47.81	\$14.25	\$16.05	\$0.00	\$78.11
	06/01/2025	\$48.87	\$14.25	\$16.05	\$0.00	\$79.17
	12/01/2025	\$50.04	\$14.25	\$16.05	\$0.00	\$80.34
	06/01/2026	\$51.10	\$14.25	\$16.05	\$0.00	\$81.40
	12/01/2026	\$52.28	\$14.25	\$16.05	\$0.00	\$82.58

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$25.23	\$9.35	\$16.89	\$0.00	\$51.47
	06/01/2023	\$25.98	\$9.35	\$16.89	\$0.00	\$52.22
	12/01/2023	\$25.98	\$9.35	\$16.89	\$0.00	\$52.22
	06/01/2024	\$27.01	\$9.35	\$16.89	\$0.00	\$53.25
	12/01/2024	\$27.01	\$9.35	\$16.89	\$0.00	\$53.25
	06/01/2025	\$28.09	\$9.35	\$16.89	\$0.00	\$54.33
	12/01/2025	\$28.09	\$9.35	\$16.89	\$0.00	\$54.33
	06/01/2026	\$29.21	\$9.35	\$16.89	\$0.00	\$55.45
	12/01/2026	\$29.21	\$9.35	\$16.89	\$0.00	\$55.45

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

FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	03/01/2022	\$51.77	\$9.33	\$20.27	\$0.00	\$81.37
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Apprentice - FLOORCOVERER - Local 2168 Zone 1

Effective Date - 03/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.89	\$9.33	\$1.79	\$0.00	\$37.01
2	55	\$28.47	\$9.33	\$1.79	\$0.00	\$39.59
3	60	\$31.06	\$9.33	\$14.90	\$0.00	\$55.29
4	65	\$33.65	\$9.33	\$14.90	\$0.00	\$57.88
5	70	\$36.24	\$9.33	\$16.69	\$0.00	\$62.26
6	75	\$38.83	\$9.33	\$16.69	\$0.00	\$64.85
7	80	\$41.42	\$9.33	\$18.48	\$0.00	\$69.23
8	85	\$44.00	\$9.33	\$18.48	\$0.00	\$71.81

Notes: Steps are 750 hrs.
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 \$32.94/ 3&4 \$39.66/ 5&6 \$60.32/ 7&8 \$67.10

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER OPERATING ENGINEERS LOCAL 4	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS OPERATING ENGINEERS LOCAL 4	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) GLAZIERS LOCAL 1333	06/01/2020	\$39.18	\$10.80	\$10.45	\$0.00	\$60.43

Apprentice - GLAZIER - Local 1333

Effective Date - 06/01/2020

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

Notes:

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HOISTING ENGINEER/CRANES/GRADALLS OPERATING ENGINEERS LOCAL 4	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 12/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$29.50	\$14.25	\$0.00	\$0.00	\$43.75
2	60	\$32.18	\$14.25	\$16.05	\$0.00	\$62.48
3	65	\$34.86	\$14.25	\$16.05	\$0.00	\$65.16
4	70	\$37.54	\$14.25	\$16.05	\$0.00	\$67.84
5	75	\$40.22	\$14.25	\$16.05	\$0.00	\$70.52
6	80	\$42.90	\$14.25	\$16.05	\$0.00	\$73.20
7	85	\$45.59	\$14.25	\$16.05	\$0.00	\$75.89
8	90	\$48.27	\$14.25	\$16.05	\$0.00	\$78.57

Effective Date - 06/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$30.18	\$14.25	\$0.00	\$0.00	\$44.43
2	60	\$32.93	\$14.25	\$16.05	\$0.00	\$63.23
3	65	\$35.67	\$14.25	\$16.05	\$0.00	\$65.97
4	70	\$38.42	\$14.25	\$16.05	\$0.00	\$68.72
5	75	\$41.16	\$14.25	\$16.05	\$0.00	\$71.46
6	80	\$43.90	\$14.25	\$16.05	\$0.00	\$74.20
7	85	\$46.65	\$14.25	\$16.05	\$0.00	\$76.95
8	90	\$49.39	\$14.25	\$16.05	\$0.00	\$79.69

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - B	04/01/2022	\$38.91	\$13.65	\$17.15	\$2.09	\$71.80
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For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 223	09/01/2020	\$43.66	\$10.90	\$14.66	\$0.00	\$69.22
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For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - B	04/01/2022	\$38.91	\$13.65	\$17.15	\$2.09	\$71.80
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For apprentice rates see "Apprentice- SHEET METAL WORKER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING -WATER) <i>PLUMBERS & PIPEFITTERS LOCAL 51</i>	08/30/2021	\$46.49	\$10.15	\$19.95	\$0.00	\$76.59
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PLUMBERS & PIPEFITTERS LOCAL 51</i>	08/30/2021	\$46.49	\$10.15	\$19.95	\$0.00	\$76.59
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.91	\$9.10	\$16.64	\$0.00	\$63.65
	06/01/2023	\$38.81	\$9.10	\$16.64	\$0.00	\$64.55
	12/01/2023	\$39.71	\$9.10	\$16.64	\$0.00	\$65.45
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$37.31	\$9.35	\$16.89	\$0.00	\$63.55
	06/01/2023	\$38.21	\$9.35	\$16.89	\$0.00	\$64.45
	12/01/2023	\$39.11	\$9.35	\$16.89	\$0.00	\$65.35
	06/01/2024	\$40.44	\$9.35	\$16.89	\$0.00	\$66.68
	12/01/2024	\$41.77	\$9.35	\$16.89	\$0.00	\$68.01
	06/01/2025	\$43.16	\$9.35	\$16.89	\$0.00	\$69.40
	12/01/2025	\$44.54	\$9.35	\$16.89	\$0.00	\$70.78
	06/01/2026	\$45.98	\$9.35	\$16.89	\$0.00	\$72.22
12/01/2026	\$47.42	\$9.35	\$16.89	\$0.00	\$73.66	
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)</i>	09/01/2022	\$48.95	\$13.80	\$17.14	\$0.00	\$79.89

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

Effective Date - 09/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.48	\$13.80	\$12.42	\$0.00	\$50.70
2	60	\$29.37	\$13.80	\$13.36	\$0.00	\$56.53
3	70	\$34.27	\$13.80	\$14.31	\$0.00	\$62.38
4	80	\$39.16	\$13.80	\$15.25	\$0.00	\$68.21

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 37</i>	03/16/2021	\$42.46	\$7.70	\$17.10	\$0.00	\$67.26
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Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - IRONWORKER - Local 37

Effective Date - 03/16/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95

For apprentice rates see "Apprentice- LABORER"

LABORER LABORERS - ZONE 2	12/01/2022	\$37.16	\$9.10	\$16.64	\$0.00	\$62.90
	06/01/2023	\$38.06	\$9.10	\$16.64	\$0.00	\$63.80
	12/01/2023	\$38.96	\$9.10	\$16.64	\$0.00	\$64.70

Apprentice - LABORER - Zone 2

Effective Date - 12/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$22.30	\$9.10	\$16.64	\$0.00	\$48.04
2	70	\$26.01	\$9.10	\$16.64	\$0.00	\$51.75
3	80	\$29.73	\$9.10	\$16.64	\$0.00	\$55.47
4	90	\$33.44	\$9.10	\$16.64	\$0.00	\$59.18

Effective Date - 06/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$22.84	\$9.10	\$16.64	\$0.00	\$48.58
2	70	\$26.64	\$9.10	\$16.64	\$0.00	\$52.38
3	80	\$30.45	\$9.10	\$16.64	\$0.00	\$56.19
4	90	\$34.25	\$9.10	\$16.64	\$0.00	\$59.99

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2022	\$36.56	\$9.35	\$16.89	\$0.00	\$62.80
	06/01/2023	\$37.46	\$9.35	\$16.89	\$0.00	\$63.70
	12/01/2023	\$38.36	\$9.35	\$16.89	\$0.00	\$64.60
	06/01/2024	\$39.69	\$9.35	\$16.89	\$0.00	\$65.93
	12/01/2024	\$41.02	\$9.35	\$16.89	\$0.00	\$67.26
	06/01/2025	\$42.41	\$9.35	\$16.89	\$0.00	\$68.65
	12/01/2025	\$43.79	\$9.35	\$16.89	\$0.00	\$70.03
	06/01/2026	\$45.23	\$9.35	\$16.89	\$0.00	\$71.47
	12/01/2026	\$46.67	\$9.35	\$16.89	\$0.00	\$72.91

Apprentice - LABORER (Heavy & Highway) - Zone 2

Effective Date - 12/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.94	\$9.35	\$16.89	\$0.00	\$48.18
2	70	\$25.59	\$9.35	\$16.89	\$0.00	\$51.83
3	80	\$29.25	\$9.35	\$16.89	\$0.00	\$55.49
4	90	\$32.90	\$9.35	\$16.89	\$0.00	\$59.14

Effective Date - 06/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$22.48	\$9.35	\$16.89	\$0.00	\$48.72
2	70	\$26.22	\$9.35	\$16.89	\$0.00	\$52.46
3	80	\$29.97	\$9.35	\$16.89	\$0.00	\$56.21
4	90	\$33.71	\$9.35	\$16.89	\$0.00	\$59.95

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER LABORERS - ZONE 2	12/01/2022	\$37.16	\$9.10	\$16.64	\$0.00	\$62.90
	06/01/2023	\$38.06	\$9.10	\$16.64	\$0.00	\$63.80
	12/01/2023	\$38.96	\$9.10	\$16.64	\$0.00	\$64.70

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER LABORERS - ZONE 2	12/01/2022	\$37.16	\$9.10	\$16.64	\$0.00	\$62.90
	06/01/2023	\$38.06	\$9.10	\$16.64	\$0.00	\$63.80
	12/01/2023	\$38.96	\$9.10	\$16.64	\$0.00	\$64.70

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER LABORERS - ZONE 2	12/01/2022	\$37.25	\$9.10	\$16.70	\$0.00	\$63.05
	06/01/2023	\$38.15	\$9.10	\$16.70	\$0.00	\$63.95
	12/01/2023	\$39.05	\$9.10	\$16.70	\$0.00	\$64.85

For apprentice rates see "Apprentice- LABORER"

LABORER: MASON TENDER LABORERS - ZONE 2	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.16	\$9.10	\$16.64	\$0.00	\$62.90
	06/01/2023	\$38.06	\$9.10	\$16.64	\$0.00	\$63.80
	12/01/2023	\$38.96	\$9.10	\$16.64	\$0.00	\$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.16	\$9.10	\$16.64	\$0.00	\$62.90
	06/01/2023	\$38.06	\$9.10	\$16.64	\$0.00	\$63.80
	12/01/2023	\$38.96	\$9.10	\$16.64	\$0.00	\$64.70
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>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	02/01/2023	\$46.25	\$11.49	\$20.37	\$0.00	\$78.11
	08/01/2023	\$47.89	\$11.49	\$20.37	\$0.00	\$79.75
	02/01/2024	\$48.89	\$11.49	\$20.37	\$0.00	\$80.75
	08/01/2024	\$50.57	\$11.49	\$20.37	\$0.00	\$82.43
	02/01/2025	\$51.61	\$11.49	\$20.37	\$0.00	\$83.47
	08/01/2025	\$53.33	\$11.49	\$20.37	\$0.00	\$85.19
	02/01/2026	\$54.41	\$11.49	\$20.37	\$0.00	\$86.27
	08/01/2026	\$56.17	\$11.49	\$20.37	\$0.00	\$88.03
	02/01/2027	\$57.29	\$11.49	\$20.37	\$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 - 02/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.13	\$11.49	\$20.37	\$0.00	\$54.99
2	60	\$27.75	\$11.49	\$20.37	\$0.00	\$59.61
3	70	\$32.38	\$11.49	\$20.37	\$0.00	\$64.24
4	80	\$37.00	\$11.49	\$20.37	\$0.00	\$68.86
5	90	\$41.63	\$11.49	\$20.37	\$0.00	\$73.49

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.95	\$11.49	\$20.37	\$0.00	\$55.81
2	60	\$28.73	\$11.49	\$20.37	\$0.00	\$60.59
3	70	\$33.52	\$11.49	\$20.37	\$0.00	\$65.38
4	80	\$38.31	\$11.49	\$20.37	\$0.00	\$70.17
5	90	\$43.10	\$11.49	\$20.37	\$0.00	\$74.96

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS, TILELAYERS & TERRAZZO MECH	02/01/2023	\$60.37	\$11.49	\$22.31	\$0.00	\$94.17
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2023	\$62.42	\$11.49	\$22.31	\$0.00	\$96.22
	02/01/2024	\$63.67	\$11.49	\$22.31	\$0.00	\$97.47
	08/01/2024	\$65.77	\$11.49	\$22.31	\$0.00	\$99.57
	02/01/2025	\$67.07	\$11.49	\$22.31	\$0.00	\$100.87
	08/01/2025	\$69.22	\$11.49	\$22.31	\$0.00	\$103.02
	02/01/2026	\$70.57	\$11.49	\$22.31	\$0.00	\$104.37
	08/01/2026	\$72.77	\$11.49	\$22.31	\$0.00	\$106.57
	02/01/2027	\$74.17	\$11.49	\$22.31	\$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 - 02/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.19	\$11.49	\$22.31	\$0.00	\$63.99
2	60	\$36.22	\$11.49	\$22.31	\$0.00	\$70.02
3	70	\$42.26	\$11.49	\$22.31	\$0.00	\$76.06
4	80	\$48.30	\$11.49	\$22.31	\$0.00	\$82.10
5	90	\$54.33	\$11.49	\$22.31	\$0.00	\$88.13

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.21	\$11.49	\$22.31	\$0.00	\$65.01
2	60	\$37.45	\$11.49	\$22.31	\$0.00	\$71.25
3	70	\$43.69	\$11.49	\$22.31	\$0.00	\$77.49
4	80	\$49.94	\$11.49	\$22.31	\$0.00	\$83.74
5	90	\$56.18	\$11.49	\$22.31	\$0.00	\$89.98

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES)	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 2)	01/02/2023	\$41.92	\$8.58	\$21.57	\$0.00	\$72.07
<i>MILLWRIGHTS LOCAL 1121 - Zone 2</i>						

Classification Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - MILLWRIGHT - Local 1121 Zone 2

Effective Date - 01/02/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$23.06	\$8.58	\$5.72	\$0.00	\$37.36
2	65	\$27.25	\$8.58	\$17.93	\$0.00	\$53.76
3	75	\$31.44	\$8.58	\$18.98	\$0.00	\$59.00
4	85	\$35.63	\$8.58	\$20.01	\$0.00	\$64.22

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

Apprentice to Journeyworker Ratio:1:4

MORTAR MIXER LABORERS - ZONE 2	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95

For apprentice rates see "Apprentice- LABORER"

OILER (OTHER THAN TRUCK CRANES,GRADALLS) OPERATING ENGINEERS LOCAL 4	12/01/2022	\$24.37	\$14.25	\$16.05	\$0.00	\$54.67
	06/01/2023	\$24.94	\$14.25	\$16.05	\$0.00	\$55.24
	12/01/2023	\$25.51	\$14.25	\$16.05	\$0.00	\$55.81
	06/01/2024	\$26.11	\$14.25	\$16.05	\$0.00	\$56.41
	12/01/2024	\$26.77	\$14.25	\$16.05	\$0.00	\$57.07
	06/01/2025	\$27.37	\$14.25	\$16.05	\$0.00	\$57.67
	12/01/2025	\$28.03	\$14.25	\$16.05	\$0.00	\$58.33
	06/01/2026	\$28.62	\$14.25	\$16.05	\$0.00	\$58.92
	12/01/2026	\$29.29	\$14.25	\$16.05	\$0.00	\$59.59

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OILER (TRUCK CRANES, GRADALLS) OPERATING ENGINEERS LOCAL 4	12/01/2022	\$29.57	\$14.25	\$16.05	\$0.00	\$59.87
	06/01/2023	\$30.27	\$14.25	\$16.05	\$0.00	\$60.57
	12/01/2023	\$30.96	\$14.25	\$16.05	\$0.00	\$61.26
	06/01/2024	\$31.68	\$14.25	\$16.05	\$0.00	\$61.98
	12/01/2024	\$32.48	\$14.25	\$16.05	\$0.00	\$62.78
	06/01/2025	\$33.20	\$14.25	\$16.05	\$0.00	\$63.50
	12/01/2025	\$34.00	\$14.25	\$16.05	\$0.00	\$64.30
	06/01/2026	\$34.72	\$14.25	\$16.05	\$0.00	\$65.02
	12/01/2026	\$35.52	\$14.25	\$16.05	\$0.00	\$65.82

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OTHER POWER DRIVEN EQUIPMENT - CLASS II OPERATING ENGINEERS LOCAL 4	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2023	\$56.06	\$8.65	\$23.05	\$0.00	\$87.76
	07/01/2023	\$57.26	\$8.65	\$23.05	\$0.00	\$88.96
	01/01/2024	\$58.46	\$8.65	\$23.05	\$0.00	\$90.16
	07/01/2024	\$59.66	\$8.65	\$23.05	\$0.00	\$91.36
	01/01/2025	\$60.86	\$8.65	\$23.05	\$0.00	\$92.56

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$8.65	\$0.00	\$0.00	\$36.68
2	55	\$30.83	\$8.65	\$6.27	\$0.00	\$45.75
3	60	\$33.64	\$8.65	\$6.84	\$0.00	\$49.13
4	65	\$36.44	\$8.65	\$7.41	\$0.00	\$52.50
5	70	\$39.24	\$8.65	\$19.63	\$0.00	\$67.52
6	75	\$42.05	\$8.65	\$20.20	\$0.00	\$70.90
7	80	\$44.85	\$8.65	\$20.77	\$0.00	\$74.27
8	90	\$50.45	\$8.65	\$21.91	\$0.00	\$81.01

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$8.65	\$0.00	\$0.00	\$37.28
2	55	\$31.49	\$8.65	\$6.27	\$0.00	\$46.41
3	60	\$34.36	\$8.65	\$6.84	\$0.00	\$49.85
4	65	\$37.22	\$8.65	\$7.41	\$0.00	\$53.28
5	70	\$40.08	\$8.65	\$19.63	\$0.00	\$68.36
6	75	\$42.95	\$8.65	\$20.20	\$0.00	\$71.80
7	80	\$45.81	\$8.65	\$20.77	\$0.00	\$75.23
8	90	\$51.53	\$8.65	\$21.91	\$0.00	\$82.09

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2023	\$46.96	\$8.65	\$23.05	\$0.00	\$78.66
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2023	\$48.16	\$8.65	\$23.05	\$0.00	\$79.86
	01/01/2024	\$49.36	\$8.65	\$23.05	\$0.00	\$81.06
	07/01/2024	\$50.56	\$8.65	\$23.05	\$0.00	\$82.26
	01/01/2025	\$51.76	\$8.65	\$23.05	\$0.00	\$83.46

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.48	\$8.65	\$0.00	\$0.00	\$32.13
2	55	\$25.83	\$8.65	\$6.27	\$0.00	\$40.75
3	60	\$28.18	\$8.65	\$6.84	\$0.00	\$43.67
4	65	\$30.52	\$8.65	\$7.41	\$0.00	\$46.58
5	70	\$32.87	\$8.65	\$19.63	\$0.00	\$61.15
6	75	\$35.22	\$8.65	\$20.20	\$0.00	\$64.07
7	80	\$37.57	\$8.65	\$20.77	\$0.00	\$66.99
8	90	\$42.26	\$8.65	\$21.91	\$0.00	\$72.82

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.08	\$8.65	\$0.00	\$0.00	\$32.73
2	55	\$26.49	\$8.65	\$6.27	\$0.00	\$41.41
3	60	\$28.90	\$8.65	\$6.84	\$0.00	\$44.39
4	65	\$31.30	\$8.65	\$7.41	\$0.00	\$47.36
5	70	\$33.71	\$8.65	\$19.63	\$0.00	\$61.99
6	75	\$36.12	\$8.65	\$20.20	\$0.00	\$64.97
7	80	\$38.53	\$8.65	\$20.77	\$0.00	\$67.95
8	90	\$43.34	\$8.65	\$21.91	\$0.00	\$73.90

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2023	\$45.02	\$8.65	\$23.05	\$0.00	\$76.72
PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$46.22	\$8.65	\$23.05	\$0.00	\$77.92
	01/01/2024	\$47.42	\$8.65	\$23.05	\$0.00	\$79.12
	07/01/2024	\$48.62	\$8.65	\$23.05	\$0.00	\$80.32
	01/01/2025	\$49.82	\$8.65	\$23.05	\$0.00	\$81.52

Classification Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

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

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.51	\$8.65	\$0.00	\$0.00	\$31.16
2	55	\$24.76	\$8.65	\$6.27	\$0.00	\$39.68
3	60	\$27.01	\$8.65	\$6.84	\$0.00	\$42.50
4	65	\$29.26	\$8.65	\$7.41	\$0.00	\$45.32
5	70	\$31.51	\$8.65	\$19.63	\$0.00	\$59.79
6	75	\$33.77	\$8.65	\$20.20	\$0.00	\$62.62
7	80	\$36.02	\$8.65	\$20.77	\$0.00	\$65.44
8	90	\$40.52	\$8.65	\$21.91	\$0.00	\$71.08

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.11	\$8.65	\$0.00	\$0.00	\$31.76
2	55	\$25.42	\$8.65	\$6.27	\$0.00	\$40.34
3	60	\$27.73	\$8.65	\$6.84	\$0.00	\$43.22
4	65	\$30.04	\$8.65	\$19.06	\$0.00	\$57.75
5	70	\$32.35	\$8.65	\$19.63	\$0.00	\$60.63
6	75	\$34.67	\$8.65	\$20.20	\$0.00	\$63.52
7	80	\$36.98	\$8.65	\$20.77	\$0.00	\$66.40
8	90	\$41.60	\$8.65	\$21.91	\$0.00	\$72.16

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2023	\$45.56	\$8.65	\$23.05	\$0.00	\$77.26
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$46.76	\$8.65	\$23.05	\$0.00	\$78.46
	01/01/2024	\$47.96	\$8.65	\$23.05	\$0.00	\$79.66
	07/01/2024	\$49.16	\$8.65	\$23.05	\$0.00	\$80.86
	01/01/2025	\$50.36	\$8.65	\$23.05	\$0.00	\$82.06

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW

Effective Date - 01/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.78	\$8.65	\$0.00	\$0.00	\$31.43
2	55	\$25.06	\$8.65	\$6.27	\$0.00	\$39.98
3	60	\$27.34	\$8.65	\$6.84	\$0.00	\$42.83
4	65	\$29.61	\$8.65	\$7.41	\$0.00	\$45.67
5	70	\$31.89	\$8.65	\$19.63	\$0.00	\$60.17
6	75	\$34.17	\$8.65	\$20.20	\$0.00	\$63.02
7	80	\$36.45	\$8.65	\$20.77	\$0.00	\$65.87
8	90	\$41.00	\$8.65	\$21.91	\$0.00	\$71.56

Effective Date - 07/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.38	\$8.65	\$0.00	\$0.00	\$32.03
2	55	\$25.72	\$8.65	\$6.27	\$0.00	\$40.64
3	60	\$28.06	\$8.65	\$6.84	\$0.00	\$43.55
4	65	\$30.39	\$8.65	\$7.41	\$0.00	\$46.45
5	70	\$32.73	\$8.65	\$19.63	\$0.00	\$61.01
6	75	\$35.07	\$8.65	\$20.20	\$0.00	\$63.92
7	80	\$37.41	\$8.65	\$20.77	\$0.00	\$66.83
8	90	\$42.08	\$8.65	\$21.91	\$0.00	\$72.64

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2023	\$43.62	\$8.65	\$23.05	\$0.00	\$75.32
PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$44.82	\$8.65	\$23.05	\$0.00	\$76.52
	01/01/2024	\$46.02	\$8.65	\$23.05	\$0.00	\$77.72
	07/01/2024	\$47.22	\$8.65	\$23.05	\$0.00	\$78.92
	01/01/2025	\$48.42	\$8.65	\$23.05	\$0.00	\$80.12

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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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

PIPELAYER	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
<i>LABORERS - ZONE 2</i>	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95

For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY)	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
<i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16

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

PLUMBER & PIPEFITTER	08/30/2021	\$46.49	\$10.15	\$19.95	\$0.00	\$76.59
<i>PLUMBERS & PIPEFITTERS LOCAL 51</i>						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 653 - Southeastern Concrete (Weymouth)</i>	05/01/2023	\$25.00	\$13.41	\$6.90	\$0.00	\$45.31
	08/01/2023	\$25.00	\$13.91	\$6.90	\$0.00	\$45.81
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

ROOFER (Inc.Roofing Waterproofing &Roofing Damproofg) <i>ROOFERS LOCAL 33</i>	02/01/2023	\$48.53	\$12.78	\$20.20	\$0.00	\$81.51
	08/01/2023	\$50.03	\$12.78	\$20.20	\$0.00	\$83.01
	02/01/2024	\$51.28	\$12.78	\$20.20	\$0.00	\$84.26
	08/01/2024	\$52.78	\$12.78	\$20.20	\$0.00	\$85.76
	02/01/2025	\$54.03	\$12.78	\$20.20	\$0.00	\$87.01
	08/01/2025	\$55.53	\$12.78	\$20.20	\$0.00	\$88.51
	02/01/2026	\$56.78	\$12.78	\$20.20	\$0.00	\$89.76

Apprentice - ROOFER - Local 33

Effective Date - 02/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.27	\$12.78	\$5.59	\$0.00	\$42.64
2	60	\$29.12	\$12.78	\$20.20	\$0.00	\$62.10
3	65	\$31.54	\$12.78	\$20.20	\$0.00	\$64.52
4	75	\$36.40	\$12.78	\$20.20	\$0.00	\$69.38
5	85	\$41.25	\$12.78	\$20.20	\$0.00	\$74.23

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.02	\$12.78	\$5.59	\$0.00	\$43.39
2	60	\$30.02	\$12.78	\$20.20	\$0.00	\$63.00
3	65	\$32.52	\$12.78	\$20.20	\$0.00	\$65.50
4	75	\$37.52	\$12.78	\$20.20	\$0.00	\$70.50
5	85	\$42.53	\$12.78	\$20.20	\$0.00	\$75.51

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 <i>ROOFERS LOCAL 33</i>	02/01/2023	\$48.78	\$12.78	\$20.20	\$0.00	\$81.76
	08/01/2023	\$50.28	\$12.78	\$20.20	\$0.00	\$83.26
	02/01/2024	\$51.53	\$12.78	\$20.20	\$0.00	\$84.51
	08/01/2024	\$53.03	\$12.78	\$20.20	\$0.00	\$86.01
	02/01/2025	\$54.28	\$12.78	\$20.20	\$0.00	\$87.26
	08/01/2025	\$55.78	\$12.78	\$20.20	\$0.00	\$88.76
	02/01/2026	\$57.03	\$12.78	\$20.20	\$0.00	\$90.01

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER SHEETMETAL WORKERS LOCAL 17 - B	04/01/2022	\$37.41	\$13.95	\$17.85	\$2.08	\$71.29

Apprentice - SHEET METAL WORKER - Local 17-B

Effective Date - 04/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$14.96	\$13.95	\$4.10	\$1.02	\$34.03
2	45	\$16.83	\$13.95	\$4.61	\$1.09	\$36.48
3	50	\$18.71	\$13.95	\$11.26	\$1.35	\$45.27
4	55	\$20.58	\$13.95	\$11.26	\$1.41	\$47.20
5	60	\$22.45	\$13.95	\$14.60	\$1.53	\$52.53
6	65	\$24.32	\$13.95	\$14.88	\$1.59	\$54.74
7	70	\$26.19	\$13.95	\$15.16	\$1.66	\$56.96
8	75	\$28.06	\$13.95	\$15.44	\$1.72	\$59.17
9	80	\$29.93	\$13.95	\$15.72	\$1.79	\$61.39
10	85	\$31.80	\$13.95	\$15.57	\$1.85	\$63.17

Notes:

Apprentice to Journeyworker Ratio:1:3

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
SPECIALIZED EARTH MOVING EQUIP > 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/01/2021	\$36.53	\$13.41	\$16.01	\$0.00	\$65.95
SPRINKLER FITTER SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2	03/01/2023	\$59.58	\$10.90	\$23.20	\$0.00	\$93.68
	10/01/2023	\$61.16	\$10.90	\$23.20	\$0.00	\$95.26
	03/01/2024	\$62.78	\$10.90	\$23.20	\$0.00	\$96.88
	10/01/2024	\$64.40	\$10.90	\$23.20	\$0.00	\$98.50
	03/01/2025	\$66.02	\$10.90	\$23.20	\$0.00	\$100.12

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SPRINKLER FITTER - Local 550 (Section B) Zone 2

Effective Date - 03/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$20.85	\$10.90	\$9.70	\$0.00	\$41.45
2	40	\$23.83	\$10.90	\$9.70	\$0.00	\$44.43
3	45	\$26.81	\$10.90	\$9.70	\$0.00	\$47.41
4	50	\$29.79	\$10.90	\$9.70	\$0.00	\$50.39
5	55	\$32.77	\$10.90	\$9.70	\$0.00	\$53.37
6	60	\$35.75	\$10.90	\$11.20	\$0.00	\$57.85
7	65	\$38.73	\$10.90	\$11.20	\$0.00	\$60.83
8	70	\$41.71	\$10.90	\$11.20	\$0.00	\$63.81
9	75	\$44.69	\$10.90	\$11.20	\$0.00	\$66.79
10	80	\$47.66	\$10.90	\$11.20	\$0.00	\$69.76

Effective Date - 10/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.41	\$10.90	\$9.70	\$0.00	\$42.01
2	40	\$24.46	\$10.90	\$9.70	\$0.00	\$45.06
3	45	\$27.52	\$10.90	\$9.70	\$0.00	\$48.12
4	50	\$30.58	\$10.90	\$9.70	\$0.00	\$51.18
5	55	\$33.64	\$10.90	\$9.70	\$0.00	\$54.24
6	60	\$36.70	\$10.90	\$11.20	\$0.00	\$58.80
7	65	\$39.75	\$10.90	\$11.20	\$0.00	\$61.85
8	70	\$42.81	\$10.90	\$11.20	\$0.00	\$64.91
9	75	\$45.87	\$10.90	\$11.20	\$0.00	\$67.97
10	80	\$48.93	\$10.90	\$11.20	\$0.00	\$71.03

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

STEAM BOILER OPERATOR	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
OPERATING ENGINEERS LOCAL 4	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 223</i>	09/01/2022	\$38.16	\$11.25	\$13.31	\$0.00	\$62.72
	09/01/2023	\$39.40	\$11.50	\$13.91	\$0.00	\$64.81
	09/01/2024	\$40.69	\$11.75	\$14.53	\$0.00	\$66.97

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 223

Effective Date - 09/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Notes: See Electrician Apprentice Wages

Telecom Apprentice Wages shall be the same as the Electrician Apprentice Wages

Apprentice to Journeyworker Ratio:2:3***

TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	02/01/2023	\$59.29	\$11.49	\$22.34	\$0.00	\$93.12
	08/01/2023	\$61.34	\$11.49	\$22.34	\$0.00	\$95.17
	02/01/2024	\$62.59	\$11.49	\$22.34	\$0.00	\$96.42
	08/01/2024	\$64.69	\$11.49	\$22.34	\$0.00	\$98.52
	02/01/2025	\$65.99	\$11.49	\$22.34	\$0.00	\$99.82
	08/01/2025	\$68.14	\$11.49	\$22.34	\$0.00	\$101.97
	02/01/2026	\$69.49	\$11.49	\$22.34	\$0.00	\$103.32
	08/01/2026	\$71.69	\$11.49	\$22.34	\$0.00	\$105.52
	02/01/2027	\$73.09	\$11.49	\$22.34	\$0.00	\$106.92

Classification Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.65	\$11.49	\$22.34	\$0.00	\$63.48
2	60	\$35.57	\$11.49	\$22.34	\$0.00	\$69.40
3	70	\$41.50	\$11.49	\$22.34	\$0.00	\$75.33
4	80	\$47.43	\$11.49	\$22.34	\$0.00	\$81.26
5	90	\$53.36	\$11.49	\$22.34	\$0.00	\$87.19

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.67	\$11.49	\$22.34	\$0.00	\$64.50
2	60	\$36.80	\$11.49	\$22.34	\$0.00	\$70.63
3	70	\$42.94	\$11.49	\$22.34	\$0.00	\$76.77
4	80	\$49.07	\$11.49	\$22.34	\$0.00	\$82.90
5	90	\$55.21	\$11.49	\$22.34	\$0.00	\$89.04

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER	12/01/2022	\$46.58	\$9.35	\$17.97	\$0.00	\$73.90
LABORERS - FOUNDATION AND MARINE	06/01/2023	\$47.58	\$9.35	\$17.97	\$0.00	\$74.90
	12/01/2023	\$48.83	\$9.35	\$17.97	\$0.00	\$76.15
	06/01/2024	\$50.31	\$9.35	\$17.97	\$0.00	\$77.63
	12/01/2024	\$51.78	\$9.35	\$17.97	\$0.00	\$79.10
	06/01/2025	\$53.28	\$9.35	\$17.97	\$0.00	\$80.60
	12/01/2025	\$54.78	\$9.35	\$17.97	\$0.00	\$82.10
	06/01/2026	\$56.33	\$9.35	\$17.97	\$0.00	\$83.65
	12/01/2026	\$57.83	\$9.35	\$17.97	\$0.00	\$85.15

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER	12/01/2022	\$42.70	\$9.35	\$17.97	\$0.00	\$70.02
LABORERS - FOUNDATION AND MARINE	06/01/2023	\$43.70	\$9.35	\$17.97	\$0.00	\$71.02
	12/01/2023	\$44.95	\$9.35	\$17.97	\$0.00	\$72.27
	06/01/2024	\$46.43	\$9.35	\$17.97	\$0.00	\$73.75
	12/01/2024	\$47.90	\$9.35	\$17.97	\$0.00	\$75.22
	06/01/2025	\$49.40	\$9.35	\$17.97	\$0.00	\$76.72
	12/01/2025	\$50.90	\$9.35	\$17.97	\$0.00	\$78.22
	06/01/2026	\$52.45	\$9.35	\$17.97	\$0.00	\$79.77
	12/01/2026	\$53.95	\$9.35	\$17.97	\$0.00	\$81.27

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$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>	12/01/2021	\$36.82	\$13.41	\$16.01	\$0.00	\$66.24
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2022	\$54.81	\$9.35	\$18.42	\$0.00	\$82.58
	06/01/2023	\$55.81	\$9.35	\$18.42	\$0.00	\$83.58
	12/01/2023	\$57.06	\$9.35	\$18.42	\$0.00	\$84.83
	06/01/2024	\$58.54	\$9.35	\$18.42	\$0.00	\$86.31
	12/01/2024	\$60.01	\$9.35	\$18.42	\$0.00	\$87.78
	06/01/2025	\$61.51	\$9.35	\$18.42	\$0.00	\$89.28
	12/01/2025	\$63.01	\$9.35	\$18.42	\$0.00	\$90.78
	06/01/2026	\$64.56	\$9.35	\$18.42	\$0.00	\$92.33
	12/01/2026	\$66.06	\$9.35	\$18.42	\$0.00	\$93.83
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2022	\$56.81	\$9.35	\$18.42	\$0.00	\$84.58
	06/01/2023	\$57.81	\$9.35	\$18.42	\$0.00	\$85.58
	12/01/2023	\$59.06	\$9.35	\$18.42	\$0.00	\$86.83
	06/01/2024	\$60.54	\$9.35	\$18.42	\$0.00	\$88.31
	12/01/2024	\$62.01	\$9.35	\$18.42	\$0.00	\$89.78
	06/01/2025	\$63.51	\$9.35	\$18.42	\$0.00	\$91.28
	12/01/2025	\$65.01	\$9.35	\$18.42	\$0.00	\$92.78
	06/01/2026	\$66.56	\$9.35	\$18.42	\$0.00	\$94.33
	12/01/2026	\$68.06	\$9.35	\$18.42	\$0.00	\$95.83
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2022	\$46.88	\$9.35	\$18.42	\$0.00	\$74.65
	06/01/2023	\$47.88	\$9.35	\$18.42	\$0.00	\$75.65
	12/01/2023	\$49.13	\$9.35	\$18.42	\$0.00	\$76.90
	06/01/2024	\$50.61	\$9.35	\$18.42	\$0.00	\$78.38
	12/01/2024	\$52.08	\$9.35	\$18.42	\$0.00	\$79.85
	06/01/2025	\$53.58	\$9.35	\$18.42	\$0.00	\$81.35
	12/01/2025	\$55.08	\$9.35	\$18.42	\$0.00	\$82.85
	06/01/2026	\$56.63	\$9.35	\$18.42	\$0.00	\$84.40
	12/01/2026	\$58.13	\$9.35	\$18.42	\$0.00	\$85.90
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2022	\$48.88	\$9.35	\$18.42	\$0.00	\$76.65
	06/01/2023	\$49.88	\$9.35	\$18.42	\$0.00	\$77.65
	12/01/2023	\$51.13	\$9.35	\$18.42	\$0.00	\$78.90
	06/01/2024	\$52.61	\$9.35	\$18.42	\$0.00	\$80.38
	12/01/2024	\$54.08	\$9.35	\$18.42	\$0.00	\$81.85
	06/01/2025	\$55.58	\$9.35	\$18.42	\$0.00	\$83.35
	12/01/2025	\$57.08	\$9.35	\$18.42	\$0.00	\$84.85
	06/01/2026	\$58.63	\$9.35	\$18.42	\$0.00	\$86.40
	12/01/2026	\$60.13	\$9.35	\$18.42	\$0.00	\$87.90
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2022	\$37.41	\$9.10	\$16.64	\$0.00	\$63.15
	06/01/2023	\$38.31	\$9.10	\$16.64	\$0.00	\$64.05
	12/01/2023	\$39.21	\$9.10	\$16.64	\$0.00	\$64.95
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i>	12/01/2022	\$36.81	\$9.35	\$16.89	\$0.00	\$63.05
	06/01/2023	\$37.71	\$9.35	\$16.89	\$0.00	\$63.95
	12/01/2023	\$38.61	\$9.35	\$16.89	\$0.00	\$64.85
	06/01/2024	\$39.94	\$9.35	\$16.89	\$0.00	\$66.18
	12/01/2024	\$41.27	\$9.35	\$16.89	\$0.00	\$67.51
	06/01/2025	\$42.66	\$9.35	\$16.89	\$0.00	\$68.90
	12/01/2025	\$44.04	\$9.35	\$16.89	\$0.00	\$70.28
	06/01/2026	\$45.48	\$9.35	\$16.89	\$0.00	\$71.72
	12/01/2026	\$46.92	\$9.35	\$16.89	\$0.00	\$73.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER PLUMBERS & PIPEFITTERS LOCAL 51	08/30/2021	\$46.49	\$10.15	\$19.95	\$0.00	\$76.59
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

SECTION 01069

HEALTH & SAFETY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for providing a Health and Safety Plan and maintenance of health and safety while performing the Work.

1.02 PAYMENT PROCEDURES

- A. Provision for "Health & Safety Requirements" will not be paid separately, but shall be considered a subsidiary obligation of the Contractor, with costs thereof distributed among the contract unit prices for the other items of work.

1.03 REQUIREMENTS

- A. The Contractor is responsible to monitor working conditions at all times during construction and, if it is found to be necessary, to provide appropriate protective clothing, equipment and facilities for his personnel, and to establish workplace procedures to ensure their safety, and to enforce the use of these procedures, equipment and facilities in accordance with the following guidelines:
 - 1. Safety and Health Regulations Promulgated by the U.S. Department of Labor OSHA, 29 CFR 1910 - Occupational Safety and Health Standards, and 29 CFR 1920 - Safety and Health Regulations for Construction.
 - 2. U.S. Environmental Protection Agency Interim Standard Operating Safety Guidelines - Office of Emergency and Remedial Response - Hazardous Response Support Division, Rev. September 1982.
 - 3. U.S. Environmental Protection Agency Medical Monitoring Program Guidelines.
- B. The Contractor shall implement a Health and Safety protection program. The procedures for such implementation shall be submitted to the Engineer and Owner for approval. The procedures shall include provisions for stations allowing workers to wash and to put on and remove protective clothing, and stations for vehicles to be cleaned, if necessary, before leaving the site, air monitoring, and evaluation of areas where unsafe levels of gas has accumulated.
- C. The Contractor shall comply with all Federal, State, and local safety requirements related to the presence of combustibile and nausea-inducing gases.

- D. In addition to the above requirements, the Contractor shall comply with the following requirements:
1. All construction equipment on the site shall be equipped with vertical exhaust pipes or a sparkproof exhaust.
 2. Smoking shall not be permitted in any area where gases can accumulate, or in areas where geomembrane liners are being installed.
 3. Welding or open flames shall not be permitted in enclosed areas. In other areas in which a detectable concentration of methane is found, ground mats shall be used.
 4. Toxic gas indicators, a combustible gas indicator, and fire extinguishers shall be available at all times during operations. Periodic monitoring with portable monitoring devices shall be employed in areas susceptible to gas accumulation, with the Contractor furnishing daily to the Engineer, three (3) copies of a certified statement of their findings.
- E. During operations, whenever unsafe levels of landfill gases are detected, all work will cease in that area until acceptable levels are reached.

1.04 SHOP DRAWINGS

- A. Submit site specific Health and Safety Plan (HASP) that complies with all applicable OSHA requirements to the Engineer for review and acceptance within fifteen (15) working days of the Contractor's Notice to Proceed. Certified Industrial Hygienist must certify the Contractor's plan prior to submittal to and review by the Engineer. The Contractor is not to proceed with any subsurface site work without review and acceptance of the submitted Health and Safety Plan by the Engineer.

1.05 QUALITY ASSURANCE

- A. Engage an independent, qualified Health and Safety expert having experience in similar construction conditions, to monitor site conditions and recommend all necessary Health and Safety protection. This person shall be a Certified Industrial Hygienist (CIH). The Contractor shall follow such recommendations and shall provide such protection to his personnel, and personnel of the Owner and Engineer, as may be affected.

1.06 REGULATORY REQUIREMENTS

- A. Establish workplace procedures, enforce the use of these procedures, and the associated equipment and facilities in accordance with the following guidelines:
1. Safety and Health Regulations Promulgated by the U.S. Department of Labor OSHA, 29 CFR 1910 - Occupational Safety and Health Standards, and 29 CFR 1920 - Safety and Health Regulations for Construction.

2. Occupational Safety and Health Standards, 29 CFR 1926 - Safety and Health Regulations for Construction.
3. U.S. Environmental Protection Agency Medical Monitoring Program Guidelines.

1.07 SITE CONDITIONS

- A. The Contractor's attention is directed to the fact that the work includes connecting new pipelines to the existing water, sewer and drainage systems. In addition to confined space issues, hazardous gasses and oxygen depletion may be encountered in the existing sewer system where proposed work is to take place.
- B. The Contractor is also responsible for reviewing site specific investigation reports included in the Appendix of these specifications.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 PROTECTION

- A. If, at any time, the Owner or the Engineer is apprised of a safety hazard which demands immediate attention because of its high potential for harm to the public travel, persons on or about the work, or public or private property, the Owner or the Engineer shall have the right to order such safeguards to be erected and such precautions to be taken as necessary and the Contractor shall comply with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the work into proper and approved condition, or if the Contractor or his representative is not upon the site so that he can be notified immediately of the insufficiency of safety precautions, then the Owner may put the work into such a condition that is shall be, in his opinion, in all respects safe, and the Contractor shall pay all expenses of such labor materials as may have been used for this purpose by him or by the Owner. The fact that the Owner or the Engineer does not observe a safety hazard or does not order the Contractor to take remedial measures shall in no way relieve the Contractor of the entire responsibility for any costs, loss or damage by any party sustained on account of the insufficiency of the safety precautions taken by him or by the Owner acting under authority of this Section.
- B. If the Contractor is alerted to the fact that conditions of high hazard are present or can be present at the site during the performance of the work. It is the responsibility of the Contractor to take appropriate safety precautions to meet whatever conditions of hazard may be present during the performance of the work, whether reasonably foreseeable or not. The safety conditions enumerated in the within Specifications are

the minimum permissible and neither the Owner nor the Engineer make any representation that the safety standards provided herein will be adequate to meet all eventualities. The Contractor is therefore alerted to the fact that it shall be its responsibility to anticipate and provide such additional safety precautions, facilities, personnel and equipment as shall be necessary to protect life and property from whatsoever conditions of hazard are present or may be present.

END OF SECTION



**SECTOR SPECIFIC WORKPLACE SAFETY STANDARDS FOR
CONSTRUCTION SITES TO ADDRESS COVID-19**

As of July 24, 2020

A. Enforcement and Oversight

- A site-specific COVID-19 Officer (who may also be the Health and Safety Officer) shall be designated for every site except as provided below for construction and remodeling in 1-3 family residences
- Except as provided below for construction and remodeling in 1-3 family residences, the Contractor's site-specific project COVID-19 Officer shall submit a written daily report to the Owner's Representative. The COVID-19 Officer shall certify that the contractor and all subcontractors are in full compliance with sections B to D, inclusive (the "COVID-19 Construction Safety Guidance")
- For large, complicated construction projects a city or town may additionally require the Owner to develop and submit a site-specific risk analysis and enhanced COVID-19 safety plan, which may include additional requirements to address risks specific to the project or type of project. The city or town shall review and approve such plan and may require such projects to pause construction until such a risk analysis and plan is submitted and approved. Once such an enhanced COVID-19 safety plan is approved, a violation of the plan shall be treated the same as a violation of the COVID-19 Construction Safety Guidance
- For all projects undertaken, managed or funded by a state agency or authority there shall be joint enforcement responsibility between the project's public Owner and the city or town where the project is located. The Owner of a public project has the lead responsibility for compliance and enforcement including frequent on-site inspections by an employee or contractor of the state agency or authority who is familiar with the COVID-19 Construction Safety Guidance and is authorized to enforce that guidance and shut down work at the site if violations are found. The Owner of the project is required to notify the municipality where the work is taking place whenever a site is shut down or of any violations of the COVID-19 Construction Safety Guidance and the resulting corrective action plan, as well as to provide copies of the COVID-19 Officer's written daily reports upon request. While the public Owner has the lead responsibility for enforcement, cities and towns retain the authority to take enforcement action against public projects found not in compliance with the COVID-19 Construction Safety Guidance, including the authority to order the project to shut down until a corrective action plan is developed, approved and implemented
- Cities and towns are authorized to enforce the COVID-19 Construction Safety Guidance using their public health staff, building inspectors or any other appropriate official or contractor

- Cities and towns may enforce the safety and distance protocols including, if multiple violations are found, requiring the Owner and / or Contractor to safely secure the site and pause construction activities until a corrective action plan is prepared, submitted and approved by the city or town
- The city or town may require the Owner of a large, complicated private project to pay for an independent, third party inspector or inspection firm (or to pay into a pool to pay for such inspections). The third party inspector shall be accountable solely to the city or town and shall be responsible for enforcement on behalf of the city or town. A city or town may require private projects to pause construction until such a third-party inspector has been secured

B. Employee Health Protection – ZERO Tolerance

ZERO TOLERANCE FOR SICK WORKERS REPORTING TO WORK. IF YOU ARE SICK, STAY HOME! IF YOU FEEL SICK, GO HOME! IF YOU SEE SOMEONE SICK, SEND THEM HOME!

If you are exhibiting any of the symptoms below, you are to report this to your supervisor (via phone, text or email) right away, and head home from the job site or stay home if already there

If you notice a co-worker showing signs or complaining about such symptoms, he or she should be directed to their supervisor (via phone, text or email) and asked to leave the project site immediately

COVID-19 Typical Symptoms:

- Fever
- Cough
- Shortness of Breath
- Sore Throat

Self-certify prior to shift

Prior to starting a shift, each employee will self-certify to their supervisor that they:

- Have no signs of a fever or a measured temperature above 100.3 degrees or greater, a cough or trouble breathing within the past 24 hours
- Have not had "close contact" with an individual diagnosed with COVID-19. "Close contact" means living in the same household as a person who has tested positive for COVID-19, caring for a person who has tested positive for COVID-19, being within 6 feet of a person who has tested positive for COVID-19 for about 15 minutes, or coming in direct contact with secretions (e.g., sharing utensils, being coughed on) from a person who has tested positive for COVID-19, while that person was symptomatic
- Have not been asked to self-isolate or quarantine by their doctor or a local public health official

Employees exhibiting symptoms or unable to self-certify should be directed to leave the work site and seek medical attention and applicable testing by their health care provider. They are not to return to the work site until cleared by a medical professional

General On-the-Job Guidance to Prevent Exposure & Limit the Transmission of the Virus

- No handshaking
- Wash hands often with soap for at least 20 seconds or use an alcohol-based hand sanitizer with at least 60% ethanol or 70% isopropanol
- Contractor and State Agency Field Offices are locked down to all but authorized personnel
- Each jobsite should develop cleaning and decontamination procedures that are posted and shared. These Procedures must cover all areas including trailers, gates, equipment, vehicles, etc. and shall be posted at all entry points to the sites, and throughout the project site.
- A "No Congregation" policy is in effect, individuals must implement social distancing by maintaining a minimum distance of 6-feet from other individuals
- Avoid face to face meetings – critical situations requiring in-person discussion must follow social distancing
- Conduct all meetings via conference calls, if possible. Do not convene meetings of more than 10 people. Recommend use of cell phones, texting, web meeting sites and conference calls for project discussion
- All individual work crew meetings / tailgate talks should be held outside and follow social distancing
- Please keep all crews a minimum of 6 feet apart at all times to eliminate the potential of cross contamination
- At each job briefing / tool box talk, employees are asked if they are experiencing any symptoms, and are sent home if they are
- Each jobsite should have laminated COVID-19 safety guidelines and handwashing instructions
- All restroom facilities / porta-potties should be cleaned and handwashing stations must be provided with soap, hand sanitizer and paper towels
- All surfaces should be regularly cleaned, including surfaces, door handles, laptops, etc.
- All common areas and meeting areas are to be regularly cleaned and disinfected at least once a day but preferably twice a day
- Be sure to use your own water bottle, and do not share
- To avoid external contamination, we recommend everyone bring food from home
- Please maintain Social Distancing separation during breaks and lunch

- Cover coughing or sneezing with a tissue, then throw the tissue in the trash and wash hands, if no tissue is available then cough into your elbow
- Avoid touching eyes, nose, and mouth with your hands
- To avoid sharing germs, please clean up after Yourself. DO NOT make others responsible for moving, unpacking and packing up your personal belongings
- For guidance on business-sponsored travel, refer to the Commonwealth's current out-of-state travel order: [mass.gov/MATraveler](https://www.mass.gov/MATraveler). Employers are strongly discouraged from requiring or allowing business-related travel to destinations other than those appearing on the Department of Public Health's list of COVID-19 lower risk States. Employers that permit employer-paid or -reimbursed travel to those States should take measures to ensure employees comply with this order. Employers are also urged to strongly discourage their employees from taking leisure travel to destinations not included on the list of COVID-19 lower-risk States
- If you or a family member is feeling ill, stay home!

Work Site Risk Prevention Practices

- At the start of each shift, confirm with all employees that they are healthy
- We will have a 100% glove policy from today going forward. All construction workers will be required to wear cut-resistant gloves or the equivalent
- Use of eye protection (safety goggles / face shields) is recommended
- In work conditions where required social distancing is impossible to achieve affected employees shall be supplied PPE including as appropriate a standard face mask, gloves, and eye protection
- All employees should drive to work site / parking area in a single occupant vehicle. Contractors / State staff should not ride together in the same vehicle
- When entering a machine or vehicle which you are not sure you were the last person to enter, make sure that you wipe down the interior and door handles with disinfectant prior to entry
- In instances where it is possible, workers should maintain separation of 6 feet from each other per CDC guidelines
- Multi person activities will be limited where feasible (two person lifting activities)
- Large gathering places on the site such as shacks and break areas will be eliminated and instead small break areas will be used with seating limited to ensure social distancing.
- Contact the cleaning person for your office trailer or office space and ensure they have proper COVID- 19 sanitation processes. Increase their cleaning visits to daily
- Clean all high contact surfaces a minimum of twice a day in order to minimize the spread of germs in areas that people touch frequently. This includes but is not limited to desks, laptops and vehicles

Wash Stations

All site-specific projects with outside construction sites without ready access to an indoor bathroom MUST install Wash Stations.

- Install hand wash stations with hot water, if possible, and soap at fire hydrants or other water sources to be used for frequent handwashing for all onsite employees
- All onsite workers must help to maintain and keep stations clean
- If a worker notices soap or towels are running low or out, immediately notify supervisors
- Garbage barrels will be placed next to the hand wash station for disposal of tissues / towels

Do all you can to maintain your good health by: getting adequate sleep; eating a balanced, healthy diet, avoid alcohol; and consume plenty of fluids.

Please Note: This document is not intended to replace any formalized procedures currently in place with the General Contractor.

Where these guidance does not meet or exceed the standards put forth by the General Contractor, everyone shall abide by the most stringent procedure available.

A site-specific COVID-19 Officer (who may also be the Health and Safety Officer) shall be designated for every site.

The Contractor's site specific project COVID-19 Officer shall submit a written daily report to the Owner's Representative. The COVID-19 Officer shall certify that the contractor and all subcontractors are in full compliance with these guidelines.

Any issue of non-compliance with these guidelines shall be a basis for the suspension of work. The contractor will be required to submit a corrective action plan detailing each issue of non-conformance and a plan to rectify the issue(s). The contractor will not be allowed to resume work until the plan is approved by the Owner. Any additional issues of non-conformance may be subject to action against the contractor's prequalification and certification status.

Limiting Exposures

Workers should follow the General On-the-Job Guidance to Prevent Exposure & Limit the Transmission of the Virus of the COVID-19 Employee Health, protection, guidance and prevention guide.

In addition, Contractors should advise workers of best practice to limit exposures off the construction site.

When leaving a construction site for breaks, lunch, or other reasons are required to wash hands with soap for at least 20 seconds or use an alcohol-based hand sanitizer with at least 60% ethanol or 70% isopropanol before leaving the site and must maintain social distancing and wear face coverings if traveling to other locations off the construction site. Frequent use of handwashing or alcohol-based

hand sanitizers should be encouraged and handwashing facilities and / or alcohol-based hand sanitizers should be made readily available at work sites.

C. Construction and Remodeling in 1-3 Family Residences

For construction and remodeling work in 1-3 family residential constructions, section B shall be modified as follows:

- The contractor does not need to designate a site-specific COVID-19 Officer (who may also be the Health and Safety Officer) for every site if there are 5 or less workers at the site at any given time. Instead, the contractor may designate a COVID-19 Officer for all such small sites in a given city or town who shall be in daily contact with each of the sites to ensure that the contractor and all subcontractors are in full compliance with this safety guidance. This COVID-19 safety officer shall prepare a written daily report covering all the small sites in each city or town and make a copy of that report available to a municipal official and / or the owner of the residence upon request
- If the project has restroom facilities / porta-potties they must be cleaned and handwashing stations must be provided with soap, hand sanitizer and paper towels. For outside construction sites without ready access to an indoor bathroom, the contractors must either install Wash Stations with hot water, if possible, and soap at fire hydrants or other water sources to be used for frequent handwashing for all onsite employees or provide each employee and subcontractor with a sufficient quantity of hand sanitizer to allow for frequent handwashing

D. Worker Infection Protocol

As stated above, there is a zero tolerance for sick workers reporting to work. Employees should be instructed that even those with mild symptoms of respiratory infection (cough, shortness of breath, sore throat) or fever should stay off work. Contractors shall take immediate steps to limit infections at the job site in the event that a worker discovered to have tested positive for COVID-19 or has COVID-19 related symptoms.

Although it is understood that contractors are enforcing Work Site Risk Prevention Practices including social distancing rules and use of PPE, consistent with guidelines it is also recognized that there may be occasions where someone who has tested positive for COVID-19 or who has COVID-19 symptoms has been present in a work area.

Prompt identification and isolation of potentially infectious individuals is a critical step in protecting workers, vendors, visitors, and others at a worksite.

Identification of Exposure

The Contractor shall direct workers with COVID-19 related symptoms to leave the jobsite immediately and contact their healthcare provider. The Massachusetts Department of Health (DPH) or a local board

of health will make appropriate notifications to those who had direct prolonged contact with the COVID-19 positive workers.

The Contractor shall work with the local board of health to identify any potential job site exposures, including:

- Other workers, vendors, inspectors, or visitors to the work site with close contact to the individual
- Work areas such as supply cabinets and designated work stations or rooms
- Work tools and equipment
- Common areas such as break rooms and tables, vending machines, and sanitary facilities

Notification and Quarantine Requirements

As provided by law, the identity of the worker must be kept confidential

Upon learning of an infection, the contractor must immediately notify the designated COVID-19 safety officer, the site safety officer, and the owner

Sanitation Requirements

After a worker with COVID-19 related symptoms has been asked to leave the job site, the contractor shall take immediate steps to sanitize common areas and direct work places. This includes all on-site bathrooms facilities, any break facilities, and any other common areas on the job site that may have been in close contact with the infected worker.

Sanitation will be conducted with personnel, equipment, and material approved for COVID-19 sanitization.

Identified areas should remain isolated from workers until sanitation process has been completed and area is deemed safe for use.

Returning to Work

All impacted workers should follow CDC and DPH recommended steps concerning return to work. Workers who are considered close contacts to a COVID-19 case by public health authorities should not return for 14 days and are subject quarantine by public health.

Workers who leave during the work day due to COVID-19 symptoms and develop COVID-19 as confirmed by laboratory testing or diagnosis by a healthcare provider shall not return to the site until either released from isolation by healthcare provider or public health official.

In All Cases

- Keep all employee names confidential as required by law

- Other employees may be sent home while a workspace is being cleaned but will return to work after cleaning unless advised otherwise by a health care provider
- Other employees should be asked to contact their health provider if they have any questions
- Remind other employees to continue to practice proper sanitation and monitor for flu like symptoms

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reference material, abbreviations, and terms used in the Construction Documents and establishes edition dates and complete titles for standards referenced elsewhere in the Specifications.

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Obtain copies of standards when required by Contract Documents.
- C. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.
- D. Should specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.03 SCHEDULE OF REFERENCES

AA	Aluminum Association 818 Connecticut Ave. N.W. Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AFBMA	Anti-Friction Bearing Manufacturers Association

AGC	Associated General Contractors of America 1956 E Street, N.W. Washington, DC 20006
AGM	American Gear Manufacturers Association
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16 th Street, N.W. Washington, DC 20036
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANS	American National Standard
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
API	American Petroleum Institute
ARI	Air-Conditioning and Refrigeration Institute 1501 Wilson Boulevard Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47 th Street New York, NY 10017
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329

ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASPA	American Sod Producers Association 4415 West Harrison Street Hillside, IL 60162
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWG	American or Brown and Sharpe Wire Gage
AWPA	American Wood-Preservers' Association 7735 Old Georgetown Road Bethesda, MD 20014
AWS	American Welding Society
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
BIA	Brick Institute of America 11490 Commerce Park Drive Reston, VA 22091
CS	Commercial Standard
EJCDC	Engineers' Joint Contract Document Committee American Consulting Engineers Council 1015 15 th Street, N.W. Washington, DC 20005
FM	Factory Mutual System 1151 Boston-Providence Turnpike PO Box 688 Norwood, Massachusetts 02062
Fed Spec.	Federal Specification General Services Administration Specification and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407

IBR	Institute of Boiler and Radiator Manufacturers
ICBO	International Conference of Building Officials 5360 S. Workman Mill Road Whittier, CA 90601
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
NASSCO	National Association of Sewer Service Companies 101 Wymore Road, Suite 521 Altamonte, FL 32714
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association PO Box 781 Herndon, VA 22070
NCPWB	National Certified Pipe Welding Bureau
NEMA	National Electrical Manufacturers' Association 2101 'L' Street, N.W. Washington, DC 20037
NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
NPT	National Pipe Thread
OS&Y	Outside screw and yoke
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077

SMACNA	Sheet Metal and Air Conditioning Contractors' National Assoc. 8224 Old Court House Road Vienna, VA 22180
Stl. WG	U.S. Steel Wire Washburn and Moen, American Steel and Wire or Roebling Gage
UL	Underwriters' Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062
USS Gage	United States Standard Gage
125-lb. ANS	American National Standard for Cast-Iron Pipe Flanges and Flange
250-lb. ANS	Fittings, Designation B16.1-1975, for the appropriate class

1.04 EDITION DATES

- A. Reference to publications and reference material shall be understood to mean the latest edition, unless stated otherwise.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

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SECTION 01200
PROJECT MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for project meetings.

1.02 PRECONSTRUCTION CONFERENCE

- A. The Engineer will schedule and administer a pre-construction conference.
- B. The pre-construction conference will be scheduled and administered within fourteen (14) calendar days after the dated "Notice to Proceed". The Contractor shall be prepared to address such topics as projected construction schedules, major personnel, critical work areas, construction facilities and shop drawing submittals.

1.03 PROGRESS MEETINGS

- A. The Engineer will schedule and administer progress meetings and specially called meetings throughout the duration of the Work at minimum monthly intervals.
- B. The time and location of such meetings shall be designated by the Engineer and shall be convenient for all parties involved.
- C. The Engineer will, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to participants, and those affected by decisions made.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for submission of schedules and shop drawings.

1.02 PROGRESS SCHEDULE

- A. Refer to Section 01310 Construction Progress Schedule for Critical Path Method (CPM) construction scheduling requirements.
- B. Special attention is directed to the requirement that the Contractor shall start the Work, as specified under this Contract, no later than thirty (30) calendar days after the execution of the Contract Documents, unless otherwise directed by the Owner. The Contractor shall comply with all pre-construction requirements as specified. The Owner reserves the right to delay the commencement of the Work or any part thereof if the specified requirements as determined by the Engineer have not been satisfied. The Owner further reserves the right to limit or, delay construction, or certain activities thereof, in certain areas of the Contract should the Owner deem it to be in the public's best interest and/or safety to do so.
- C. The Contractor shall contact the appropriate town or city authorities concerning any public or semi-public events that may occur during the construction period that may affect construction. The Contractor alone shall be responsible for arranging his construction sequence to conform to any restrictions these events may impose. No claims for extras will be allowed because of any delay, extra materials handling, extra excavation, etc. caused by the imposed restrictions. However, additional time may be granted for completion of the work to compensate for delays caused by said restrictions.

1.03 SHOP DRAWINGS

- A. Submit six (6) copies of all shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated especially for the Contract, and materials and equipment for which such drawings are specifically requested.
- B. A maximum of two (2) submittals of each shop drawing will be reviewed by the Engineer. If more submittals are required due to the Contractor's neglect or failure to fulfill the requirements of the Contract plans and specifications, or to make

corrections or modifications required by the Engineer in the review of the first two submittals, the Engineer will review the submittal and the Contractor will be responsible for the cost of the review, as determined by the Owner based on the Engineer's documentation of time and rates for additional services established in the Engineering Agreement between the Owner and the Engineer.

- C. If resubmittals on shop and working drawings are required, the Engineer will retain three (3) copies and three (3) copies will be returned to the Contractor. When resubmittals are returned to the Engineer, six copies of the complete submittal shall again be required.
- D. Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When the dimensions are of particular importance, or when specified, the drawings shall be certified by the manufacturer or fabricator as correct for the Contract.
- E. When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted in place of shop and working drawings.
- F. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings to eliminate delay to the Work due to the absence of such drawings. All shop and working drawings must be submitted to the Engineer within thirty (30) calendar days prior to incorporation into the Work, unless otherwise permitted by the Engineer. **Prior to the submittal of any shop drawings, the Contractor shall submit a schedule of proposed shop drawing transmittals.** The schedule shall identify the subject matter of each transmittal, the corresponding specification section number and the proposed date of submission. Prior to and during the progress of the Work the schedule shall be revised and resubmitted as requested by the Engineer.
- G. No material or equipment shall be purchased or fabricated for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- H. Until the necessary review has been made, the Contractor shall not proceed with any portion of the Work (such as the construction of foundations) for which review is required.
- I. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. All shop and working drawings shall be prepared on standard size, 24 inch by 36 inch sheets,

except those which are made by changing existing standard shop and working drawings. All drawings shall be clearly marked with the names of the Owner, Contractor, and building, equipment, or structure to which the drawing applies, and shall be suitable numbered. Submitted shop drawings shall be accompanied by a letter of transmittal, completed by the Contractor as approved by the Engineer.

- J. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer; other drawings shall be returned for correction.
- K. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in his letter of transmittal.
- L. The review of shop and working drawings by the Engineer will be general only, and nothing contained in this Section shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance as specified. The Contractor shall be responsible for errors and omissions in shop drawings.
- M. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires, appurtenances, or layouts etc., either existing or as detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do the work necessary to make such modifications.
- N. The Contractor shall furnish additional copies of shop drawings or catalog cuts when so requested.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

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SECTION 01310

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

1. Requirements for computer generated Critical Path Method (CPM) construction scheduling and Narrative progress report.
2. No portion of this specification shall take precedent over SECTION 00500-Contract Agreement.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01300-Submittals

1. Quality Assurance/Control Submittal
 - a. Name and version of CPM software proposed for use.
 - b. List of construction projects completed on which progress of work was controlled with CPM software.
2. Schedule
 - a. Within **14 days** following the execution of the Contract, the Contractor shall submit two color copies of a computer-generated schedule and a list of activities to the Engineer. Following review by the Engineer and Owner the Contractor shall meet with the Engineer and Owner to discuss the review. The Contractor shall incorporate the Engineer's comments into the schedule and submit eight color copies of the revised schedule within 14 days following receipt of the Engineer's comments.

PART 2 PRODUCTS

2.01 SOFTWARE

- A. Computer based scheduling software used by the Contractor shall be the product of a recognized commercial computer software producer and shall be capable of meeting the requirements specified herein.

PART 3 EXECUTION

3.01 PREPARATION

A. General

1. The Contractor shall prepare his proposed CPM schedule based on a breakdown of work tasks that he has developed.
2. The construction schedule and updates shall be prepared by the Contractor or the Contractor's qualified consultant.

B. Schedule

1. Each schedule shall be prefaced with the following summary data:
 - a. Contract name and number
 - b. Contractor's Name
 - c. Contract duration
 - d. The effective or starting date of the schedule
 - e. Revision date of the latest schedule.
2. The CPM schedule shall be sequenced by early start date and shall include the following minimum items:
 - a. Activity Name
 - b. Estimated duration
 - c. Activity description
 - d. Early start date (calendar date)
 - e. Early finish date (calendar date)
 - f. Latest allowable start date (calendar date)
 - g. Latest allowable finish date (calendar date)
 - h. Status (whether critical)
 - i. Estimated cost of the activity
 - j. Float (total and free)
 - k. Major milestones
3. Separate milestones shall be included for Notice-to-Proceed and Project Completion Date.
4. Activities shall include major components of the work including submittals that might impact the critical path, subcontractor work, major and critical equipment design, fabrication, testing, delivery and installation times, system/subsystem/component testing, process and facility startup, training, demobilization, project cleanup and closeout. Critical portions of process instrumentation and control system work, shall be defined in detail in a sub schedule.

5. The sum of the costs assigned to the activities shall be equal to the Contract price. Activity costs shall not be assigned to submittals or submittal reviews. Provide a table showing the anticipated monthly percentage of completion, based on the total contract price.
6. Critical activities, predecessors, free float and total float shall be clearly displayed on the schedule in graphical form. Schedules that contain activities showing negative float or that extend beyond the contract completion date will not be approved.
7. Each schedule submittal shall also include a list of activities in the order in which the activities will be performed, along with activity durations, activity predecessors, type of predecessor (finish-start, finish-finish, start-start, lead/lag), and any dependency or required date.
8. The schedule shall be based on a standard 5-day work week with allowance for holidays and adverse weather.
9. Engineer's approval of the CPM schedule is advisory only and shall not relieve the Contractor of responsibility for accomplishing the work prior to the contract completion date. Omissions and errors in the approved CPM schedule shall not excuse performance less than that required by the Contract. Approval by the Engineer in no way makes the Engineer an insurer of the CPM schedule's success or liable for time or cost overruns flowing from its shortcomings. The Owner hereby disclaims any obligation or liability by reason of approval by its agent, the Engineer, of the CPM schedule.

C. Narrative Progress Report

1. Include as a minimum:
 - a. Summary of work completed during the previous period (since submission of last narrative progress report).
 - b. Explanation for variations between actual work completed in previous period and planned work as reported in last period.
 - c. Summary of work planned during the next period.
 - d. Current and anticipated delaying factors and their estimated impacts on other activities and milestones, both critical and non-critical.
 - e. Corrective actions taken or proposed.
2. A Narrative Progress Report shall be submitted monthly to the Engineer, at least 5 working days prior to the progress meeting.
3. At the discretion of the Engineer, the Contractor may be required to submit a revised CPM schedule showing completion to date and any changes to the previous schedule.

3.02 MONITORING SCHEDULE

- A. The CPM approved construction schedule shall be used by the Contractor throughout the duration of the project for planning, organizing, and directing the Work, and for reporting progress of the Work
- B. The Contractor is solely responsible for monitoring schedule compliance. When a delay to the critical path occurs, the Contractor shall immediately notify the Engineer in writing. Within one week of the notification, the Contractor shall submit for the Engineer's approval, a description of proposed actions to return the project to schedule.

3.03 MODIFYING SCHEDULE

- A. If the Contractor desires to make changes in his method of operating which affect the approved CPM schedule, he shall notify the Engineer in writing stating what changes are proposed and the reason for the change. If the Engineer approves these changes, the Contractor shall revise and submit for approval, without additional cost to the Owner, all of the affected portions of the CPM schedule.
- B. It may be necessary for the contract schedule or completion time to be adjusted by the Owner to reflect the effects of job conditions, weather, technical difficulties, strikes, unavoidable delays on the part of the Owner or its representatives and other unforeseeable conditions which may indicate schedule adjustments or completion time extensions. Under such conditions, the Engineer will direct the Contractor to reschedule the work or contract completion time to reflect the changed conditions and the Contractor shall revise his schedule accordingly.
- C. Float time is a project resource available to both the Contractor and the Owner to meet contract milestones and completion dates. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited and use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to proportionate benefit of OWNER and CONTRACTOR.
- D. If the Contractor provides an accepted schedule with an early completion date, the Owner reserves the right to reduce the Time of Completion to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

END OF SECTION

SECTION 01381

AUDIO VIDEO RECORDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for color audio video recording of all existing roadway and right-of-way conditions.

1.02 REQUIREMENTS

A. Pre Construction recording

1. Furnish to the Engineer an original and one copy of a continuous color audio video recording. Take recording prior to any construction activity.
2. Recordings to be of sufficient detail to accurately and clearly show the existing, preconstruction conditions of this entire area of the Work. Each recording to include an audio description of the area being video recorded.
3. Coverage shall include, but not limited to, all existing roadways, sidewalks, curbs, driveways, buildings, structures, above ground utilities, landscaping, trees, signage and other physical features located within the zone of influence of the Work. The coverage may be expanded if directed by Engineer.
4. All recordings will be done during daylight hours. No recording shall be performed if weather is not acceptable, such as rain, fog, etc.

- B. The Engineer reserves the right to reject any recordings because of poor quality.

- C. Any recordings rejected by the Engineer shall be rerecorded at no additional cost.

1.03 SUBMITTALS

- A. Provide references of similar projects for review by the Engineer, include owner contacts and telephone numbers.

1.04 QUALITY CONTROL

- A. The recording shall be performed by a qualified, established audio video recording firm knowledgeable in construction practices and inspection procedures.

PART 2 PRODUCTS

2.01 AUDIO VIDEO MEDIA

- A. Recording media shall be Digital Video Disk (DVD), single layer (4.7 GB capacity), DVD+R or DVD-R format. Contractor to ensure that recording is capable of playback on both commercial DVD players and computer DVD-ROM drives.

PART 3 EXECUTION

3.01 AUDIO AND VIDEO RECORDING

- A. Each recording shall begin with the Owner's name, Contract name and number, Contractor's name, date and location information such as street name, direction of travel, viewing side, etc.
- B. Information appearing on the recording must be continuous and run simultaneously by computer generated transparent digital information. No editing or overlaying of information at a later date will be acceptable.
- C. Digital information will be as follows:
 - 1. Day, date and time
- D. Time must be accurate to within 1/10 of a second and continuously generated.
- E. Written documentation must coincide with the information on the recording so as to make easy retrieval of locations sought for a later date.
- F. The video system shall have the capability to transfer individual frames of video electronically into hard copy prints or photographic negatives or digital image files in commonly accepted image file formats (e.g. .jpg, .tif, .etc.).
- G. Audio shall be recorded at the same time as the video recording. Special commentary will be given for unusual conditions of buildings, sidewalks and curbing, foundations, trees and shrubbery, etc.
- H. All DVD's shall bare labels with the following information:
 - 1. DVD Number
 - 2. Owner's Name
 - 3. Date of Recording
 - 4. Project Name and Number
 - 5. Location and Standing Limit of recording

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Contractor's quality control of products, suppliers, manufacturers, services, site conditions, and workmanship, to produce Work of specified quality.

1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Comply fully with manufacturers' instructions, including each step in sequence.
- B. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. 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.
- D. Perform work by persons qualified to produce workmanship of specified quality.
- E. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.03 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified to be removed, clear area only after field sample has been accepted by the Engineer.

1.04 CERTIFIED WELDERS

- A. Structural welds shall be made only by operators who have been qualified by tests, as prescribed in the "Standard Qualification Procedure" of the American Welders Society, to perform the type of work required.

B. Pipe welds shall be made only by operators who have been qualified by the National Certified Pipe Welding Bureau and each operator's qualification record shall be submitted to the Engineer before any work is preformed.

C. Shop welding shall be in accordance with the "Code for Welding in Building Construction".

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Qualification, duties and responsibilities of testing laboratories.
2. Coordination and scheduling responsibilities of the Contractor.

B. Related Sections

1. Section 01600 - Materials and Equipment

1.02 PAYMENT PROCEDURES

A. Initial Testing

1. The Owner will pay for initial testing services required by the Engineer, unless otherwise included in a payment item as outlined in Section 01025.

B. Retesting

1. When initial tests indicate noncompliance with the Contract Documents, subsequent retesting occasioned by the noncompliance shall be performed by the same testing agency, and costs thereof will be deducted by the Owner from the Contract Sum.

C. Contractors Convenience Testing

1. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. E329, Agencies Engaged in Construction Inspection and/or Testing

1.04 REQUIREMENTS

A. Work included:

1. Cooperate with the Owner's selected testing agency and all others responsible or testing and inspecting the Work.
2. Provide other testing and inspecting as specified to be furnished by the Contractor in this Section and/or elsewhere in the Contract Documents.
3. Where no testing requirements are described, but the Owner directs testing, the Contractor shall provide testing under the requirements of this Specification.

B. Work not included:

1. Selection of testing laboratory: The Owner will select a qualified independent testing laboratory.

1.05 QUALITY ASSURANCE

A. Qualifications

1. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E329.

B. Regulatory requirements

1. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.
2. Regulatory Requirements Inspections and tests required by codes or ordinances, or by a plan approved authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01600 - Materials and Equipment.

- B. Promptly process and distribute, to the Engineer, required copies of test reports and instructions to assure necessary retesting and replacement of materials with the least possible delay in progress of the Work.

1.07 SCHEDULING

A. Establishing schedule

1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
2. Provide all required time within the construction schedule.
3. Coordinate testing activity with the appropriate testing laboratory.

B. Revising schedule

1. When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.

C. Adherence to schedule

1. When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Site Tests

1. Representatives of the testing laboratory shall have access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.
2. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

END OF SECTION

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SECTION 01510

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for temporary utilities required during construction.

1.02 GENERAL REQUIREMENTS

- A. The Contractor is responsible for payment of all costs associated with the installation and operation of all temporary utilities necessary for the completion of the work. The Temporary Utilities to be paid by the Contractor include but are not limited to the following: Electricity, Water, Sanitary, Heating, Ventilation, Plumbing and other services required to complete the work.

1.03 TEMPORARY WATER

- A. Temporary pipelines and connections from the permanent service lines, necessary for the use of the General Contractor and his Subcontractors shall be installed, protected, and maintained at the expense of the General Contractor.
- B. Provide an adequate supply of drinking water from an approved source of acceptable quality, satisfactorily cooled, for his employees and those of his Subcontractors.

1.04 TEMPORARY ELECTRICITY

- A. Provide electrical energy required for temporary lighting and power.
- B. Assume all costs necessary to provide a temporary, separately metered electric service for all construction.
- C. Temporary wiring of a special nature shall be paid for by the Contractor including but not limited to special circuits required by electric welders, elevators, lifts, pumps or other special equipment requiring high-amperage and/or special voltage service and exterior lighting circuits for protection against vandalism, public warning lights and lights for advertising, etc.
- D. The General Contractor and all Subcontractors, individually, shall furnish all extension cords, sockets, motors, and accessories required for their work. They shall also pay for all temporary wiring of construction offices and buildings used by them.
- E. Temporary wiring installed by the Electrical Subcontractor shall be removed after it has served its purpose.
- F. Electrical work to be done in accordance with applicable codes.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide adequate sanitary facilities for the use of those employed on the Work. Sanitary facilities shall be made available when the first employees arrive on the site of the Work, be properly secluded from public observation, and be maintained during the progress of the Work in suitable numbers.
- B. Maintain sanitary facilities in an orderly and sanitary condition at all times and enforce their use. Rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the Owner, or any adjacent property.

1.06 TEMPORARY HEATING

- A. Within 30 calendar days after the execution of this Contract, submit in writing to the Engineer for approval, three copies of method and time schedule for heating during construction which shall concur with his progress schedule submitted under Specification Section 01300.
- B. The installation and operation of heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection. Heating devices which may cause damage to finish surfaces shall not be used.
- C. After the permanent heating system has been installed, tested, and made ready for operation, the Contractor may, at his own risk and expense, use it for providing heat for protection of the Work. He shall provide and pay for all fuel and care necessary, and, when the Work is ready for acceptance, he shall, at his own expense, put the system into first-class condition, even to the extend of replacing worn or damaged parts as directed.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for cleaning, maintenance of the site, barriers and fences required during construction.

1.02 CLEANING DURING CONSTRUCTION

- A. Unless otherwise specified under the various trade Sections of the Specifications, the General Contractor shall perform clean-up operations during construction as herein specified.
 - 1. Control accumulation of waste materials and rubbish; periodically dispose of off-site. Bear all costs, including fees resulting from disposal.
 - 2. Clean interior areas prior to start finish work and maintain areas free of dust and other contaminants during finishing operations.
 - 3. Maintain project in accordance with all local, State and Federal Regulatory Requirements.
 - 4. Store volatile wastes in covered metal containers, and remove from premises.
 - 5. Prevent accumulation of wastes that create hazardous conditions.
 - 6. Provide adequate ventilation during use of volatile or noxious substances
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.
 - 4. Use only those materials which will not create hazards to health or property and which will not damage surfaces.
 - 5. Use only those cleaning materials and methods recommended by manufacturer of surface material to be cleaned.
 - 6. Execute cleaning to ensure that the buildings, the sites, and adjacent properties are maintained free from accumulations of waste materials and rubbish and wind blown debris, resulting from construction operations.

7. Provide on-site containers for collection of waste materials, debris, and rubbish.
8. Remove waste materials, debris, and rubbish from the site periodically and dispose of at legal disposal areas off the construction site.
9. Handle material in a controlled manner with as little handling as possible. Do not drop or throw materials from heights.
10. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not damage surrounding surfaces.
11. During its progress, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
12. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc. shall, upon completion of the work, be left in a clean and neat condition.

1.03 DUST CONTROL

- A. Provide adequate means for the purpose of preventing dust caused by construction operations throughout the period of the construction contract.
- B. This provision does not supersede any specific requirements for methods of construction or applicable general conditions or performance obligations of the General Contractor.

1.04 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts for clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.05 NOISE CONTROL

- A. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.
- B. Execute construction work by methods and by use of equipment which will reduce excess noise.
 - 1. Equip air compressors with Silencers, and power equipment with mufflers.
 - 2. Manage vehicular traffic and scheduling to reduce noise.

1.06 POLLUTION CONTROL

- A. Special care shall be taken to prevent contamination or muddying up or interfering in any way with the stream flows, if any along the line of work. No waste matter of any kind will be allowed to discharge into the stream flows or impounded water of any pools or other bodies of water.

1.07 SURFACE WATER CONTROL

- A. Take all precautions to prevent damage to the work or equipment by high waters or by storms. The Engineer with the approval of the Owner may prohibit the carrying out of any work at any time when in his judgement, high water or storm conditions are unfavorable or not suitable, or at any time, regardless of the weather, when proper precautions are not being taken to safeguard previously constructed work or work in progress.
- B. In case of damage caused by the failure of the Contractor to take adequate precautions, the Contractor shall repair or replace equipment damaged and shall make such repairs or rebuild such parts of the damaged work, as the Engineer may require, at no additional expense to the Owner.

1.08 BARRIERS AND ENCLOSURES

- A. Fences and Barricades
 - 1. Provide and maintain temporary fences, barriers, lights, guardrails, and barricades as indicated in the Contract Documents, or as necessary to secure the Work and adjacent property, and protect persons and property.
 - 2. Obtain necessary approvals and permits and provide temporary expedients as necessary to accommodate tasks requiring items mentioned herein.
- B. Protection of Trees

1. The Contractor shall take care not to harm trees along the sides of roads or within the existing facility in which the construction work is to be done or trees on adjacent lands except as indicated on the drawings or with the written permission of the Owner and any other owner of the trees involved. Care shall be taken not to cut tree roots so as to harm the growth of trees to remain.
2. If, in the opinion of the Engineer, any trees damaged during construction can be repaired, the Contractor shall satisfactorily repair same at no further cost to the Owner.
3. If, in the opinion of the Engineer, any tree damaged during construction cannot be repaired and should be removed, the Contractor shall satisfactorily remove and replace, in kind, same at no further cost to the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01570
TRAFFIC REGULATIONS
(MASSACHUSETTS)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for traffic control for the duration of the Contract.

1.02 REFERENCES

- A. Manual of Uniform Traffic Control devices (MUTCD) 1988 Edition including all latest revisions.

1.03 PERFORMANCE REQUIREMENTS

- A. Contractor shall have the sole responsibility for the maintenance and protection of traffic.
- B. An authorized representative of the Contractor shall be available on a 24-hour basis for the duration of the Contract for the purpose of correcting construction related impediments or hazards.

1.04 SHOP DRAWINGS

- A. In accordance with SECTION 01300 – SUBMITTALS, submit a traffic plan delineating requirements of this section, the Contract Drawings, and the **Town of Wareham, MA**.
- B. Traffic control plans shall detail all typical work zones and detours.

1.05 SITE CONDITIONS

- A. Replace at no cost to the Owner pavement markings, legends and lane arrows removed or damaged by the construction operation.
- B. Restore temporary detours to original condition.
- C. Replace traffic signal loops damaged during construction within 72 hours.

1.06 SCHEDULING

- A. There shall be no time limitations on construction operations except those hours and locations where noise regulations may apply, as required for the maintenance of traffic as required by the **Town of Wareham, MA**, or as otherwise restricted in the Contract Documents.
- B. Keep closing of travel lanes to a minimum.
- C. Notify city departments 48 hours prior to construction operations on travel ways.
 - A. Police Department (508-295-1212)
 - B. Fire Department (508-295-2973)
 - C. Sewer Department (508-295-6144)

PART 2 PRODUCTS

2.01 TRAFFIC CONTROL DEVICES

- A. In accordance with the MUTCD.

PART 3 EXECUTION

3.01 INSTALLATION OF TRAFFIC CONTROL DEVICES

- A. In accordance with the MUTCD.

3.02 PROTECTION OF TRAFFIC

- A. Barricade trenches and roadway excavations at the end of each work period with temporary precast concrete barriers, properly lighted and marked to guide traffic to designated travel lane. Or other means acceptable to the Engineer and approved on the Traffic Plan.
- B. Maintain and protect traffic movements for the entire length of the project.
- C. Keep one lane of traffic open at all times except for brief stoppages dictated by the construction operation involving safety of vehicles in the travel lanes.
- D. Maintain access to business and private ways during construction operations.
- E. Furnish sufficient number of signs, temporary precast concrete barriers, warning lights, drums and traffic cones to warn traffic of construction and guide traffic through the construction area in accordance with the MUTCD.

3.03 TRAFFICMEN

- A. Provide service of uniformed trafficmen as required to complete construction as required by the Owner.

END OF SECTION

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SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for delivery, storage, handling and installation of systems, materials, manufactured units, equipment, components, and accessories used in the work.

B. Related Sections

1. Section 01300 - Submittals

1.02 DELIVERY

- A. Refer to Specifications' Sections for requirements pertaining to delivery and handling of materials and equipment.
- B. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturers' unopened containers or packaging, dry.
- C. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- D. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct, and products are undamaged.

1.03 STORAGE AND PROTECTION

- A. Refer to Specifications' Sections for requirements pertaining to storage and protection of materials and equipment.
- B. Store products in accordance with manufacturers' instruction, with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity ranges required by manufacturers' instructions.
- C. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

- D. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- E. Arrange storage to provide access for inspection. Periodically inspect to assure that products are undamaged, and are maintained under required conditions.

1.04 INSTALLATION STANDARDS

- A. Comply with Specifications and referenced standards as minimum requirements.
- B. Components required to be supplied in quantity within a Specification Section shall be the same, and shall be interchangeable.
- C. Do not use materials and equipment removed from existing structures, except as specifically required, or allowed, by the Contract Documents.
- D. Perform work by persons qualified to produce workmanship of specified quality.
- E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- F. When work is specified to comply with manufacturers' instructions, submit copies as specified in Section 01300 - Submittals, distribute copies to persons involved, and maintain one set in field office.
- G. Perform work in accordance with details of instructions and specified requirements.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01700

CONTRACT CLOSE-OUT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for specific administrative procedures, record keeping, close-out submittals, and forms used at substantial and final completion of the Work.
- B. Contractor shall satisfy all administrative requirements within the Contract Documents and the Requirements listed in this section prior to Contract Close-out.

1.02 FINAL CLEANING

- A. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- B. The Contractor shall restore or replace, when and as directed, any public or private property damage by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end, the Contractor shall do as required, all necessary highway or driveway, walk and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.
- C. Unless otherwise specified under the various Sections of the Specifications, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.
- D. At completion of work, remove waste materials, rubbish tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.
- E. Cleaning shall include all surfaces, interior and exterior in which the Contractor and all Subcontractors have had access whether existing or new.

- F. Refer to Sections of the Specifications for cleaning of specific products or work.
- G. Use only those materials which will not create hazards to health or property and which will not damage surfaces.
- H. Use only those cleaning materials and methods that are recommended by the manufacturer of surfaces material to be cleaned.
- I. Employ experienced workmen, or professional cleaners, for final cleaning operations.

1.03 PROJECT RECORD DOCUMENTS

- A. Project Record Documents also referred here as As-Built Drawings shall consist of all the contract drawings.
- B. The Contractor and all Subcontractors shall be required to maintain one set of As-Built Drawings, as the work relates to their Sections of the Specifications, at the site.
- C. As-Built Drawings shall be stored and maintained in the General Contractor's field office apart from other documents used for construction. The As-Built Drawings shall be maintained in a clean, dry, and legible condition and shall not be used for construction purposes.
- D. As-Built Drawings shall be available at all time for inspection by the Engineer. All deficiencies noted shall be promptly corrected.
- E. At the end of each month and before payment for materials installed, the Contractor, and his Subcontractors, shall review As-Built Drawings for purpose of payment. If the changes in location of all installed elements are not shown on the as-built drawings and verified in the field, then the material shall not be considered as installed and payment will be withheld.
- F. At the completion of the contract, each Subcontractor shall submit to the Contractor a complete set of his respective As-Built Drawings indicating all changes. After checking the above drawings, the Contractor shall certify in writing on the title sheet of the drawings that they are complete and correct and shall submit the As-Built Drawings to the Engineer.

1.04 FINAL INSPECTION

- A. The Contractor shall submit written certification that:
 - 1. Project has been inspected for compliance with Contract Documents.

2. Equipment and systems have been tested in the presence of the manufacturer's representative and are operational and satisfactory.
3. Project is completed, and ready for final inspection.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01740

WARRANTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

1.02 SUBMITTAL

- A. Submit written warranties to the Owner prior to the date fixed by the Engineer for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than a date of Substantial Completion for the Work, or a designed portion of the Work, submit written warranties upon request of the Owner.
- B. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Owner prior to acceptance of this portion of the Work.
- C. Refer to individual Sections of Division 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

1.03 WARRANTY REQUIREMENT

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.

- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.04 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01800

MAINTENANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for maintaining work completed under this Contract.

1.02 MAINTENANCE PERIOD

- A. The general maintenance period for all construction or materials under this Contract shall be one (1) year subsequent to the date of the acceptance of the work by the Owner, or as provided by other sections of this Specification.
- B. If the Owner puts any structure or equipment to use prior to acceptance of all work under the Contract, the maintenance period for such structures or equipment shall be calculated from the time use begins.
- C. Contractor agrees to replace the material which does not conform to the Contract requirements, and to repair any damage of material or work without cost to the Owner, to satisfaction of Engineer, in conformance with Contract Documents provided orders for replacement and/or repairs are received in writing by the Contractor within the one-year period.
- D. This Section shall in no way limit the duration of the Contractor's responsibility for the correction of any defect due to workmanship or materials provided by the Contractor which are not in compliance with the Contract Documents.

1.03 ABUSE OF WORK

- A. Contractor is not obligated to perform work of replacement or repair that he may prove is required because of abuse by parties other than the Contractor, after the date the Owner puts to continuous use the work requiring replacements or repair, or after date the Owner has approved the Certificate of Completion.

1.04 EMERGENCY REPAIRS

- A. If the Owner deems necessary, the Owner shall order replacement or repairs be undertaken within 24 hours.
- B. If the Contractor delays or fails to make the ordered replacement or repairs within the time specified, the Owner shall have the right to make such replacements or repairs

and the expense shall be deducted from moneys due the Contractor, or moneys of the Contractor retained by the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

DIVISION 2

SECTION 02076

REMOVE AND DISPOSE ASBESTOS CEMENT PIPE (MA)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements to remove and dispose of buried asbestos cement pipe.

1.02 REFERENCES

- A. Massachusetts Department of Environmental Protection (MassDEP),
 - 1. Asbestos Cement Pipe Guidance Document and Conditional Enforcement Discretion, dated June 2011, amended May 22, 2015.
 - 2. Asbestos regulation, 310 CMR 7.15, Removal and Disposal of Asbestos.
 - 3. Asbestos regulation, 310 CMR 19.061, Special Waste Disposal Requirements.
- B. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926.
- C. Massachusetts Department of Labor Standards (DLS) regulation 453 CMR 6.00.

1.03 SUBMITTALS

- A. In accordance with section 01300, submit the following,
 - 1. Detailed plans and descriptions outlining the asbestos abatement procedures to be followed.
 - 2. Copies of training certificates for all personnel involved in the removing of asbestos cement pipe.
 - 3. Copy of current license of the asbestos abatement contractor if utilized.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Remove and dispose of underground asbestos pipe in accordance with the requirements of MassDEP, Asbestos Cement Pipe Guidance Document and Conditional Enforcement Discretion, dated June 2011, amended May 22, 2015.
- B. Qualifications
 - 1. Asbestos contractors engaged in or performing removal, enclosure or encapsulation of asbestos or asbestos containing material including damaged asbestos pipe, must be trained, certified and licensed in accordance with Massachusetts Department of Labor Standards regulation 453 CMR 6.00, or;

2. In lieu of hiring a DLS-licensed asbestos contractor, the owner or operator conducting asbestos abatement activity on underground asbestos cement piping may hire contractors or other entities who have completed the “8 Hour OSHA Class II Asbestos Training: Asbestos Cement Pipe (ACP) Worker Safety” course developed jointly by the Massachusetts Water Works Association (MWWA) and Utility Contractors Association of New England (UCANE), or a course similar in length and content reviewed and approved in writing by DLS, provided that owner, operator and contractor comply with the provisions and procedures that are described in the “Asbestos Cement Pipe Guidance Document and Conditional Enforcement Discretion, dated June 2011, amended May 22, 2015.

PART 2 PRODUCTS

2.01 MATERIAL AND EQUIPMENT

- A. Any required equipment, such as; overalls, gloves, air respirator and etc. for persons involved in the handling of the asbestos cement material must meet the OSHA standard 29 CFR 1926.
- B. Material such as polyethylene sheeting, labels and duct tape must meet the OSHA standard 29 CFR 1926.

2.02 PERSONNEL PROTECTION

- A. The Contractor is responsible to determine what personnel protection equipment is needed.
 1. The MassDEP suggests employees engaged in work involving intact asbestos pipe be provided with medical monitoring and personal protective equipment as specified in the OSHA standard 29 CFR Part 1926.1101.
- B. The Contractor is required to provide all required personnel protective equipment.

PART 3 EXECUTION

3.01 GENERAL

- A. Keep the Engineer advised at all times of any changes made to the overall operation(s) to accommodate field conditions.
- B. No work shall begin until all provisions and requirements of this Specification have been met by the Contractor and approved by the Engineer.
- C. The Engineer reserves the right to limit and/or otherwise restrict the Contractors overall activities and/or operations at any time without claim should the Engineer deem it to be in the Owners best interest to do so.

3.02 PREPARATION

- A. Notification

1. Submit an Asbestos Notification Form ANF-001/BWP AQ-04 to MassDEP at least ten (10) working days prior to commencement of asbestos cement pipe removal.
Or:
 2. Call regional MassDEP office to obtain an emergency waiver of the ten (10) working day notification period.
 - a. Contractor is responsible for all notification fees.
 - b. Provide copy of completed notification form to the Engineer.
- B. The Contractor is responsible to notify the workers and others in the area of the type of work being conducted and the regulations associated with the project.

3.03 REMOVAL AND DISPOSAL PROCEDURES

- A. Expose the asbestos cement pipe without disturbing the pipe. Excavate the trench to within 6-inches of the pipe. Carefully uncover the pipe by hand or hand shovel. Assess the condition of the pipe.
1. Pipe which is not damaged (intact and not deteriorated):
 - a. Place 6 mil (0.006 inch) thick polyethylene sheeting under the asbestos cement pipe to prevent soil contamination.
 - b. Adequately wet the asbestos cement pipe with amended water using surfactant or liquid soap before and during removal to avoid creating airborne dust.
 - c. Separate the asbestos cement pipe at the nearest coupling (bell or compression fitting).
 - d. Slide the pipe apart at the joints (no saw cutting) or use other methods that do not cause the pipe to break, become friable or otherwise create the potential to release asbestos fibers.
 - e. Wrap the wet asbestos cement pipe in two (2) layers of 6 mil polyethylene sheeting, seal with duct tape and label in accordance with all applicable regulatory requirements. This can be done in the trench or adjacent to the trench.
 - f. If the trench is filled with water, the placement of polyethylene sheeting is not required.
 2. Pipe which is damaged, deteriorated, not intact or to be saw cut, broken or tapped for service connection:
 - a. Place 6 mil (0.006 inch) thick polyethylene sheeting under the asbestos cement pipe to prevent soil contamination.
 - b. Adequately wet the asbestos cement pipe with amended water using surfactant or liquid soap where cutting or breaking will occur.
 - c. Saw cutting of asbestos cement pipe shall only be conducted with a HEPA shrouded vacuum attachment or wet cutting equipment, unless it is conducted within a small enclosure that isolates the area in which the saw cutting is being conducted to prevent the release of asbestos fibers to ambient air.
 - d. Wrap the wet asbestos cement pipe in two (2) layers of 6 mil polyethylene sheeting, seal with duct tape and label. This can be done in the trench or adjacent to the trench.
 - e. Manage wet asbestos cement pipe, polyethylene sheeting and any other material contaminated with visible asbestos debris as Asbestos Contaminated Waste Material (ACWM) in accordance with MassDEP regulation 310 CMR 7.15 and 310 CMR 19.061.

- B. Packaging, labeling, transportation, storage, disposal of all asbestos containing waste material (ACWM) shall be in accordance with MassDEP regulation 310 CMR 7.15.
 - 1. Packaging in accordance with 310 CMR 7.15(16),
 - 2. Transportation in accordance with 310 CMR 7.15(17),
 - 3. Storage and disposal in accordance with 310 CMR 7.15(18),
- C. Waste Shipment Records and reports in accordance with 310 CMR 19.061,
- D. Special Waste including but not limited to the following:
 - 1. Place properly wrapped and labeled ACWM pipe as well as all other containerized ACWM and debris in a roll-off container(s), or covered trucks, trailers or vans that are lined with 2 layers of 6 mil polyethylene sheeting.
 - a. The container shall be an enclosed and sealed leak-tight container having proper labels and Department of Transportation (DOT) placards as required.
 - b. If open top roll-off containers are used, they must be properly sealed, labeled and secured inside a locked fenced area when they are not being loaded to prevent access by unauthorized personnel and covered to prevent water accumulation.
 - 2. Package, transport and dispose of ACWM to be in accordance with local, state and federal regulations.
 - 3. Complete waste shipment records must be provided to the Engineer and also retained for two (2) years by the owner/operator of the facility that generated the ACWM.
 - 4. Dispose of ACWM at landfill permitted/licensed to accept the material.
 - 5. Provide a copy of the permit/license to the Engineer. Said permit/license must be valid at the time of disposal in the selected landfill.
 - 6. The Contractor shall coordinate with the authorities in charge of the landfill for specific details on acceptability of the disposal of the asbestos-cement material.
 - 7. The Contractor shall pay all fees associated with the disposal of asbestos at a landfill which accept asbestos waste products.
- E. Post Abatement Visual Inspection
 - 1. Inspection to be performed by a qualified person.
 - a. To be considered qualified; the person must meet the qualifications of Article 1.04, B, 1 or 2 of this specification.
 - 2. The qualified person must;
 - a. Be present to conduct the visual inspection of the work area prior to backfilling the trench.
 - b. Document in writing (using Template B, included in the Asbestos Cement Pipe Guidance Document) that there was no visible debris remaining in the excavation, in soil excavated from the trench, in the surrounding area adjacent to the trench, and on any tools used during the removal and disposal operation and all ACWM has been removed for proper storage/disposal.
 - c. Sign and date the documentation of the final inspection.

3. Provide all documentation to the Engineer/Owner.

END OF SECTION

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SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for removal of vegetation and topsoil at the site.

1.02 DEFINITIONS

- A. Clearing: Removal of trash, vegetation, or organic matter alive or dead.
- B. Grubbing: Removal of vegetation including stumps, buried logs and roots.
- C. Scalping: Removal of grass turf to a depth of 3 inches.
- D. Stripping: Removal of topsoil after scalping operation is complete.

1.03 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked work limits prior to starting the clearing, grubbing, and stripping.

1.04 PROJECT/SITE CONDITIONS

- A. Environmental Requirements
 - 1. Install erosion and sediment controls prior to starting the Work.
- B. Existing Conditions
 - 1. Temporarily remove property improvements, to the minimum extent necessary, to complete the work and restore improvements to condition which existed prior to construction.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Chips from cleared trees and brush.

PART 3 EXECUTION

3.01 PROTECTION

- A. Do not cut or injure any trees or other vegetation outside the limits of disturbance and/or the Town Right of Way, as indicated on the drawings.
- B. Trees, shrubbery, or planting, along the traveled highways or roads, shall not be removed except with the written approval of the Engineer.
- C. Preserve certain vegetation such as trees, shrubs, hedges and plants within the construction area, as indicated on the drawings to be protected.
- D. Easement Clearing
 - 1. The Engineer shall designate trees to be removed within easement lines.
- E. Work In Improved Property
 - 1. Protect trees, cultivated hedges, lawns, shrubs, and plants that might be damaged by the Contractor's operations.
 - 2. Temporarily replant and care for trees less than 4 inches in diameter that would be damaged by the construction operation. After the construction operations have been substantially completed, replant in their original positions and care for until growth is reestablished. If trees, cultivated hedges, lawns, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced at the Contractor's expense by items of kind and quality existing at the start of the work.
 - 3. Do such handwork as may be required to prevent damage to buildings and improvements.
 - 4. Protect fences and stone walls and if needed to be removed to facilitate construction or if damaged, upon completion of the work, properly restore or repair to at least as good condition as existed prior to start of the work.

3.02 CLEARING

- A. Cut or remove all trees, saplings, brush, and vines, windfalls, logs, and trees lying on the ground, dead trees and stumps more than 1 foot high above the ground surface.
- B. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and the stumps to be cleared shall be cut as close to the ground surface as practicable, but no more than 6-inches above the ground surface in the case of small trees, and 12-inches in the case of larger trees. Saplings, brush, and vines shall be cut off close to the ground.
- C. Selective Trimming
 - 1. Cut back limbs and branches of trees to be preserved only to the extent necessary for construction.
 - 2. Trim neatly, and cleanly so that the remaining tree will not be damaged and healing will be facilitated. Where limbs and branches over 1 inch in diameter have been cut, the newly cut area of the tree shall be given a thorough application of approved tree-healing paint.

D. Salvaged Wood

1. Logs, timber and other wood removed in the course of clearing found to be acceptable, as determined solely by the Engineer, shall remain the property of the applicable private property owner or the Owner, unless otherwise directed by the Engineer.
2. Cut logs, timber and other wood in 4 foot lengths and stack, as directed by the Engineer.
3. Prior to the final completion of the contract, all unclaimed logs, timber and other wood previously cut and stacked shall be removed from the site and properly disposed of by the Contractor at no additional cost to the Owner.

E. Chips from Cleared Wood and Brush

1. Stockpile for future use on cleared easements as indicated on the Drawings.
2. Spread at locations shown on the drawings once work is substantially complete.
3. If the wood chips from the cleared wood are not of sufficient amount, the Contractor at his own expense shall furnish the required amount to provide a minimum thickness as shown on the Contract Drawings.
4. Elm wood and elm bark shall not be used as chips for ground cover.

3.03 GRUBBING

- A. Remove completely all stumps.
- B. Remove to a depth of 12-inches all roots larger than 3-inches in diameter.
- C. Remove to a depth of 6-inches all roots larger than 1/2-inches in diameter.
- D. Measure depths from the existing ground surface or the proposed finished grade, whichever is the lower.

3.04 STRIPPING

- A. Strip topsoil, loam and unsuitable earth from the ground surface in areas cleared and grubbed.
- B. Utilize topsoil and loam, where possible, for finished surfacing.
- C. All loam to remain on site.
- D. Dispose of unsuitable materials off site at authorized disposal location.

3.05 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

- A. Dispose of cleared and grubbed materials off site at authorized disposal location.
- B. Such disposal shall be carried on as promptly as possible after removal of material in the clearing and grubbing operations and shall not be left until the final period of cleaning up.

- C. Elm bark whether stripped from the wood or intact with the wood shall be either buried at least 1 ft. below grade in approved dumping areas or burned in a suitable incinerator off-site with satisfactory anti pollution and fire prevention controls to prevent the spread of Dutch Elm Disease.

END OF SECTION

SECTION 02140

DEWATERING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for designing, furnishing, installing, maintaining, operating and removal of temporary dewatering systems required to lower and control water levels and hydrostatic pressures during construction.
2. Requirements for disposing of pumped water.

B. Related Sections

1. Section 01300 – Submittals
2. Section 02200 – Earth Excavation, Backfill, Fill and Grading
3. Section 02160 – Excavation Support

1.02 DEFINITIONS

- A. Dewatering: Lowering the zone of saturation and intercepting groundwater seepage which would otherwise emerge from the slopes or bottom of the excavations. The purposes of dewatering are to increase the stability of excavated slopes; prevent loss of material from beneath the slopes or bottom of the excavation; improve the excavating and hauling characteristics of on-site soil; prevent rupture or heaving of the bottom of an excavation; and dispose of pumped water. In addition, dewatering is required to place and compact structural fill.

1.03 DESIGN REQUIREMENTS

- A. The Contractor is responsible for the adequacy of the dewatering system.
- B. Design dewatering systems to:
1. Effectively reduce the hydrostatic pressure and lower the groundwater levels to a minimum of 2 feet below excavation in soil;
 2. Develop a substantially dry and stable subgrade for the protection of subsequent operations;
 3. Result in no damage to adjacent buildings, structures, utilities and other work, included in this contract.

4. Depressurize stratified layers of sand that may be confined by silt layers so that a stable excavation bottom is maintained.
- C. Methods may include sump pumping, single or multiple stage well point or jet eductor well point systems, deep wells, or combinations thereof.
- D. Locate dewatering facilities where they will not interfere with existing utilities, facilities and/or construction work to be done under this Contract.
- E. The Contractor shall be responsible for obtaining all necessary permits from the State and local authorities regarding the operation and discharge of the dewatering system, including but not limited to the Massachusetts Water Resources Authority Construction Site Dewatering Discharge Permit, and to conduct all necessary sampling and testing that may be required by those authorities at no additional cost to the Owner.

1.04 SUBMITTALS

A. Shop Drawings

1. In accordance with Section 01300 submit the following prior to dewatering system installation:
 - a. Proposed system components.
 - b. Operational plan to include locations and depth of components.
 - c. Method of disposal of pumped water, including method of insuring proper sediment removal should upset in dewatering system occur.

B. Quality Assurance/Control Submittals

1. In accordance with Section 01300 submit the following:
 - a. Dewatering systems to be designed under the direct supervision of a professional Civil Engineer registered in the state which the work is to be done.
 - b. Complete Certificate of Design at the end of this section.
 - c. Provide documentation demonstrating ability and experience of installing contractor for the type of conditions under this contract.
 - d. Names, addresses and telephone numbers of supervisory personnel actively involved in at least five successful projects requiring dewatering.

1.05 PROJECT/SITE CONDITIONS

A. Environmental Requirements

1. Dispose of all pumped water in accordance with all U.S. Environmental Protection Agency, Massachusetts Department of Environmental Protection (MassDEP), and Town of Wareham requirements.

B. Existing Conditions

1. Soil borings have not been advanced as part of this contract.
2. Groundwater measurements have not been taken for this contract.
3. Groundwater surface is subject to fluctuations during periods of heavy precipitation.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Surface Drainage

1. Construct dikes, ditches, pipelines, sumps or other means to intercept and divert precipitation and surface water away from excavations.

B. Drainage of Excavated Areas

1. Construct dikes, ditches, pipelines, sumps or other means to collect surface and seepage water which may enter the excavation.
2. Discharge water through settling basins or method approved by Engineer when water is to be deposited into an existing watercourse.

3.02 INSTALLATION

- A. Advise Engineer of changes made to Operation Plan as submitted under article 1.04 of this section, made to accommodate field conditions.

3.03 MONITORING

- A. Observe and record daily the elevation of the groundwater during the length of the dewatering operation and provide data to Engineer on daily basis.

3.04 OPERATION

- A. Operate dewatering systems to lower the groundwater level in excavations allowing all subsequent work to be done on a stable dry subgrade.
- B. Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities, to prevent further damage. Modifications made at no additional expense to the Owner.

- C. Maintain the water level a minimum of two (2) feet below subgrade or at lower elevation to eliminate hydrostatic pressure on structures.
- D. Prevent disturbance of foundation soils and loss of ground as water is removed.
- E. Notify the Engineer of disturbance to the foundation soils caused by an interruption or inadequacy of the dewatering system.
- F. Maintain on site, auxiliary equipment to operate the dewatering system continuously while excavations are opened below elevation of final grade.

3.05 TREATMENT OF WATER

- A. Provide treatment methods to meet or exceed the standards set forth in the Discharge Permit and all applicable local, state, and federal discharge standards.

3.06 DISPOSAL OF WATER

- A. Discharge water in a manner that will not cause erosion, flooding, damage to existing facilities, completed Work or adjacent property, improved or otherwise.

3.07 REMOVAL

- A. Remove all material and equipment from the site upon completion of dewatering operations.
- B. Seal all dewatering wells upon completion of the dewatering by pressure injecting a grout capable of sealing the wells and preventing leakage.

END OF SECTION

CERTIFICATE OF DESIGN

Re: Contract Between

OWNER: _____
(Name)

and
CONTRACTOR: _____
(Name)

on
CONTRACT: _____
(Title)

_____ Dated: _____
(Number)

Contractor hereby certifies that _____
(Designer)

1. Is licensed or registered to perform professional engineering work in the state of _____
(Location of Project)
2. Is qualified to design the _____ (Item)
specified in Section _____ of the subject contract;
3. Has designed _____ before;
4. Has prepared the design in full compliance with the applications and requirements of
Section _____ of subject contract including all applicable laws, regulations, rules and
codes; and
5. The work has been signed and sealed pursuant to the applicable state law.

FOR: _____
(Contractor)

BY: _____
(Signature)

_____ Dated: _____
(Name and Title)

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SECTION 02149

MAINTAINING EXISTING FLOW

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements to maintain existing flow and implement and complete all flow diversions and/or bypass pumping required to complete all Work.

1.02 PERFORMANCE REQUIREMENTS

- A. It is essential to the operation of the existing sewerage system that there be no interruption of the wastewater flow throughout the duration of this project. An interruption shall be considered, but may not be limited to, any condition that in the sole opinion of the Engineer adversely affects or alters operation of the existing sewerage system and/or any other portion or component of the existing collection system including the associated flows; allows the level of sewage flow to increase, rise, collect, surcharge and/or overflow existing facilities in any manner; or results in any operational or permit violations being issued to the Owner.
- B. The Contractor shall provide, maintain, and operate temporary facilities such as dams, bulkheads, pumping equipment (both primary and backup units as required) conduits, electrical power, and all other labor and equipment to intercept and maintain the existing sewage flow before it reaches the point where it would interfere with his work, carry it past his work, and return it to the existing facilities beyond his work.
- C. The Engineer may prohibit the carrying out of any work at any time when in his sole judgment, increased flow conditions are unfavorable or not suitable, or at any time, regardless of the existing flows, when proper precautions are not being taken to safeguard the existing sewerage system, previously constructed work, work in progress and/or the general public.
- D. In case of damage caused by the failure of the Contractor to take adequate precautions, the Contractor shall repair or replace equipment damaged and shall make such repairs or rebuild such parts of the damaged work, as the Owner may require, at no additional expense to the Owner.

1.03 SUBMITTALS

- A. In accordance with SECTION 01300 submit the following:
 - 1. Detailed plans and descriptions outlining all provisions and precautions to be taken regarding the control and handling of existing sewage flows.

2. Include such items as schedules, locations, elevations, capacities of equipment, materials, traffic maintenance plans, and all other incidental items necessary and/or required by the Owner to insure proper protection of the facilities and compliance with the requirements herein specified.
 3. Qualifications as described herein.
 4. Detailed proposal for noise prevention measures for review of at least thirty (30) consecutive calendar days prior to anticipated usage.
 5. Shop drawings for all pumping, piping, and appurtenances for type and size of equipment required to perform the flow diversion and/or bypass pumping work as required herein.
- B. The Engineer reserves the right to limit and/or otherwise restrict the Contractor's overall proposal and/or operations without claim should the Engineer deem it to be in the Owner's or public's best interest to do so.

1.04 QUALITY ASSURANCE

A. Qualifications

1. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Engineer that he specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of similar size and complexity in wastewater applications performed by his firm within the past three years within New England. The bypass system shall meet the requirements of codes and regulatory agencies having jurisdiction.
2. The vendor shall demonstrate the bypass pumping equipment is automated and is capable of functioning without the assistance of an operator.
3. The vendor shall demonstrate the pumping equipment can operate for an extended period of time running dry. After this period of time, the pump shall have the capability of pulling a 25" Hg vacuum without adjustment or repair.
4. The vendor shall demonstrate sufficient service resources and repair parts in stock to fulfill service or repair of rental equipment within one hour of a service call, twenty-four hours per day, seven days per week.
5. Temporary components of the bypass system including pumps, pipe, hose, valves, and fittings shall be provided by one bypass vendor. Hydraulic calculations and drawings required by the submittals shall be provided by the bypass vendor and stamped and certified by a Professional Engineer licensed in the State of the installation.

1.05 SPECIAL BYPASS REQUIREMENTS

- A. The Contractor's attention is directed to the fact that the existing low-pressure sewer is being replaced under this Contract. The Contractor shall be responsible for constructing the new low-pressure and transferring all existing services to the new low-pressure sewer while maintaining flow of the existing low-pressure sewer. The Contractor will be required to submit a plan to the Engineer for approval detailing how the work will be sequenced while maintaining flow of the existing sewer system. The plan shall include how the existing low-pressure sewer will be maintained during construction including any necessary pumps, valves and other necessary equipment.

PART 2 PRODUCTS

2.01 GENERAL

- A. At a minimum, all equipment shall be supplied in duplicate for emergency situations. Provide adequate on-line backup facilities so that no interruption in service is encountered. Equipment and installation are subject to the approval of the Owner and the Engineer.

2.02 PUMPING SYSTEM(S)

- A. All pumping units (primary and secondary) and appurtenances shall be sized properly to handle the flows encountered including increased flows due to wet weather.

2.03 PIPING SYSTEM(S)

1. All piping systems (primary and secondary) and appurtenance shall be sized properly to handle the flows encountered including increased flows due to wet weather.
2. Provide temporary bypass suction piping from the upstream manhole(s) to the bypass pumps, and temporary discharge piping from the bypass pumps to the downstream manhole(s).

2.04 POWER GENERATING FACILITIES

1. Include power generating facilities capable of providing all power necessary to operate any primary and secondary pumping systems.
2. Maintain facility to be ready for use if required.

2.05 NOISE PREVENTION

1. Noise prevention measures for all equipment shall be used to insure minimum noise impact or surrounding areas.
2. Measures may include but shall not be limited to insulation, electric pumping units, and hospital grade silencers or mufflers.

3. Noise shall be kept to a minimum particularly if any night, Saturday, Sunday or holiday work be deemed necessary by the Engineer for work under this Contract.
4. Should at any time prior to or during the performance of above mentioned work, the Engineer determines the noise prevention measures being used are not adequate, the Contractor shall at no additional cost to the Owner suspend all work until acceptable measures are incorporated.

PART 3 EXECUTION

3.01 PUBLIC SAFETY AND CONVENIENCE

A. General

1. The Contractor shall at all times keep the streets, highways, roads, driveways, parking lots, private walks, and public sidewalks open for pedestrian and vehicular traffic unless otherwise authorized by the Owner/Engineer.

B. Public Travel Ways

1. Any authorized temporary closure of any streets, highways or roads shall be coordinated with the local Fire, Police and/or Department of Public Works as required by the municipality.

C. Municipal, Commercial and Private Property

1. Any authorized, temporary closure of any municipal, commercial or private driveway or access route will require the Contractor provide 48 hour notice to abutters of the temporary restriction of access to their property. The Contractor will make every attempt to schedule his work with as little inconvenience to the property owner as possible

3.02 INSTALLATION

- A. Keep the Engineer advised at all times of any changes made to the overall operation(s) to accommodate field conditions.
- B. Flow diversions and/or bypass pumping shall be maintained at all times as long as it is necessary to maintain the flow through the limits of the project during construction.
- C. Maintain auxiliary and/or emergency equipment at the site to continue flow diversion and/or by-pass pumping operations in the event of a breakdown and/or loss of normal power.
- D. No work shall begin until all provisions and requirements of this Section have been reviewed and approved by the Engineer.

E. The Engineer reserves the right to limit and/or otherwise restrict the Contractor's overall activities and/or operations at any time without claim should the Engineer deem it to be in the Owner's or public's best interest to do so.

END OF SECTION

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SECTION 02160

EXCAVATION SUPPORT

PART 1 GENERAL

1.01 DESCRIPTION

- A. The Contractor shall properly design and furnish all labor and materials necessary and shall construct complete, all sheeting, bracing supports, and appurtenances required to perform the Work including sheet piling for construction of structures and buildings, trench support and cofferdams, permanent and temporary alike, as indicated on the Drawings and specified or as otherwise directed by the Engineer or required by agencies having jurisdiction over the Work.
- B. Wood timber or steel sheeting shall be used except where otherwise indicated, specified or directed by the Engineer and agencies having jurisdiction over the work.

1.02 DESIGN RESPONSIBILITY

- A. The Contractor shall be fully responsible for providing complete and adequately designed sheeting as required and/or directed by the Engineer in accordance with the provisions set forth herein. The sheeting shall be designed to resist hydrostatic pressures in accordance with the Contractor's dewatering design.
- B. The Contractor shall engage, at his own expense, the services of a fully competent and qualified Professional Engineer, hereinafter referred to as the "Contractor's Engineer", registered in the State in which the Work is being constructed, for the design of all sheeting requirements to accomplish the Work specified, and for supervising the proper on-site installation associated therewith. The Contractor's Engineer shall be acceptable to the Engineer and demonstrate a minimum of ten (10) years documented experience in the field of sheeting design and implementation. Prior to the actual employment of the Contractor's Engineer, the Contractor shall submit to the Engineer, to the full extent deemed necessary, a detailed resume stating the Contractor's Engineer's professional qualifications, related experience and references, and if requested, examples of work similar to that required for the Work specified, for a general review by the Engineer and a means of documenting the requisite experience hereinbefore specified. Only after a satisfactory review of the Contractor's Engineer's overall qualifications by the Engineer in fulfillment of the requisite experience hereinbefore specified shall the Contractor finalize such employment and begin the design aspects of the Work.
- C. The Contractor's attention is directed to the fact the acceptance of the Contractor's Engineer and/or his/her qualifications by the Owner and/or Engineer shall not be an overall approval of the Contractor's Engineer nor the sheeting designs and methods of installation employed during the Work. It being understood that all sheeting

requirements necessary to accomplish the Work specified and/or indicated on the Drawings shall be designed by and installed under the direct supervision of the Contractor's Engineer who shall ultimately and fully bear the responsibility for that Work.

1.03 QUALITY ASSURANCE

- A. The Contractor's Engineer shall provide and maintain throughout the sheeting installation and/or Work sufficient supervision and technical guidance to the Contractor for proper sheeting materials, equipment, operations and methods to the extent necessary to assure strict compliance with the Contractor's Engineer's design, all safety procedures and standard requirements for such Work, and the successful completion of the Work. Failure to provide and/or maintain such supervision and/or technical guidance during the Work shall in no way relieve the Contractor's Engineer and/or the Contractor from their overall responsibilities and obligations under the Contract, nor shall it be a basis for any claim by either against the Owner and/or Engineer.
- B. The Contractor and Contractor's Engineer shall fully indemnify and save harmless the Owner and Engineer and their agents, employees and representatives, from and against any and all claims as stipulated under the Agreement, whether directly or indirectly arising out of, relating to or in connection with the Work.
- C. Quality assurances and proper safety procedures must be maintained at all times and be in strict accordance with the Contractor's Engineer's requirements and consistent with all federal, state and local regulatory agencies having jurisdiction over the Work. Should any conflict in requirements, regulations, restrictions or codes exist between that which is specified by the Contractor's Engineer and any federal, state or local agency, the more stringent application shall prevail.

1.04 PRODUCTS AND DESIGN CRITERIA

- A. The overall sheeting design, quality of materials and methods of installation for all sheeting applications necessary to accomplish the Work specified shall be consistent with the established standards of the construction industry and must, as a minimum, comply with the requirements for earth support systems for excavations as defined by current US Department of Labor, Occupational Safety and Health Act (OSHA) regulation applicable thereto, and any other federal, state and local agencies having jurisdiction and/or requirements pertaining thereto including Building Code requirements for the State in which the work is being performed. The design and implementation thereof shall be in accordance with sound engineering practice and modern accepted principles of soil mechanics, and shall include the effects of hydrostatic forces and all surcharge loads which may be reasonable anticipated. The methods employed shall be to the extent necessary to permit the proper and satisfactory installation and construction of the Work specified; to withstand all loads and forces encountered; to provide soil restraint and control of water as required; to insure the safety of the workers and all other personnel on or near the site; to prevent injurious caving or erosion, or loss of ground; to maintain at all times proper and safe

pedestrian, vehicular traffic on public and private streets, property and rights-of-way; and to stabilize unforeseen areas of work encountered during the execution of the Work as deemed necessary by the Owner and/or Engineer.

- B. The Contractor and Contractor's Engineer's attention is directed to the fact that should any additional investigations, subsurface explorations and/or other appurtenant information be required to fulfill the needs of this design, as determined by the Contractor's Engineer above and beyond that which is already provided under these Contract Documents, the Contractor shall obtain all such information and data required at his own expense.

1.05 SHOP DRAWINGS AND/OR DESCRIPTIVE LITERATURE

- A. Prior to the installation of any sheeting, the Contractor shall submit to the Engineer for documentation ONLY, complete sheeting layout and detail drawings and sheeting descriptions bearing the Contractor's Engineer's State of Massachusetts Professional Seal and signature. Said submission shall be for informational purposes only as a means of documenting the work to be performed and will not be considered an approval or disapproval of the design and/or the implementation thereof. This submission will not relieve the Contractor of the sole responsibility for the adequacy of the system nor shall it be construed as an approval or guarantee that the Contractor's proposed equipment, materials and methods for the sheeting, bracing or appurtenances will be adequate for the work required at the locations of and for the Work required by this Contract.
- B. Included as part of this submission, the Contractor's Engineer must provide a complete listing of all references, codes and specifications used by the Contractor's Engineer and required by any federal, state or local agency having jurisdiction, and to which the sheeting design conforms.
- C. Specific design calculations are not to be submitted to the Engineer. In the event design calculations are submitted to the Engineer, they shall be returned to the Contractor without review nor checking by the Engineer.

1.06 CERTIFICATE OF DESIGN

- A. The Contractor's special attention is directed to the required "Certificate of Design", the form of which is provided at the end of this Section. The Contractor and Contractor's Engineer shall complete this "Certificate" in its entirety for each location of work to be done, and any revisions associated there with, and submit it simultaneously with, as an integral part thereof, the sheeting submission. Any submission made without the completed "Certificate", appropriately signed and sealed, shall be returned to the Contractor. The Owner and/or Engineer hereby reserves the right to delay sheeting work and/or any work associated with, or dependent upon, the proper implementation of sheeting, without cause for claim against the Owner or Engineer, until a complete and appropriate submission is rendered. This Certification shall indicate that the sheeting, bracing and all

appurtenances related thereto are designed to withstand the required loads, forces to be encountered, and to provide soil and water control, and are in compliance with these specifications and all federal, state or local agencies having jurisdiction over the Work to be performed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Timber sheeting and bracing:

1. Timber sheeting and bracing may be of any species of wood which will satisfactorily withstand all driving and construction stresses and the loads to which the members will be subjected. Sheeting shall not be less than 3 inches nominal thickness and shall be provided with continuous interlocks. All timber sheeting and bracing shall be free from worm-holes, windshakes, loose knots, decayed or unsound portions or other defects which might impair its strength or tightness.

B. Steel sheeting:

1. The shapes, sizes, and lengths of steel sheeting to be utilized are optional with the Contractor, providing they are satisfactory to withstand all driving and construction stresses and provided with continuous interlocks.

C. Bracing, Hardware and Fastenings:

1. Bracing and other supports whether of steel or of timber, shall be of the strength and dimensions necessary to satisfactorily withstand the loads to which they will be subjected. All bracing and other supports shall be free from any defects which might impair this strength. The Contractor shall provide all necessary hardware and fastenings necessary in connections with satisfactory installation of all sheeting and bracing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall be fully responsible for ensuring adequate safety measures are provided at all times and shall comply with all safety requirements of federal, state and local agencies having jurisdiction over the Work. Installation of the sheeting including all bracing, supports and appurtenances, shall be adequate to permit the performance of the Work and be in accordance with the requirements of the Contractor's Engineer and the sheeting design associated therewith.
- B. Any movements of sheeting and/or appurtenances which prevent the proper completion of the work shall be corrected at the expense of the Contractor.

- C. Sheeting shall be installed in a manner which will prevent the disturbance of the surrounding surface, subsurface conditions and/or structures. Any such disturbances shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

3.02 REMOVAL

- A. All sheeting shall be removed except as shown on the Contract Drawings or directed by the Engineer.
- B. All sheeting approved for removal by the Engineer shall become the property of the Contractor.
- C. All restoration and clean up shall be as indicated and as specified.

CERTIFICATE OF DESIGN

_____ (Owner)

Contract Reference:

_____, dated _____.

In accordance with the provisions of the above referenced Contract, as the designated Contractor,

(Contractor's Name and Address)

hereby certifies that _____

(Contractor's Engineer's Name and Address)

(1) Is properly licensed and currently registered as a Professional Engineer in the State (or Commonwealth) of _____;

(2) Is fully qualified to design and supervise the _____

(Item of work and location)

In accordance with the provision specified under the appropriate Section and/or Subsections of the Contract Documents:

(3) Has successfully designed and supervised _____

(Item of work)

before and demonstrates a minimum of ten (10) documented years of proven experience in such field;

(4) Has personally examined the type(s) and locations(s) of the Work required under this Contract, and the overall conditions associated therewith, to the extent necessary to fully satisfy his or her professional responsibilities for designing and supervising the above referenced work;

- (5) Has prepared the attached design in full compliance with the applications and requirements of the Contract Documents, sound engineering practice, modern accepted principles of construction, and all applicable federal, state and local laws, regulations, rules and codes having jurisdiction over the Work;
- (6) Will provide sufficient supervision and technical guidance to the Contractor throughout the Work to ensure compliance with the design and all quality assurances necessary to successfully complete the Work;
- (7) Hereby indemnifies and holds harmless the _____
_____ and BETA Group, Inc.,
(name of owner)
and their agents, employees and representatives, from and against any and all claims, whether directly or indirectly, arising out of, relating to or in connection with the Work; and
- (8) This "Certificate of Design" together with all applicable designs, drawings, details, specifications on other related documents necessary to complete the Work as specified, have been signed and sealed pursuant to applicable state law.

In recognition and observance of the above referenced statements, the undersigned parties hereby acknowledge and accept the responsibilities and obligations associated therewith.

CONTRACTOR:

CONTRACTOR'S ENGINEER:

(Contractor's Name)

(Engineer's Name)

By: _____

By: _____

(Name and Title)

(Name and Title)

Date: _____

Date: _____

(SEAL)

(P.E. STAMP)

SECTION 02200

EARTH EXCAVATION, BACKFILL, FILL AND GRADING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for; excavating in earth for trenches and structures; backfilling excavations; furnishing necessary material; compaction; constructing embankments and fills; miscellaneous earth excavations and miscellaneous grading.

B. Related Sections

1. Section 01025 - Measurement and Payment
2. Section 01410 - Testing Laboratory Services
3. Section 02140 – Dewatering
4. Section 02149 – Maintaining Existing Flow
5. Section 02160 – Excavation Support
6. Section 02215 - Aggregate Materials
7. Section 03300 - Cast-In-Place Concrete

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM).

1. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

1.03 MEASUREMENT AND PAYMENT PROCEDURES

A. Sheeting

1. As specified in SECTION 01025, Contractor paid only for certain sheeting left in place.

B. Test Pits

1. Where determination of the exact location of pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations. When such test pits may be properly considered as incidental to other excavation, the Contractor shall receive no additional compensation, the work being understood to be included as part of the excavation. When the Engineer orders test pits beyond the limits of

excavation he considers a part of the work, such test pits shall be paid for as specified in SECTION 01025.

1.04 QUALITY ASSURANCE

A. Field Samples

1. Provide samples of materials as requested by the Engineer, to the Quality Control Engineer hired by the Owner, prior to delivery of materials on site, in order to facilitate field testing of compaction operations and material properties.

1.05 PROJECT/SITE CONDITIONS

A. Existing Conditions

1. There are pipes, drains, and other utilities in locations not indicated on drawings, no attempt has been made to show all services, and completeness or accuracy of information given is not guaranteed.

1.06 MAINTENANCE

- A. Maintain all work in accordance with SECTION 01800.

PART 2 PRODUCTS

2.01 MATERIALS

A. Suitable Aggregate

1. The nature of materials will govern both acceptability for backfill and methods best suited for placement and compaction.
2. All material whether from excavations or from borrow pits, after being placed and properly compact, will make a dense stable fill and containing no vegetation, masses of roots, individual roots more than 18 inches long, or more than 1/2 inch in diameter, stones over 6 inches in diameter, or porous matter.
3. Organic matter to be well distributed and not to exceed minor quantities.

B. Trench and Excavation Backfill

1. In general, and unless other material is indicated on drawings or specified, material used for backfilling trenches and excavations shall be suitable material which was removed in the course of making the construction excavations. If sufficient suitable material is not available from the excavations, the backfill material shall be crushed stone, gravel borrow or select borrow as directed by the Engineer, in according to respective Specification Sections.

C. Structure Backfill

1. Unless otherwise indicated or specified, all fill and backfill under structures and pavement adjacent to structures shall be compacted gravel borrow containing not more than 10 percent material passing a 200 sieve. When coarse aggregate and fine aggregate are indicated or specified for use under structures, they shall conform to the requirements for coarse and fine aggregate specified in SECTION 03300.

D. Filling and Embankment Backfill

1. Suitable selected materials available from the excavations and not required for backfill around pipes or against structures may be used for filling and building embankments, except as otherwise specified. Material needed in addition to that available from construction operations shall be obtained from suitable gravel banks or other suitable deposits. The Contractor shall furnish, at his own expense, all borrow material needed on the work.

E. Additional materials

1. Concrete: In accordance with SECTION 03300.
2. Crushed stone: In accordance with SECTION 02215.
3. Gravel borrow: In accordance with SECTION 02215.
4. Selected borrow: In accordance with SECTION 02215.

2.02 EQUIPMENT

A. Well Points

1. Designed to drain soil and prevent saturated soil from flowing into excavation.

B. Pumping Units

1. Designed for use with the wellpoints, capable of maintaining a high vacuum and, handling large volumes of air and water at the same time.

C. Underdrain Pipe

1. HDPE pipe enclosed in crushed stone encased in filter fabric.
2. Sewer pipe of quality know as "seconds".

2.03 SOURCE QUALITY CONTROL

- A. Provide Engineer with access to location of off-site sources of materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify all existing utilities and facilities prior to excavation.

3.02 PROTECTION

A. Utilities

1. Support and protect from damage existing pipes, poles, wires, fences, curbing, property line markers, and other structures, which the Engineer decides must be preserved in place without being temporarily or permanently relocated.
2. Restore items damaged during construction without compensation, to a condition at least equal prior to construction.

B. Trees

1. Enclose the trunks of trees adjacent to work with substantial wooden boxes of height necessary to protect trees from injury from piled material, equipment, operations or otherwise.
2. Employ excavating machinery and cranes of suitable type and size and operate with care to prevent injury to trees not to be cut and particularly to overhanging branches and limbs.
3. When trimming is required, make all cuts smooth and neat without splitting or crushing.
4. Cover cut areas with an application of grafting wax or tree healing paint.
5. Branches, limbs, and roots shall not be cut except by permission of the Engineer.

C. Plantings

1. Protect by suitable means or temporarily replant and maintain cultivated hedges, shrubs, and plants which may be injured by the Contractor's operations
2. Replant in their original positions and care for until growth is re-established, once the construction operations have been substantially completed.
3. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to which existed prior to the start of the Work.

D. Paved surfaces

1. Do not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels shaped as to cut or injure paved surfaces.

2. All surfaces which have been injured by the Contractor's operations shall be restored to a condition at least equal to which existed prior to start of the Work.
3. Suitable materials and methods shall be used for such restoration.

3.03 PREPARATION

A. Pavement Removal

1. Remove only existing pavement as necessary for the prosecution of the work.
2. Engineer may require that pavement be cut with pneumatic tools or saws without extra compensation to Contractor, where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
3. Dispose large of pieces of broken pavement before proceeding with excavation.

B. Topsoil Removal

1. From areas which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.

C. Subgrade

1. Remove loam and topsoil, loose vegetable matter, stumps, large roots, etc., from areas where embankments will be built or material will be placed for grading.
2. Shape as indicated on the drawings and prepare by forking, furrowing, or plowing to bond first layer of the new material placed.

3.04 RELOCATION AND REPLACEMENT OF EXISTING STRUCTURES

A. The structures to which the provisions of this article apply include pipes, wires, and other structures which meet all of the following:

1. Are not indicated on the drawings or otherwise provided for.
2. Encroach upon or are encountered near and substantially parallel to the edge of the excavation.
3. In the opinion of the Engineer will impede progress to such an extent that satisfactory construction cannot proceed until they have been changed in location, removed (to be later restored), or replaced.

B. In removing existing pipes or other structures, the Contractor should use care to avoid damage to materials, and the Engineer shall include for payment only those new materials which, in his judgment, are necessary to replace those unavoidably damaged.

C. Whenever the Contractor encounters certain existing structures as described above and is so ordered in writing, he shall do the whole or such portions of the work as he

may be directed to change the location of, remove and later restore, or replace such structures, or to assist the Owner thereof in so doing. For all such work, the Contractor shall be paid under such items of work as may be applicable, otherwise as Extra Work.

- D. When fences interfere with the Contractor's operations, he shall remove and (unless otherwise specified) later restore them to a condition which existed prior to the start of the Work, all without additional compensation. The restoration of fences shall be done as promptly as possible and not left until the end of the construction period.

3.05 SHEETING AND BRACING

- A. Furnish, put in place, and maintain such sheeting, bracing, etc., as necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures.
- B. Whenever possible, sheeting shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside of the sheeting, but, if voids occur, they shall be filled immediately with sand and compacted.
- C. Leave in place to be embedded in the backfill, or concrete, all sheeting, bracing, etc., which is indicated on the drawings to be left in place. Leave in place any and all other sheeting, bracing, etc., which the Engineer may direct to leave in place, at any time during the progress of the work, for the purpose of preventing injury to structures or property.
- D. The Engineer may direct that sheeting and bracing to be left in place be cut off at any specified elevation.
- E. All sheeting and bracing not to be left in place shall be carefully removed in such manner as not to endanger the construction or other structures. All voids left or caused by the withdrawal of sheeting shall be backfilled immediately using suitable materials and compaction methods.

3.06 DEWATERING

- A. Ensure proper conditions at all times during construction, provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) to intercept and/or remove promptly and dispose properly all water entering trenches and other excavations. Keep excavations dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

- B. Disposed of all water pumped or drained from the work in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Provide suitable temporary pipes, flumes, or channels for water that may flow along or across the site of the work.
- C. Provide adequate sedimentation and/or erosion control methods at all times to ensure soil stabilization and protection of surrounding areas including any designated wetlands and/or waterways encountered.
- D. Underdrains
 - 1. Temporary underdrains, if used, shall be laid in trenches beneath the grade of the structure. Trenches shall be of suitable dimensions to provide room for the chosen size of underdrain and its surrounding gravel.
 - 2. Underdrains, if used, shall be laid at a suitable distance below the bottom of the normal excavation and with open joints wrapped in cheesecloth or filter fabric approved by the Engineer, and entirely surrounded by graded gravel, or crushed stone to prevent the admission of sand or other soil into the underdrains. The distance between the bottom of the pipe or structure and the top of the bell of the underdrain pipe shall be at least 3 in. unless otherwise permitted. The space between the underdrain and the pipe or structure shall be filled with graded gravel or crushed stone which shall be rammed if necessary and left with a surface suitable for laying the pipe or building the structure.
- E. Drainage Wellpoint System
 - 1. If necessary, dewater the excavations by means of an efficient drainage wellpoint system which will drain the soil and prevent saturated soil from flowing into the excavation.
 - 2. The installation of the wellpoints and pump shall be done under the supervision of a competent representative of the manufacturer. The Contractor shall do all special work such as surrounding the wellpoints with sand or gravel or other work which is necessary for the wellpoint system to operate for the successful dewatering of the excavations.

3.07 EXCAVATION

- A. Execute operation of dewatering, sheeting and bracing without undermining or disturbing foundations of existing structures or of work previously completed under this contract.
- B. Excavate to widths that provide suitable room for:
 - 1. Building structures or laying and jointing piping.
 - 2. Placing all sheeting, bracing, and supports.
 - 3. Cofferdamming, pumping and draining.

- C. Render bottom of excavations firm, dry and acceptable in all respects.
- D. Do not plow, scrap or dig by machinery, earth at finished subgrade which results in disturbance of material below subgrade, unless indicated or specified, and remove with pick and shovel, last of material to be excavated, just before placing pipe, masonry or other structure.
- E. Make all excavations in open, except as otherwise specified or permitted.
- F. Excavation Near Existing Facilities
 - 1. As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools. Such manual excavation when incidental to normal excavation shall be included in the work to be done under items involving normal excavation.
- G. Unauthorized Excavation
 - 1. If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at the Contractor's expense with thoroughly compacted gravel borrow, if the excavation was for a pipeline, or with Class B concrete, if the excavation was for a masonry structure.
- H. Unsuitable Material
 - 1. If material unsuitable for foundation (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried in accordance with the drawings and/or specifications, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted, crushed stone, gravel borrow, fine aggregate or concrete as directed.

3.08 TRENCHING

A. Trench Excavation

- 1. Where pipe is to be laid in specified bedding material or concrete cradle, the trench may be excavated by machinery to, or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed, as approved by the Engineer.
- 2. Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery, but, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.

B. Depth Of Trench

1. Excavate trench to depths permitting the pipe to be laid at the elevations, slopes, or depths of cover indicated on the drawings, and at uniform slopes between indicated elevations.

C. Width Of Trench

1. Excavate trench as narrow as practicable and do not widen by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
2. Excavate trenches with approximately vertical sides between the elevation of the center of the pipe and an elevation 1 ft. above the top of the pipe.

D. Trench Excavation In Fill

1. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least 1 ft. above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall then be excavated as though in undisturbed material.

- E. Length of trench open at any one time will be controlled by conditions, subject to any limits that may be prescribed by Engineer.

3.09 BACKFILLING

A. General

1. Frozen material shall not be placed in the backfill nor shall backfill be placed upon frozen material. Previously frozen material shall be removed or shall be otherwise treated as required, before new backfill is placed.

B. Fill And Backfill Under Structures

1. The fill and backfill materials shall be placed in layers not exceeding 6 in. in thickness. Unless otherwise indicated or specified, each layer shall be compacted to 95 percent in accordance with ASTM D1557.

C. Backfilling Around Structures

1. Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage. As soon as practicable after the structures are structurally adequate and other necessary work has been done, special leakage tests, if required, shall be made. Promptly after the completion of such tests, the backfilling shall be started and then shall proceed until its completion. The best of the excavated materials shall be used in

backfilling within 2 ft. of the structure. Unequal soil pressures shall be avoided by depositing the material evenly around the structure.

2. The material shall be placed and compacted to 90 percent in accordance with ASTM D1557 unless otherwise indicated or specified.

D. Backfilling Pipe Trenches

1. As soon as practicable after the pipes have been laid and the joints have acquired a suitable degree of hardness, if applicable, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started and thereafter it shall proceed until its completion.
2. With the exception mentioned below in this paragraph, trenches shall not be backfilled at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the Contractor wish to minimize the maintenance of lights and barricades and the obstruction of traffic, he may, at his own risk backfill the entire trench, omitting or including backfill at joints as soon as practicable after the joints have acquired a suitable degree of hardness, if applicable, and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.
3. No stone or rock fragment larger than 12 in. in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than 5 ft. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.
4. Zone Around Pipe
 - a. Backfilled with the materials and to the limits indicated on the drawings.
 - b. Material shall be compacted to 90 percent by tamping.
5. Remainder of Trench
 - a. Compact by water-jetting, or tamping, in accordance with the nature of the material to 95 percent in accordance with ASTM D1557. Water-jetting may be used wherever the material does not contain so much clay or loam as to delay or prevent satisfactory drainage. However, tamping shall be used if water-jetting does not compact the material to the density required.
6. Excavated material which is acceptable to the Engineer for surfacing or pavement subbase shall be placed at the top of the backfill to such depths as may be specified elsewhere or as directed. The surface shall be brought to the required grade and stones raked out and removed.

E. Placing And Compacting Embankment Material

1. After the subgrade has been prepared as hereinbefore specified, the material shall be placed thereon and built up in successive layers until it has reached the required elevation.
2. Layers shall not exceed 12 in. in thickness before compaction. In embankments at structures, the layers shall have a slight downward slope away from the structure; in other embankments the layers shall have a slight downward slope away from the center. In general, the finer and less pervious materials shall be placed against the structures or in the center, and the coarser and more pervious materials, upon the outer parts of embankments.
3. Each layer of material shall be compacted by the use of approved rollers or other approved means so as to secure a dense, stable, and thoroughly compacted mass. At such points as cannot be reached by mobile mechanical equipment, the materials shall be thoroughly compacted by the use of suitable power-driven tampers.
4. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction. No compacting shall be done when the material is too wet, from either rain or too great an application of water, to compact it properly; at such times the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction, or such other precautions shall be taken as may be necessary to obtain proper compaction.
5. The portion of embankments constructed below proposed structures shall be compacted to 95 percent in accordance with ASTM D1557. The top 2 ft. of an embankment below a pavement base shall be compacted to 95 percent. All other embankments shall be compacted to 90 percent in accordance with ASTM D1557.

3.10 METHODS OF COMPACTION

A. Water-Jetting

1. Saturate backfill material throughout its full depth and at frequent intervals across and along the trench until all slumping ceases.
2. Furnish one or more jet pipes, each of sufficient length to reach the specified depth and of sufficient diameter (not less than 1-1/4 in.) to supply an adequate flow of water to compact the material.
3. Equip jet pipe with a quick-acting valve, supply water through a fire hose from a hydrant or a pump having adequate pressure and capacity to achieve the required results.

B. Tamping and Rolling

1. Deposit backfill material and spread in uniform, parallel layers not exceeding 8 in. thick before compaction. Before the next layer is placed, each layer shall be

tamped to obtain a thoroughly compacted mass. Care shall be taken that the material close to the bank, as well as in all other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar power equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling, and compacting.

2. If necessary to ensure proper compaction by tamping (or rolling), the backfill material shall first be wet by sprinkling. However, no compaction by tamping (or rolling) shall be done when the material is too wet either from rain or too great an application of water to be compacted properly; at such times the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compacting, or such other precautions shall be taken as may be necessary to obtain proper compaction.

C. Miscellaneous Requirements.

1. Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. Only suitable quantities of stones and rock fragments shall be used in the backfill; the Contractor shall, as part of the work done under the items involving earth excavation and rock excavation as appropriate, furnish and place all other necessary backfill material.
2. All voids left by the removal of sheeting shall be completely backfilled with suitable materials, and thoroughly compacted.

3.11 DISPOSAL OF SURPLUS EXCAVATED MATERIALS

- A. No excavated materials shall be removed from the site of the work or disposed of by the Contractor except as directed or permitted by the Engineer.
- B. Surplus excavated materials suitable for backfill shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill; shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes within a haul of 1 mile from the point of excavation; all as directed or permitted and without additional compensation.
- C. Surplus excavated materials not needed as specified above shall be hauled away and dumped by the Contractor, at his expense, at appropriate locations, and in accordance with arrangements made by him.

3.12 DISPOSAL OF SPECIAL WASTES

- A. The Contractor's attention is directed to the requirements set forth by the State of Massachusetts, Department of Environmental Protection, (MA DEP) regarding "Special Wastes" and the proper disposal thereof. All waste materials and debris, as designated by the Owner and/or Engineer, including but not limited to any sewers, storm drains, catchbasins, and combined system pipelines and associated structures, or any portions thereof, including but not limited to sludge, grit, sediment, dirt, sand, rock, grease, roots and other liquid, solid or semi-solid materials contained therein, shall be considered "Special Wastes." In addition, any excavated soils contaminated in any manner, as designated by the Owner and/or Engineer, shall also fall under this category and shall be handled the same. When so encountered, all such materials and debris shall be removed to the extent so ordered by the Engineer and properly disposed of in strict compliance with the requirements of the MA DEP and other regulating authorities to an approved and certified waste disposal site. It shall remain the sole responsibility of the Contractor to apply for and obtain all required permits, bonds and/or insurance relative to such disposal. The Contractor shall also pay all costs associated with the disposal, required permits, bonds and insurance with no additional expense to the Owner. All handling of such "Special Waste" shall be done in strict compliance with the MA DEP requirements and/or any other federal, state or local agency having jurisdiction or authority over the same. Under no circumstances shall sewage, solids or other "Special Wastes" removed from the sewer lines be dumped or spilled onto the streets or into ditches, catch basins or storm drains. The Contractor must use watertight and State approved vehicles in transporting any wastes as hereinbefore designated.
- B. The Contractor shall indemnify and save harmless the Owner and Engineer and all persons acting for or on behalf of the Owner and Engineer from all claims and liability of any nature or kind, and all damages, costs and expenses, including attorney's fees and penalties, arising from the improper handling, transportation or disposal of "Special Wastes" as determined by the MA DEP and/or any other federal, state or local agency having jurisdiction or authority over the same.

3.13 DUST CONTROL

- A. During the progress of the Work, maintain the area of activities, by sweeping and sprinkling of streets to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed.

3.14 BRIDGING TRENCHES

- A. Provide suitable and safe bridges and other crossings where required for the accommodation of travel, and to provide access to private property during construction. Remove once bridges and crossings are no longer needed.

3.15 FIELD QUALITY CONTROL

A. Site Tests

1. In accordance with SECTION 01410

3.16 CARE AND RESTORATION OF PROPERTY

- A. Restoration of existing property or structures done as promptly as practicable and not left until the end of the construction period.

END OF SECTION

SECTION 02210
ROCK EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for removal and disposal of rock.

B. Related Sections

1. Section 00500-Agreement
2. Section 00800- Supplementary Conditions
3. Section 02200-Earth Excavation, Backfill, Fill and Grading

1.02 DEFINITIONS

- A. Rock-as defined in SECTION 00500.

1.03 REQUIREMENTS

- A. Excavate rock if encountered, to the lines and grades indicated on the drawings or as directed, dispose of the excavated material, and furnish acceptable material for backfill in place of the excavated rock.
- B. Excavate rock in pipe trenches to a limit which provides 6-inches clearance minimum from the pipe after it has been laid. Before the pipe is laid, the trench shall be backfilled to the correct subgrade with thoroughly compacted, suitable material or, when so specified or indicated on the drawings, with the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.
- C. The use of explosives will not be allowed.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 EXCESS ROCK EXCAVATION

- A. If rock is excavated beyond the limits of payment indicated on the drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below in this section.
- B. In pipe trenches, excess excavation below the elevation of the top of the bedding, cradle, or envelope shall be filled with material of the same type, placed and compacted in the same manner, as specified for the bedding, cradle, or envelope. Excess excavation above said elevation shall be filled with earth as specified in the article titled "Backfilling Pipe Trenches" in SECTION 02200.
- C. In excavations for structures, excess excavation in the rock beneath foundations shall be filled with 3000 psi concrete. Other excess excavation shall be filled with earth as specified in the article titled "Backfilling Around Structures" in SECTION 02200.

3.02 SHATTERED ROCK

- A. If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor, and the Engineer considers such shattered rock to be unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled with concrete as required, except that in pipe trenches screened gravel shall be used for backfill. All such removal and backfilling shall be done by and at the expense of the Contractor.

3.03 PREPARATION OF ROCK SURFACES

- A. Whenever so directed during the progress of the work, remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Water in depressions shall then be removed as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.
- B. The surfaces of rock foundations shall be left sufficiently rough to bond well with the masonry and embankments to be built thereon, and if required, shall be cut to rough benches or steps.
- C. Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means shall be used to accomplish this cleaning. Remove free water left on the surface of the rock.

3.04 REMOVAL OF BOULDERS

- A. Remove piles of boulders and loose rock encountered within the limits of earth embankments and dispose in a suitable place.

3.05 DISPOSAL OF EXCAVATED ROCK

- A. All excavated rock shall be handled, transported and disposed of by the Contractor, at his expense, at appropriate locations, and in accordance with arrangements made by him without additional cost to the Owner.
- B. Excavated rock may be used in backfilling trenches subject to the following limitations:
 - 1. Pieces of rock larger than permitted under the article titled "Backfilling Pipe Trenches" in SECTION 02200 shall not be used for this purpose.
 - 2. The quantity of rock used as backfill in any location shall not be so great as to result in the formation of voids.
 - 3. Rock backfill shall not be placed within 36 in. of the surface of the finish grade.
- C. Surplus excavated rock shall be disposed of as specified for surplus excavated material as specified in SECTION 02200.

3.06 BACKFILLING ROCK EXCAVATIONS

- A. Where rock has been excavated and the excavation is to be backfilled, the backfilling above normal depth shall be done as specified in SECTION 02200. If material suitable for backfilling is not available in sufficient quantity from other excavations, the Contractor shall, at his own expense, furnish suitable material from outside sources.

END OF SECTION

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SECTION 02215

AGGREGATE MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for furnishing and placing materials, which include Crushed Stone, Gravel Borrow and Selected Borrow.
2. Location of specified materials as detailed on the Drawings or as directed by the Engineer for excavation below normal depth, utility support, replacement of unsuitable material or elsewhere, as ordered.

B. Related Sections

1. Section 02200 - Earth Excavation, Backfill, Fill and Grading.
2. Section 02500 - Pavement

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO).

1. T11, Amount of Material Finer than 0.075 mm Sieve in Aggregate
2. T27, Sieve Analysis of Fine and Coarse Aggregates.

B. American Society for Testing and Materials (ASTM).

1. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

1.03 DEFINITIONS

- ###### A. The term Screened Gravel as used in the Contract Documents shall mean Crushed Stone.

1.04 SUBMITTALS

A. Shop Drawings

1. Provide sieve analysis when gradation requirements are given in the Specification.

B. Samples

1. Furnish representative sample including location of source with Shop Drawing transmittal sheet.

1.05 QUALITY ASSURANCE

A. Field Samples

1. The attention of the Contractor is directed to the fact that under Specification SECTION 00700, 1.03 Materials and Equipment, all materials furnished by the Contractor to be incorporated into the Work shall be subject to the inspection of the Engineer. The Engineer shall be the sole judge as to the acceptability of proposed materials and said judgement shall be final, conclusive, and binding.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection

1. In accordance with Specification SECTION 00700, 1.03 Materials and Equipment.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed Stone

1. For bedding and pipe zone material for pipe larger than 3 inches diameter. Well graded in size from 3/8 inches to 3/4 inches or such other sizes as may be approved.
2. For bedding and pipe zone material for plastic pipe 3 inches diameter and less, maximum particle size shall be 3/8 inches.
3. Clean, hard, and durable particles or fragments, free from dirt, vegetation, or other objectionable matter, and free from an excess of soft, thin elongated, laminated or disintegrated pieces.
4. Screened Stone of similar size and grading to this specification may be used instead of Crushed Stone.

B. Gravel Borrow

1. Granular material well graded from fine to coarse with a maximum size of 3 inches, obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted.
2. Gravel shall not contain vegetation, masses of roots, or individual roots more than 18 inches long or more than 1/2 inches in diameter.
3. Gravel shall be substantially free from loam and other organic matter, clay and other fine or harmful substances.
4. Gradation requirements for gravel shall be determined by AASHTO-T11 and T27 and conform to the following:

Sieve	Percent Passing
1/2 inch	60-95
No. 4	50-85
No. 50	8-28
No. 200	0-8

C. Selected Borrow

1. Use natural soils and/or rock free of roots, leaves, organics and clay, having not more than 8 percent by weight passing the No. 200 sieve and having a maximum stone size no greater than two thirds the loose lift thickness.
2. Use only material well-graded throughout entire size range, free of ice or frost and aggregations of frozen soil particles.
3. Material must meet compaction requirements indicated or as specified.

D. Gravel Base Course

1. In accordance with SECTION 02500.

2.02 SOURCE QUALITY CONTROL

A. Test, Inspection

1. Engineer may elect to sample material supplied at the source.
2. Assist the Engineer and/or personnel from the designated testing laboratory in obtaining samples.

PART 3 EXECUTION

3.01 INSTALLATION

A. Crushed Stone

1. Spread in layers of uniform thickness not greater than 6 inches.
2. Compact thoroughly by means of a suitable vibrator or mechanical tamper.

B. Gravel Borrow

1. Spread in layers of uniform thickness not exceeding 12 inches before compaction and moistened or allowed to dry as directed.
2. Compact thoroughly by means of suitable power-driven tampers or other power-driven equipment.
3. Compaction shall conform to 95% of minimum dry density per ASTM D1557.
4. The percolation rate for the compacted bank-run gravel shall not exceed 5 minutes per inch.

C. Selected Borrow

1. Spread in layers of uniform thickness not exceeding 12 in. (loose lift) before compaction and moistened or allowed to dry.
2. Compact thoroughly by means of suitable power-driven tampers or other power-driven equipment unless otherwise directed by the Engineer.

3.02 FIELD QUALITY CONTROL

A. Material and compaction testing

1. In accordance with SECTION 01410.

END OF SECTION

SECTION 02224

CONTROLLED DENSITY FILL
(MASSACHUSETTS)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for controlled density fill (CDF) to be used in place of compacted soil for general backfill of trenches and/or excavations.

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M 85 - Standard Specification for Portland Cement (Chemical and Physical)
2. AASHTO M 295, Class F - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

B. This specification makes reference to the requirements of additional specifications as listed. The Contractor shall obtain and familiarize himself with all requirements referenced by this specification prior to preparation and installation of any materials.

1. Massachusetts Department of Transportation Highway Division (massDOT), Standard Specifications for Highways and Bridges, 1988 Edition, including all addenda, issued by the State of Massachusetts Department of Transportation, (referred to as the Standard Specification).

1.03 DEFINITIONS

A. Controlled Density Fill, also known as "Flowable Fill" is a flowable, self-consolidating, rigid setting, low density material that can substitute for compacted gravel in backfills, fills and structural fills.

B. The two main categories of CDF's are Excavatable and Non-excavatable, with sub categories of flowable and very flowable.

C. Categories of CDF's:

1. Type 1 Very Flowable, non excavatable,
2. Type 1E Very Flowable, excavatable,
3. Type 2 Flowable, non excavatable,
4. Type 2E Flowable, excavatable.

D. Excavatable mixes shall be hand tool excavatable.

E. Very Flowable shall have very flowable characteristics for distances and small hard to reach areas.

1.04 DESIGN REQUIREMENTS

- A. Provide a mixture of Portland cement, aggregates, water and mineral admixtures with a low cement content and high slump to reduce strength development for possible removal and minimize settlement after placement.
- B. The proposed mix should maximize the flow characteristics of the material while producing the necessary strength.
- C. The mixes shall have the following design strengths:
 - 1. Non excavatable fill,
 - a. Type I (very flowable) and Type 2 (flowable),
 - b. Compressive strength at 28 days = 30 to 150 psi, 200 psi maximum at 90 days.
 - 2. Excavatable fill,
 - a. Type 1E (very flowable) and Type 2E (flowable),
 - b. Compressive strength at 28 days = 30 to 80 psi, 100 psi maximum at 90 days.
- D. Specific compressive strength(s) for structural applications are noted on the Contract Drawings.
- E. Slump
 - 1. Standard method = 10 to 12-inches.
 - 2. Modified method consisting of a six inch long by three inch inside diameter straight tube of non-porous material = 9 to 14-inches.

1.05 PERFORMANCE REQUIREMENTS

- A. Provide fill of homogeneous structure which when cured, will have the required strength, water tightness, and durability. To this end, it is essential that careful attention be given to the selection of materials, mixtures, placing and curing of the fill.

1.06 SUBMITTALS

- A. In accordance with Section 01300, submit the following,
 - 1. Mix design data not limited to, but including maximum and minimum strengths, air content, setting times, flowability and yield.
 - 2. Certification by the supplier stating compatibility with the project requirements and the Contractor's installation methods.

1.07 QUALITY ASSURANCE

- A. Furnish the supplier with information as to the intended use of the CDF.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland cement,

1. In accordance with AASHTO M85.
- B. Fly Ash (very flowable),
 1. In accordance with AASHTO M295, Type F.
- C. Sand,
 1. In accordance with Standard Specification M4.02.02
- D. Water,
 1. Clean and potable.
- E. Air entraining admixtures,
 1. In accordance with Standard Specification M4.02.05.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall follow the guideline set forth in ACI 229, except non-standard materials shall not be used.

3.02 PREPARATION

- A. Pipes and all other members to be encased in CDF shall be temporarily secured in place to prevent displacement during fill placement.
- B. To reduce hydrostatic pressure and limit displacement potential, Contractor may use a high air generator in the fill mixture to lower unit weights.
- C. Pre-job test all pump applications prior to day of placement with actual equipment.
- D. Secure site during the placement for the CDF. Cautions include but are not limited to barricades, fences, lights and steel plates.
- E. Work shall be sequenced so as to keep traffic flowing within the project area.

3.03 INSTALLATION

- A. CDF shall be batched at concrete plants and hauled to job sites in ready-mix trucks with continuous agitating drums and be discharged with slumps as indicated.
- B. During waiting period prior to discharge, truck drums shall agitate mixture.
- C. CDF shall be installed in accordance with supplier's recommendations, be flowable and require no vibration.

3.04 FIELD QUALITY CONTROL

- A. All CDF to be used in the work shall be subject to testing to determine whether it conforms to the requirements of the specifications. The methods of testing shall be in accordance with the Standard Specification, and as approved by the Engineer.
- B. The place, time, frequency, and method of sampling will be determined by the Engineer in accordance with the particular conditions of this project.

3.05 PROTECTION

- A. Open excavations containing uncured CDF shall not be left uncovered overnight.

END OF SECTION

SECTION 02272
GEOTEXTILE MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for installation of geotextile filter fabric in trenches and under riprap.

B. Related Sections

1. Section 02100 - Site Preparation
2. Section 02200 – Earthwork
3. Section 02215 – Aggregate Materials

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. D3786, Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method
2. D4355, Test Method for Deterioration of Geotextiles From Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
3. D4491, Test Method for Water Permeability of Geotextiles by Permittivity
4. D4533, Test Method for Trapezoid Tearing Strength of Geotextiles
5. D4632, Test Method for Grab Breaking Load and Elongation of Geotextiles
6. D4751, Test Method for Determining Apparent Opening Size of a Geotextile
7. D4833, Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
8. D5261, Measuring Mass Per Unit Area of Geotextiles.
9. D6241, Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.03 QUALITY ASSURANCE

A. General

1. Producer of fabric to maintain competent laboratory at point of manufacture to insure quality control in accordance with ASTM testing procedures.
2. Laboratory to maintain records of quality control results.

1.04 SUBMITTALS

A. Shop Drawings

1. Submit in accordance with SECTION 01300
2. Include manufacturer's recommended method of joining of adjacent fabric panels.

B. Certificate of Conformance

1. Upon each shipment/delivery of product to the work site, furnish mill certificate(s) from the company manufacturing the fabric attesting that the fabric meets the chemical, physical, manufacturing and performance requirements specified. Fabric will be rejected if it is found to have defects, rips, flaws, deterioration or other damage.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Provide fabric in rolls wrapped with a heavy-duty protective covering to protect fabric from, mud, dirt, dust, debris and other deleterious sources until it is installed. Label each roll of fabric with number or symbol to identify production run.
- B. Do not expose fabric to ultraviolet radiation (sunlight) for more than 20 days total in period of time following manufacture until fabric is installed and covered.
- C. If Engineer determines material is damaged in any way or has excessive sunlight exposure, the Contractor shall immediately make all repairs and replacements as directed by the Engineer, at no additional cost to the Owner.

1.06 SCHEDULING

- A. Schedule Work so that the covering of the fabric with a layer of the cover material is accomplished immediately after inspection and approval of the placed fabric by the Engineer. Failure to comply with this requirement shall require replacement of the fabric.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER/MATERIAL

- A. The geotextile fabric shall be nonwoven polypropylene designated as MIRAFI 140N as manufactured by Nicolon Corporation/Mirafi Group, Norcross, Georgia; or acceptable equivalent and shall meet the following minimum requirements:

<u>Minimum Property (Unit)</u>	<u>Unit</u>	<u>Test Method</u>	<u>Requirements</u>
Weight	oz/sy	ASTM D5261	4.3
Grab Tensile Strength	lbs	ASTM D4632	120
Grab Tensile Elongation	%	ASTM D4632	50
Mullen Burst Strength	psi	ASTM D3786	240
Puncture Strength	lbs	ASTM D6241	310

Trapezoid Tear Strength	lbs	ASTM D4533	50
Apparent Opening Size (AOS)	US Std. Sieve (mm)	ASTM D4751	70 (0.21)
Permittivity	sec ⁻¹	ASTM D4491	1.5
Permeability	cm/sec	ASTM D4491	0.22
Flow Rate	gal/min/sf	ASTM D4491	120
Ultraviolet Resistance (strength retained at 500 hrs)	%	ASTM D4355	70

- B. To keep the number of overlay joints to a minimum, fabric shall be provided in sections not less than fifteen (15) feet in width unless otherwise approved by the Engineer prior to delivery to the site.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. For Riprap

1. Prepared areas to receive geotextile in accordance with SECTION 02100 and SECTION 02200
2. Clear subgrade of all sharp objects, large stones, roots, debris, or any other foreign materials that may contribute to puncturing, shearing, rupturing or tearing of the geotextile.
3. Grade area as smooth as possible and compact in accordance with SECTION 02200, with a vibratory roller or other method approved by the Engineer.
4. Inspect subgrade and repair all unstable areas or soft spots with the installation of gravel and recompact prior to the placement of geotextile.

3.02 FABRIC INSTALLATION

A. For Riprap

1. Place at the locations shown on the Contract Drawings.
2. Unroll directly onto the prepared slope in a continuous manner. Join adjacent sections by overlapping the fabric a minimum of 12-inches. Join end sections by overlapping the fabric a minimum of 2-feet with field-sewn joints or as recommended by the manufacturer.
3. Place fabric on slopes creating a "shingled" effect in the direction of anticipated water flow.
4. Lay fabric smooth, maximizing surface contact with the prepared subbase, free of tension, stress, folds, wrinkles, or creases.
5. Securely anchor fabric sections at the top of the slope as recommended by the manufacturer. Use anchoring pins, nails, staples or other such means to secure fabric to the subbase surface to prevent fabric movement caused by wind uplift, and/or placement of cover material.

6. Maintain sufficient amount of cover material (minimum depth of 6-inches) to protect fabric during placement of riprap. Dozer buckets or blades, or other heavy or damaging equipment shall not be in direct contact with the fabric.
7. Minimize the height from which cover material is dumped and/or dropped directly onto the fabric material in order to avoid fabric damage or movement. Equipment used for spreading and compacting the cover material shall be of the type and size to avoid damage or movement to the underlying geotextile fabric.
8. Spread cover material in the direction of fabric overlap and in a manner that avoids creating undue tension, stress, sagging, buckling and/or other movement of the underlying fabric.

B. Fabric Installation in Trenches

1. In accordance with manufacturers recommendations
2. Place fabric in trench prior to placing crushed stone pipe bedding.
3. Overlap fabric 18-inches minimum for unsewn lap joints.
4. Do not permit equipment to travel directly on fabric.
5. Place fabric in smooth condition to prevent tearing or puncture.
6. Lay fabric loosely, without wrinkles or creases.
7. Leave slack in fabric to allow for adjustment.

3.03 PROTECTION

- A. Protect the work before, during and after installation, and protect the installed work covered by other Sections.

3.04 REPAIR

- A. Geotextile fabric damaged during installation shall be repaired by a piece of geotextile material cut, placed and adequately anchored over the damaged area, subject to a 3-foot minimum overlap requirement or as directed by the Engineer.
- B. If detrimental movement of the geotextile fabric occurs during any step of the installation, as determined solely by the Engineer, the Contractor shall remove the cover material and/or sections of fabric to the limits deemed necessary and reinstall the fabric.
- C. Any fabric damage during its installation or during placement of cover materials shall be replaced by the Contractor at no additional cost to the Owner.

END OF SECTION

SECTION 02277

STRAW WATTLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements to furnish and install straw wattles, as indicated on the Drawings and as herein specified.

1.02 SUBMITTALS

- A. In accordance with SECTION 01300 submit product details, manufacturers installation instructions and certifications.

1.03 STORAGE

- A. Store wattles off the ground and covered to protect from site construction damage, precipitation, sunlight (ultraviolet light), chemicals, open flames, sparks or other conditions which may damage the rolls.

PART 2 PRODUCTS

2.01 MATERIALS

A. Straw Wattles

1. Machine produced.
2. Straw filled tubes of compacted straw of rice, wheat or barley.
3. Straw wattles to be certified as weed free.
4. Netting for tubes to be seamless, high density polyethylene with ultra violet inhibitors.
5. Roll length to be 10.0 feet to 25.0 feet.
6. Weight per linear foot,
 - a. 12-inch: 2.5 lbs. minimum
 - b. 9-inch: 1.5 lbs. minimum
7. Stakes shall be wooden, 1 1/8-inch x 1 1/8-inch x 2.5 feet long, with lower ends tapered to facilitate driving into compacted soil. Rebar may be substituted for wooden stakes.

PART 3 EXECUTION

3.01 INSTALLATION

A. Straw Wattles

1. Install at locations indicated on the Drawings or as directed by the Engineer.
2. Remove all rocks, vegetation or other obstructions at straw wattle location.
3. Excavate a trench approximately 2 to 3-inches deep to accept the straw wattle and place straw wattle in trench.
4. Anchor straw wattle with stakes placed a maximum of 4-feet apart.
5. The end stakes shall be placed 6-inches from the end of straw wattle and angled toward previously laid straw wattle to force straw wattles together.
6. Refer to detail on Drawings for additional installation requirements.

3.02 MAINTENANCE

1. Maintain straw wattles throughout the duration of the project.
 - a. Damaged or displaced straw wattles shall be replaced by the Contractor at no additional cost to the Owner.
2. Remove sediments when depths accumulate to 50% of the depth of the straw wattle height, or as necessary.

3.03 REMOVAL AT PROJECT COMPLETION

- A. Remove all sediment collected by the straw wattle, remove the straw wattle, and restore the area to pre-construction condition to the satisfaction of the Engineer.

END OF SECTION

SECTION 02500

PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for construction of all temporary and permanent pavement on paved areas affected or damaged by his operations, whether inside or outside the normal trench limits, as indicated on the drawings and as herein specified.

B. Related Sections

1. Section 02200 - Earth Excavation, Backfill, Fill and Grading

1.02 REFERENCES

- A. This specification makes reference to the requirements of additional specifications as listed. The Contractor shall obtain and familiarize himself with all requirements referenced by this specification prior to preparation and installation of any pavements.

1. The Commonwealth of Massachusetts, Massachusetts Highway Department, Standard Specifications for Highways and Bridges, dated 1988, together with all errata addenda additional revisions, and supplemental specifications, all of which are hereinafter referred to as the MassDOT Standard Specifications.

1.03 PAVEMENT SCHEDULE

- A. The Contractors attention is directed to the various pavements required under this contract, and their locations as detailed below.

- B. All pavement thickness specified in this specification shall be of the thickness required after compaction.

1. Location: All Town Roads

Temporary Pavement 2" Bituminous Binder

Permanent Trench Pavement

Type: Flexible – 4"

Requirements: 12" Dense Graded Crushed Stone

2 ½" Binder (min.)

1 ½" Surface Course

*Contractor to match existing thickness, if thicker than 4"

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Tack

1. Tack coat shall consist of emulsified asphalt, grade RS-1 or cutback asphalt, conforming to the requirements of the MassDOT Standard Specification Section M3.11.06.

B. Bituminous Base

1. Bituminous Base shall conform to the requirements of the MassDOT Standard Specification Section 420 and M3.11.00 for Base Course.

C. Bituminous Binder Trench Width (Permanent Pavement)

1. Bituminous Binder Course shall conform to the requirements of the MassDOT Standard Specification Section 420 and M3.11.00 for Binder Course.

D. Bituminous Surface, Trench Width (Permanent Pavement)

1. Bituminous Surface Course shall conform to the requirements of the MassDOT Standard Specification Section 460 and M3.11.00 for surface course Class I-1.

E. Bituminous Surface, Curb to Curb

1. Bituminous Surface Course shall conform to the requirements of the MassDOT Standard Specification Section 460 and M3.11.00 for surface course Class I-1.

F. Reinforced Concrete Base

1. Concrete Base shall conform to the requirements of the MassDOT Standard Specification, Section 430.

G. Bituminous Binder Trench Width (Temporary Pavement)

1. Temporary Pavement shall be Binder Course conforming to the requirements of the MassDOT Standard Specification Section 420 and M3.11.00 for Binder Course.

H. Dense-Graded Crushed Stone Base Course (Temporary and Permanent)

1. The dense graded crushed stone base course shall consist of coarse aggregates of crushed stone or gravel and fine aggregates of natural sand or stone screenings. Uniformly pre-mixed with a predetermined quantity of water and placed on the sub-base in close conformity with the lines and grades shown on the Contract Documents or established by the Engineer.

2. Coarse aggregate shall consist of hard, durable particles of fragments of stone. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used.
3. Coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test (AASTO-T-96) of not more than 45.
4. Fine aggregate shall consist of natural or processed sand.
5. The composite material shall be free from clay, loam or other cohesive soil, and shall conform to the following grading requirements:

Sieve Designation Mesh Sieves	Percentage by Weight Passing Square
2 in.	100
1-1/2 in.	70-100
3/4 in.	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

6. Sampling and testing shall be in accordance with the following standard AASHTO methods:

Sieve Analysis	T27
Passing No. 200 Sieve	T11

7. The dense-graded crushed stone base course shall be spread and compacted in layers not to exceed 4 inches in compacted depth, to the same tolerances specified below for the gravel sub-base.
8. The dense-graded crushed stone base course material shall meet the same requirements as specified in MassDOT Specification M2.01.7 except as noted above.

I. Gravel Sub-Base Course

1. The gravel sub-base course shall consist of Gravel Borrow Type C, as specified in MassDOT Standard Specification Section M1.03.0
2. The gravel sub-base shall be spread and compacted in one layer, 8 inches in depth compacted measurement, to not less than 95 percent of the maximum dry density of the material, as determined by the Standard AASHTO Test Designation T99 compaction test Method C within 5% of optimum moisture content as determined by the Engineer. If the material retained on the #4 sieve is 50% or more of the total sample, this test shall not apply and the material shall be compacted to the satisfaction of the Engineer. The specific density of the Gravel Sub-base shall be maintained by determining the number of passes of a roller required to produce a

constant and uniform density, after conducting a series of tests either using the sand/volume or the nuclear density-testing device.

3. Any stone with a dimension greater than 2 inches shall be removed from the sub-base before the gravel is compacted. Compaction shall continue until the surface is even and true to the proposed lines and grades within a tolerance of ½-inch above or below the required cross sectional elevations and to a maximum irregularity not exceeding ½ inch under a 10 foot line longitudinally. Any specific area a gravel sub-base which, after being rolled, does not form a satisfactory, solid, stable foundation shall be removed, replaced and recompactd by the Contractor without additional compensation.

2.02 SOURCE QUALITY CONTROL

- A. The paving plant used by the Contractor for preparation of bituminous paving materials shall be acceptable to the Engineer who shall have the right to inspect the plant and the making of the material as specified in MassDOT Specification M2.01.7 except as noted above.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prior to placing pavement, all backfill shall have been properly compacted as specified under Section 02200 to eliminate settling of backfill. No pavement shall be placed over poorly compacted backfill. Backfill and gravel base course shall be compacted, brought to the proper elevation, and dressed so that new pavement construction shall be at the required grade. The Contractor shall maintain the surfaces of all excavated and disturbed areas until the pavement is placed. If there is a time lapse of more than 24 hours between completion of preparation of subgrade or placing of gravel base course and placing of paving, or if subgrade or gravel base course has been eroded or disturbed by traffic, the subgrade or gravel base course shall be restored before placing pavement.
- B. When installing permanent pavement on bituminous concrete roadway the edges of existing pavement shall be cut back 12-inches, or more as required, from the trench excavation wall or damaged area to sound undamaged material, straightened, cleaned, and painted with an accepted asphalt emulsion to ensure a satisfactory bond between it and the newly placed surface courses. Existing surface courses shall be stripped from the bituminous concrete base course for at least a 6-inch width and trimmed square and straight so that new permanent surfacing shall be placed on undisturbed bituminous concrete base course. Existing pavement shall be swept clean prior to placing any asphalt emulsion over it. Existing pavement that will be under new pavement shall be painted with asphalt emulsion to ensure a satisfactory bond.
- C. Before permanent pavement is installed, the base shall be brought to the proper grade, and temporary pavement and excess gravel base shall be removed.

- D. All manhole covers, catch basin grates, valve and meter boxes, curbs, walks, walls and fences shall be adequately protected and left in a clean condition. Where required, the grades of manhole covers, catch basin grates, valve boxes, and other similar items shall be adjusted to conform to the finished pavement grade.
- E. The Contractor shall remove and acceptably dispose of all surplus and unsuitable material.

3.02 INSTALLATION

A. General

- 1. Unless indicated otherwise, all permanent bituminous pavement shall be installed in two courses or more. Bituminous base courses shall be carefully spread and raked to a uniform surface and thoroughly rolled before application of the top course.
- 2. All top courses of permanent paving shall be applied with acceptable mechanical spreaders in widths of at least 9 feet.
- 3. The rolling for all bituminous and gravel base courses shall conform to the standards listed in the appropriate Subsection of the Standard Specification.
- 4. Pavement shall be placed so that the entire roadway or paved area shall have a true and uniform surface, and the pavement shall conform to the proper grade and cross section with a smooth transition to existing pavement.
- 5. Total tonnage slips must be submitted from the production plant.

B. Dense Graded Crushed Stone Base Course

- 1. The base course shall be placed to such depth that the furnished compacted base course is the depth as indicated on the Contract Drawings and specified herein.
- 2. The top of the base course shall be below the furnish grade a distance required to accommodate the compacted pavement material as indicated on the Contract Drawings and specified herein.
- 3. The base course as herein specified shall be 10-inches thick for flexible pavement and 6-inches thick for rigid pavement.

C. Temporary Pavement

- 1. Temporary pavement shall be placed over all trenches in paved areas where directed by the Engineer.
- 2. The Contractor, upon completing the backfilling and compaction of the trenches in the streets and the placing of the gravel base courses, shall be required to construct temporary pavement unless otherwise directed by the Engineer.
- 3. Temporary Pavement in Town or City roads shall be placed in one course and shall consist of 2-inch compacted thickness of hot bituminous mix, on a 12-inch

compacted thickness (14-inches on Beacon Street) dense graded crushed stone base as directed by the Engineer.

4. The Contractor shall maintain temporary pavement in good repair and flush with the existing pavement at all times until the permanent pavement is placed.
5. The temporary pavement shall not be removed until 60 days after installation or until such time that the Engineer authorizes the placement of permanent pavement at an earlier time.

D. Bituminous Base:

1. Bituminous Base shall be used in town streets and parking areas as listed in Article 1.03 of this specification.
2. Bituminous Base shall be placed to the thickness as indicated in Article 1.03 of this Specification and installed in accordance with the requirements of the MassDOT Standard Specification and as detailed in the Contract Drawings.
3. Prior to placing bituminous base, all temporary pavement and sufficient gravel base course shall be removed, to proper depths as detailed in the Contract Drawings.

E. Reinforced Concrete Base:

1. Reinforced Concrete Base shall be used in the streets as listed in Article 1.03 of this specification.
2. Reinforced Concrete Base shall be 8-inch thick and installed in accordance with the requirements of the MassDOT Standard Specification.
3. Prior to placing reinforced concrete base, all temporary pavement and sufficient gravel base course shall be removed, to proper depths as detailed in the Contract Drawings.

F. Bituminous Binder

1. Bituminous Binder shall be used in the streets as listed in Article 1.03 of this specification.
2. Bituminous Binder shall be placed to the thickness as indicated in Article 1.03 of this Specification and installed in accordance with the requirements of the MassDOT Standard Specification and as detailed in the Contract Drawings.

G. Bituminous Surface

1. Bituminous Surface shall be used in the streets as listed in Article 1.03 of this specification.
2. Bituminous Surface shall be placed to the thickness as indicated in Article 1.03 of this Specification and installed in accordance with the requirements of the MassDOT Standard Specification and as detailed in the Contract Drawings.

H. Sidewalks, Driveways, Parking Lots and Curbing

1. Sidewalks, driveways, parking lots and curbing that are removed or damaged by the Contractor's operations shall be restored to a condition at least equal to that in which they are found immediately prior to the start of operations. Materials and methods used for such restoration shall be in conformance with the requirements of the MassDOT Standard Specification.
2. Where the trench location is in a sidewalk, the entire width of the sidewalk shall be replaced with new material. Side forms shall be set so as to obtain and preserve a straight edge along both sides of the walk.
3. Where trench is in a driveway, the driveway shall be repaved across its entire width with even edges.
4. Parking lots shall be repaved in accordance with Article 3.01 of this section.
5. Gravel base course under sidewalks and driveways shall not be less than 12" inch thick.

I. Surface Maintenance

1. During the guarantee, period, the Contractor shall maintain the bituminous surface and shall promptly make good all defects such as cracks, depressions, and holes that may occur. At all times, the surfacing shall be kept in a safe and satisfactory condition for traffic. If defects occur in surfacing constructed by the Contractor, the Contractor shall remove all bituminous concrete and base course as is necessary to properly correct the defect. After removing bituminous concrete and base course, the Contractor shall correct the cause of the defect and replace the base course and bituminous concrete in accordance with these specifications.

END OF SECTION

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SECTION 02618

DUCTILE-IRON PIPE AND FITTINGS
FOR BURIED SERVICE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements to furnish, lay, joint, and test ductile-iron pressure pipe, fittings (including special castings), and appurtenant materials and equipment indicated on the Drawings and specified in this Section.

1.02 REFERENCES

- A. American Water Works Association (AWWA)/American National Standards Institute (ANSI)
 - 1. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - 2. C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems
 - 3. C110/A21.10, Ductile-Iron and Gray-Iron Fittings, 3-inch. through 48-inch., for Water and Other Liquids.
 - 4. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron and Pressure Pipe and Fittings.
 - 5. C115/A21.15, Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - 6. C150/A21.50, Thickness Design of Ductile-Iron Pipe.
 - 7. C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast for Water.
 - 8. C153/A21.53, Ductile-Iron Compact Fittings, 3 inches through 24 inches, and 54 inches through 64 inches for Water Service
 - 9. C600, Installation of Ductile-Iron Water Mains and Their Appurtenances
 - 10. C651, Disinfecting Water Mains
- B. American Society of Testing and Materials (ASTM)
 - 1. A536, Standard Specification for Ductile Iron Castings

1.03 REQUIREMENTS

- A. Ductile iron pipe used for water mains shall be cement lined Pressure Class 350 push-on joint, size as indicated on the drawings.
- B. For sewer pipeline use class as indicated.
- C. Location of restrained joints shall be based on Thrust Restraint Design for Ductile Iron Pipe (Second Edition), published by Ductile Iron Pipe Research Association.

1.04 SUBMITTALS

- A. In accordance with SECTION 01300 submit the following:

B. Shop Drawings

1. Piping layouts in full detail.
2. Location and type of backup block or device to prevent separation.
3. Schedules of all pipe, fittings, special castings, couplings, expansion joints, restrained joints and other appurtenances.

C. Certificates

1. Sworn certificates of shop tests showing compliance with specified standard.

D. Manufacturer's Literature

1. Catalog cuts of joints, couplings, harnesses, expansion joints, restrained joints gaskets, fasteners and other accessories.
2. Brochures and technical data of coatings and lining's and proposed method of application.

1.05 QUALITY ASSURANCE

A. Pipe and fittings shall be inspected and tested at the foundry as required by the corresponding standards listed in Article 1.02 of this specification.

B. Owner reserves right to inspect and/or test by independent service at manufacturer's plant or elsewhere at his own expense.

PART 2 PRODUCTS

2.01 PIPE

A. Ductile-Iron Pipe

1. Designed in accordance with AWWA/ANSI C150/ A21.50.
2. Manufactured in accordance with AWWA/ANSI C151/A21.51.
3. Unless otherwise indicated or specified, ductile-iron pipe shall be at least thickness Class 52.
4. Pipe shall be manufactured by U.S. Pipe and Foundry Company, McWane Ductile, American Pipe, or approved equal.
5. The pipe shall be wrapped in polyethylene if the soil conditions are found to be corrosive in accordance with ANSI/AWWA C105/A21.5 or ASTM A674. Soil corrosivity testing shall be performed by a N.A.C.E. International certified personnel. All contractors installing pipe are required to perform this test and provide the results to the **Wareham Fire District**.

B. Pipe For Use With Couplings

1. As specified above except that the ends shall be plain (without bells or beads) cast or machined at right angles to the axis.

2.02 FITTINGS

A. General

1. Push-on or mechanical-joint fittings shall be all-bell fittings unless otherwise indicated or specified.
2. Compact fittings in accordance with AWWA/ANSI C153/A21.53 and shall have a working pressure rating of 350 psi.
3. All nuts and bolts shall be of a type equal to ductile iron or KOR-10 steel T-bolts and nuts. All studs and bolts shall be provided with sacrificial zinc end caps meeting ASTM B418-80 as manufactured by MARS (6 oz) of Ocala, FL., Northtown Company of Huntington Beach, CA., or approved equal.
4. The fitting shall be wrapped in polyethylene if the soil conditions are found to be corrosive.

B. Zinc Coating

1. Consists of a layer of arc applied or paint applied, 99.99% pure zinc coating having a mass of 200g/m².
2. Outside of pipe and fittings shall be coated with the standard bituminous coating conforming to AWWA/ANSI C151/A21.51.
3. Pipe Markings shall include the word "Zinc" in the pipe markings or label required by AWWA C-151 and/or other markings as deemed appropriate by the manufacturer.
4. Shall comply with all applicable parts of ISO 8179 for zinc coatings.
5. Minor scratches in the zinc coating will not need to be repaired due to the self-healing nature of zinc coatings but larger areas shall be repaired by field application of a zinc rich paint in accordance with ISO 8179.

C. Nonstandard Fittings

1. Fittings having nonstandard dimensions and cast especially for this project shall be of acceptable design.
2. Manufactured to meet the requirements of these specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect.

2.03 ADAPTERS

- A. Where it is necessary to joint pipes of different type, furnish and install the necessary adapters unless solid sleeves are indicated on the drawings or permitted. Adapters shall have ends, conforming to the above specifications for the appropriate type of joint, to receive the adjoining pipe. Adapters joining two classes of pipe may be of the lighter class provided that the annular space in bell-and-spigot type joints will be sufficient for proper jointing.

2.04 JOINTS

A. General

1. All nuts and bolts shall be of a type equal to ductile iron or KOR-10 steel T-bolts and nuts. All studs and bolts shall be provided with sacrificial zinc end caps meeting ASTM B418-80 as manufactured by MARS (6 oz) of Ocala, FL., Northtown Company of Huntington Beach, CA., or approved equal.

B. Push-On and Mechanical

1. In accordance with AWWA/ANSI C111/A21.11.
2. The plain end of push-on pipe shall be factory machined to a true circle and chamfered to facilitate fitting the gasket.
3. Push-on and mechanical-joint pipe and fittings shall be provided with sufficient quantities of accessories conforming to AWWA/ANSI C111/A21.11.

C. Restrained

1. Restraining glands will be required on all fittings.
2. Pipe, fittings and appurtenances for restrained joints shall be in accordance with AWWA/ANSI C153/A21.53 for compact fittings. Only restraining glands which impart multiple wedging action against the pipe increasing its pressure as the pipe pressure increases will be allowed. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536. Twist off nuts shall be used to insure proper actuating of the restraining device.
3. Mechanical joint restraint shall have a working pressure rating of at least 250 psi.
4. The restrained joint devices shall be UL listed.
5. Manufactured by EBAA Iron, Inc., Eastland, Texas, or equal.

D. Gaskets

1. Gaskets shall be of a composition suitable for exposure to the product which the pipe is intended.

2.05 COUPLINGS

A. Flexible Connections

1. Where flexible connections in the piping are specified or indicated on the drawings, they shall be obtained by the use of sleeve-type couplings, split couplings, or mechanical-joint pipe and/or fittings as herein specified.

B. Sleeve Type Couplings

1. Pressure rating at least equal to that of the pipeline in which they are to be installed.
2. Provide cast style 441 by Smith Blair, Inc., Texarkana, Texas.; Dresser style 153, 360; Romac Style 501; or be acceptable equivalent products.
3. Provided with galvanized-steel bolts and nuts, unless noted otherwise.
4. Provided with gaskets of a composition suitable for exposure to the liquid within the pipe.
5. Provided gaskets with metallic tips for electrical continuity through joints.

C. Solid Sleeve Couplings

1. Solid sleeve couplings and accessories shall be of a pressure rating at least equal to that of the pipeline in which they are to be installed.
2. Couplings shall be ductile iron with gaskets of a composition suitable for exposure to the liquid within the pipe.

2.06 ACCESSORIES

A. Tapped Connections

1. Tapped connections shall be rated for 300 psi.

2. Tapped connections in pipe and fittings shall be made in such manner as to provide a watertight joint and adequate strength against pullout. The maximum size of taps in pipe or fittings without bosses shall not exceed the listed size in the appropriate table of the Appendix to the above-mentioned ANS A21.51 based on 3 full threads for cast iron and 2 full threads for ductile iron.
3. Where the size of the connections exceeds that given above for the pipe in question, a boss shall be provided on the pipe barrel, the tap shall be made in the flat part of the intersection of the run and branch of a tee or cross, or the connection shall be made by means of a tapped tee, branch fitting and tapped plug or reducing flange, or tapping tee and tapping valve, all as indicated or permitted by the Engineer.
4. All drilling and tapping of cast-iron pipe shall be done normal to the longitudinal axis of the pipe; fitting shall be drilled and tapped similarly, as appropriate. Drilling and tapping shall be done only by skilled mechanics. Tools shall be adapted to the work and in good condition so as to produce good, clean-cut threads of the correct size, pitch, and taper.

2.07 FINISHES

A. Lining

1. Inside of pipe and fittings shall be coated with double thickness cement lining and bituminous seal coat conforming to AWWA/ANSI C104/A21.4.

B. Coating

1. Consists of a layer of arc applied or paint applied, 99.99% pure zinc coating having a mass of 200g/m².
2. Outside of pipe and fittings shall be coated with the standard bituminous coating conforming to AWWA/ANSI C151/A21.51.
3. Pipe Markings shall include the word "Zinc" in the pipe markings or label required by AWWA C-151 and/or other markings as deemed appropriate by the manufacturer.
4. Shall comply with all applicable parts of ISO 8179 for zinc coatings.
5. Minor scratches in the zinc coating will not need to be repaired due to the self-healing nature of zinc coatings but larger areas shall be repaired by field application of a zinc rich paint in accordance with ISO 8179.
6. Outside surfaces of castings to be encased in concrete shall not be coated.
7. Machined surfaces shall be cleaned and coated with a suitable rust-preventative coating at the shop immediately after being machined.

PART 3 EXECUTION

3.01 HANDLING

A. Pipe and Fittings

1. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coatings.

2. Any fitting showing a crack and any pipe or fitting which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the Work.
3. In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved, may be cut off by and at the expense of the Contractor before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.

3.02 CUTTING

A. Pipe

1. Except as otherwise approved, all cutting shall be done with a machine having rolling wheel cutters, knives, or saws adapted to the purpose. Hammer and chisel or so-called wheel span cutters shall not be used to cut pipe. All cut ends shall be examined for possible cracks caused by cutting.
2. Cut ends to be used with push-on joints shall be carefully chamfered to prevent cutting the gasket when the pipe is laid or installed.

3.03 INSTALLATION

A. Pipe and Fittings

1. No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.
2. Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.
3. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.
4. Pipe shall have a firm bearing along its entire length.
5. The deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in the tabulation titled PIPE DEFLECTION ALLOWANCES.

PIPE DEFLECTION ALLOWANCES

Maximum permissible deflection, in.*

<u>Size of pipe, in.</u>	<u>push-on joint</u>	<u>Mechanical joint</u>
4	17	28
6	17	24
8	17	18
10	17	18
12	17	18
14	10	12
16	10	12

*Maximum permissible deflection for 18-ft. lengths; maximum permissible deflections for other lengths shall be in proportion of such lengths to 18 ft.

6. When mechanical joint, push-on joint or similar pipe is laid, the bell of the pipe shall be cleaned of excess tar or other obstructions and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed.

B. Castings

1. Castings to be encased in masonry shall be accurately set with the bolt holes, if any, carefully aligned.
2. Immediately prior to being set, castings shall be thoroughly cleaned of all rust, scale and other foreign material.

C. Temporary Plugs

1. At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

D. Appurtenances

1. Valves, fittings and appurtenances shall be set and jointed as indicated on the drawings.

3.04 ASSEMBLING

A. Push-On Joints

1. Make up by inserting the gasket into the groove of the bell and applying a thin film of special nontoxic gasket lubricant uniformly over the inner surface of the gasket which will be in contact with the spigot end of the pipe.
2. The chamfered end of the plain pipe shall be inserted into the gasket and then forced past it until it seats against the bottom of the socket.

B. Bolted Joints

1. Before the pieces are assembled, rust-preventive coatings shall be removed from machined surfaces.
2. Pipe ends, sockets, sleeves, housings, and gaskets shall be thoroughly cleaned and all burrs and other defects shall be carefully smoothed.

C. Mechanical Joints

1. Surfaces against which the gasket will come in contact shall be thoroughly brushed with a wire brush prior to assembly of the joint. The gasket shall be cleaned. The gasket, bell, and spigot shall be lubricated by being washed with soapy water.
2. The gland and gasket, in that order, shall be slipped over the spigot, and the spigot shall be inserted into the bell until it is correctly seated.
3. The gasket shall then be seated evenly in the bell at all points, centering the spigot, and the gland shall be pressed firmly against the gasket.

4. After all bolts have been inserted and the nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint to the proper tension, preferably by means of a torque wrench.
5. The correct range of torque as indicated by a torque wrench and the length wrench (if not a torque wrench) used by an average man to produce such range of torque, shall not exceed the values specified in the tabulation titled TORQUE RANGE VALUES.

TORQUE RANGE VALUES

Nominal pipe size, <u>in. in.</u>	Bolt diameter, <u>ft.-lb.</u>	Range of torque, <u>in.</u>	Length of wrench,
3	5/8	40-60	8
4 thru 24	3/4	60-90	10
30, 36	1	70-100	12
42, 48	1-1/4	90-120	14

If the effective sealing of the joint is not attained at the maximum torque indicated above, the joint shall be disassembled and thoroughly cleaned, then reassembled. Bolts shall not be over stressed to tighten a leaking joint.

D. Restrained Joints

1. Install in accordance with manufacturers written instructions.
2. Do not exceed manufacturer's permissible pipe deflection allowance.

E. Sleeve-Type Couplings

1. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8-inches
2. Soapy water may be used as a gasket lubricant.
3. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6-inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint.
4. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid.
5. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares.
6. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts. The correct torque as indicated by a torque wrench shall not exceed the manufacturers recommended values
7. After assembly and inspection and before being backfilled, all exterior surfaces of buried sleeve-type couplings, including the middle and follower rings, bolts, and nuts, shall be thoroughly coated with an approved heavy-bodied bituminous mastic. Care shall be taken and appropriate devices used to ensure that the undersides, as well as the more readily accessible parts, are well coated.

3.05 PIPING SUPPORT

- A. Where necessary, bends, tees, and other fittings in pipelines buried in the ground may be backed up with Class B concrete placed against undisturbed earth where firm support can be obtained. If the soil does not provide firm support, then restraining devices shall be provided.

3.06 CLEANING

- A. Prior to the pressure and leakage tests, thoroughly clean piping of all dirt, dust, oil, grease and other foreign material. This work shall be done with care to avoid damage to linings and coatings.

3.07 TESTING

- A. Except as otherwise directed, pipelines shall be given combined pressure and leakage tests in sections of approved length.
- B. Furnish and install suitable temporary testing plugs or caps; all necessary pressure pumps, pipe connections, meters, gages, relief valves, other necessary equipment; and all labor required.
- C. Subject to approval and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.
- D. However, pipelines to be embedded in concrete shall be tested prior to placing of the concrete and exposed piping shall be tested prior to field painting.
- E. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality, and all air shall be expelled from the pipe. If hydrants or blow offs are not available at high points for releasing air the Contractor shall make the necessary excavations and do the necessary backfilling and make the necessary taps. After completion of the tests, if directed by the Engineer, remove corporations and plug said holes.
- F. The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.
- G. The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test and corrected to the gage location) to a pressure of 200 psi. Do not apply this pressure to items of equipment known to be incapable of withstanding such pressure.
- H. If the Contractor cannot achieve the specified pressure and maintain it for a period of two hours with no additional pumping, the section shall be considered as having failed to pass the test.
- I. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test and is considered acceptable by the Engineer.

- J. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure may be made as required and approved by the Engineer, but in any event the Contractor shall be fully responsible for the ultimate tightness of the line within the above leakage and pressure requirements.
- K. All testing to be witnessed by the Owner.

3.08 DISINFECTING AND FLUSHING

- A. The Contractor shall hire an independent firm to disinfect the lines carrying potable water.
- B. The Contractor shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in the AWWA Standard C651 and C651a except as otherwise specified herein. The method used shall be that described in Section 5.2 of the AWWA Standard.
- C. During the disinfection period, care shall be exercised to prevent contamination of water in existing mains.
- D. The dosage shall be such as to produce a chlorine concentration of not less than 10 PPM (mg/l) after a contact time of not less than 24 hours.
- E. Connection at cut-ins shall be swabbed with 50-PPM solution of chlorine at locations when other methods are not applicable.
- F. Chlorine shall not be placed in mains during installation.
- G. Chlorine shall not be left in mains for more than 48 hours.
- H. After treatment, the main shall be flushed with clean water until the residual chlorine content does not exceed 0.2 PPM (mg/l).
- I. Before disposing of the water used in disinfecting and flushing water mains thoroughly neutralize it through the application of a reducing agent, as referenced in AWWA C651.
- J. Dispose of the water used in disinfecting and flushing in an approved manner.
- K. After final flushing, two consecutive bacteriological water sample points shall be collected at least 24 hours apart, from the new water main at each selected point. Spacing of samples shall not exceed 1,000 feet. In addition, one sample set shall be collected from the point of water entry into the new main, at the ends of the new main, and at the ends of all branches off the new main. Hoses or hydrants may not be used for the collection of samples.
- L. If dirt or debris has entered the new main during construction, bacteriological sample sets shall be collected at 200-foot intervals as directed by the Engineer.
- M. Consecutive sampling shall be repeated for any failure until both samples within each set meet the acceptance criteria described below.
- N. Bacteriological sampling and testing shall be done in accordance with AWWA C651 for each main and each branch. Sampling shall be accomplished with sterile bottles treated with sodium thiosulfate, as required by Standard Methods. A corporation stop installed on the

main, with a removable copper tube gooseneck assembly, is the recommended method. The approved laboratory must receive samples, properly preserved, no more than 24 hours after they are taken from the main.

- O. Test results shall demonstrate that all samples have a total coliform count of zero and a heterotrophic plate count (HPC) of less than 100 per ml above the HPC of the existing system. In no case shall the total HPC exceed 500 per ml.
- P. Testing shall be done by a certified DEP laboratory approved by the Engineer, in accordance with Standard Methods, and shall show the absence of coliform organisms.
- Q. The cost for all work associated with flushing, disinfecting, dechlorination, sampling and laboratory analysis shall be paid for by the Contractor
- R. When tests indicate Work does not meet specified requirements, perform remedial work as directed by the Engineer and retest at the Contractor's expense.

END OF SECTION.

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SECTION 02622

POLYVINYL CHLORIDE GRAVITY SEWER PIPE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for furnishing, installing and testing polyvinyl chloride (PVC) gravity sewer pipe and fittings.

B. Related Sections

1. Section 02200 - Earthwork
2. Section 02215 - Aggregate Materials

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM) Publications

1. D3034, Specification for Type PSM Poly (vinyl chloride) (PVC) Sewer Pipe and Fittings.
2. D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastometric Seals.
3. F477, Specification for Elastometric Seals (Gaskets) for Joining Plastic Pipe.
4. F679, Specification for Poly (vinyl chloride) (PVC) Large - Diameter Plastic Gravity Sewer Pipe and Fittings.

1.03 SUBMITTALS

A. Shop Drawings

1. In accordance with SECTION 01300 - SUBMITTALS.
2. Submit for review shop drawings showing pipe dimensions, joints, joint gaskets, and other details for each size of pipe to be furnished for the project.
3. All pipe furnished under the contract shall be manufactured only in accordance with the Specifications and the reviewed drawings.

B. Samples

1. Submit samples of products if requested by the Engineer.

1.04 QUALITY ASSURANCE

A. Certifications

1. All pipe delivered to the job site shall be accompanied by test reports certifying that the pipe and fittings conform to the herein-mentioned ASTM specifications.
2. Pipe shall be subject to thorough inspection and tests, the right being reserved for the Engineer to apply such tests as he deems necessary.
3. All tests shall be made in accordance with the methods prescribed by the herein-mentioned ASTM specifications, and the acceptance or rejection shall be based on the test results.
4. Assist the Engineer in inspecting the pipe upon delivery.
5. Pipe not conforming to the requirements of this contract will be rejected and shall be immediately removed from the site by the Contractor.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection

1. All pipe shall be stored at the site until installation in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe, Fittings, And Specials

1. Diameters 4-inch through 15-inch, in conformance with ASTM D3034
2. Diameters 18-inch through 27-inch in conformance with ASTM F679 (Wall thickness T-1).
3. The pipe shall have pipe diameter to wall thickness ratio (SDR) of a maximum of 35, unless otherwise indicated and/or approved by the Engineer.

B. Straight Pipe

1. Lengths of not more than 13 ft..

C. Y-branches

1. Lengths of not more than 3 ft., unless otherwise permitted by the Engineer.
2. Saddle Y-branches will not be allowed.

D. Specials

1. Conform to the specifications for straight pipe as applicable and to the details indicated on the drawings or bound into the back of the specifications.

E. Joints

1. Conforming to ASTM D3212.
2. Push-on bell and spigot joints using elastomeric ring gaskets

F. Gaskets

1. Conforming to ASTM F477.
2. Securely fixed into place in the bells so that they cannot be dislodged during joint assembly.
3. Composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.

G. Lubricant

1. In accordance with manufacturers requirements.

PART 3 EXECUTION

3.01 PREPARATION

A. Inspection of Pipe

1. Inspect each pipe unit before being installed.
2. No single piece of pipe shall be laid unless it is generally straight and undamaged.
3. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 in. per ft. of length.
4. If a piece of pipe fails to meet this required check for straightness, it shall be rejected and removed from the site.
5. Any pipe unit or fitting discovered to be defective either before or after installation shall be removed and replaced with a sound unit.

B. Handling of Pipe

1. Each pipe unit shall be handled into its position in the trench, by such means as acceptable to the Engineer. Care shall be taken to avoid damaging the pipe and fittings.

3.02 INSTALLATION

A. Placement

1. Except as otherwise indicated on the drawings, support pipe with compacted Crushed Stone in accordance with Specification SECTION 02215. No pipe or fitting shall be permanently supported on saddles, blocking, or stones.
2. Provide suitable depressions in crushed stone to accept pipe bells, so that after placement, only the barrel of the pipe receives bearing pressure from the supporting material.
3. Clear pipe and fittings of debris, dirt, etc., before being installed, keep clean until accepted in the completed work.
4. Install pipe and fittings to the lines and grades indicated on the drawings or as required by the Engineer. Care shall be taken to ensure true alignments and gradients.

B. Joining Pipe

1. Before any joint is made, the previously installed unit shall be checked to assure that a close joint with the adjoining unit has been maintained and that the inverts are matched and conform to the required grade.
2. The pipe shall not be driven down to the required grade by striking it with a shovel handle, timber or other unyielding object.
3. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be lubricated in accordance with the manufacturer's recommendation.
4. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket.
5. Suitable devices shall be used to force the pipe units together so that they will fit with a minimum open recess inside and outside and have tightly sealed joints.
6. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends.
7. Joints shall not be "pulled" or "cramped" unless permitted by the Engineer.
8. Where any two pipe units do not fit each other closely enough to enable them to be properly jointed, they shall be removed and replaced with suitable units.
9. Gasket installation and joint assembly shall follow the directions of the manufacturers of the joint material and of the pipe, all subject to review by the Engineer. The resulting joints shall be watertight and flexible.
10. Open ends of pipe and branches shall be closed with polyvinyl chloride stoppers secured in place in an acceptable manner.

C. Rejecting Pipe

1. Pipe of a particular manufacturer may be rejected if there are more than five unsatisfactory joint assembly operations or "bell breaks" in 100 consecutive joints, even though the pipe and joint conform to the appropriate ASTM

Specifications as hereinbefore specified. If the pipe is unsatisfactory, as determined above, the Contractor shall, if required, remove all pipe of that manufacturer of the same shipment from the work and shall furnish pipe from another manufacturer which will conform to all of the requirements of these specifications.

D. Bedding Pipe

1. After each pipe has been properly placed, enough crushed stone shall be placed between the pipe and the sides of the trench, and thoroughly compacted, to hold the pipe in correct alignment.
2. Bell holes (depressions) , provided for jointing, shall be filled with crushed stone and compacted, and then crushed stone shall be placed and compacted to complete the pipe bedding, as indicated on the drawings.

E. Protecting Pipe

1. Take all necessary precautions to prevent flotation of the pipe in the trench.
2. Close the open ends of the pipe with temporary watertight plugs, at all times pipe installation is not in progress.
3. If water is in the trench when work is to be resumed, the plug shall not be removed until suitable provisions have been made to prevent water, earth, or other substances from entering the pipe.
4. Pipelines shall not be used as conductors for trench drainage during construction.

F. Backfilling Pipelines

1. In accordance with SECTION 02200.

3.03 ALLOWABLE PIPE DEFLECTION

- A. Pipe provided under this specification shall be installed not exceeding a maximum deflection of 7.5 percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
- B. Upon completion of a section of sewer, including placement and compaction of backfill, the Contractor shall measure the amount of deflection by pulling a specially designed gauge assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
- C. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.

3.04 CLEANING

- A. Care shall be taken to prevent earth, water, and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, clean out the pipeline and manholes, being careful to prevent soil, water, and debris from entering any existing sewer.

3.05 FIELD QUALITY CONTROL

A. Pipeline Flushing

1. Care shall be taken to prevent earth, water, and other materials from entering the pipe.. As soon as possible after the pipe and manholes are completed on any street, flush out the new pipeline, using a rubber ball ahead of the water, flushing water or debris will not be permitted to enter any existing sewer.

B. Inspection By Light

1. The alignment of the pipe will be checked by shining a flashlight through the pipe from one manhole to the adjacent manhole. The inspector must be able to see the full circumference of the lighted pipe for its entire length when looking through the pipe from the adjacent manhole towards the manhole from which the light is being emitted.

C. Leakage Tests

1. The pipeline shall be made as nearly watertight as practicable, and leakage tests and measurements shall be made after the pipeline has been backfilled.
2. Where the groundwater level is more than 1 ft. above the top of the pipe at its upper end, the Contractor shall conduct either infiltration tests or low pressure air tests.
3. Where the groundwater level is less than 1 ft. above the top of the pipe at its upper end, conduct either exfiltration tests or low-pressure air tests.
4. At the time of the test, determine the groundwater elevation from observation wells, excavations or other means, all subject to review by the Engineer.
5. For making the infiltration and exfiltration tests, furnish suitable test plugs, water pumps, and appurtenances, and all labor required to properly conduct the tests on sections of acceptable length.
6. The sewers shall be tested before any connections are made to buildings.
7. Provide all instruments, weirs, bulkheads, water and equipment required to test the sewer.
8. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing leaks and retesting as the Engineer may require without additional compensation.
9. If, in the judgment of the Engineer, it is impracticable to follow the procedures specified in this Specification for any reason, acceptable modifications in the

procedures shall be made as required, but in any event, the Contractor shall be responsible for the ultimate tightness of the line.

D. Low Pressure Air Test

1. For making the low-pressure air tests, use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. The equipment shall be provided with an air regulator valve or air safety so set that the internal air pressure in the pipeline cannot exceed 8 psig.
2. The leakage test using low pressure air shall be made on each manhole-to-manhole section of pipeline after placement of the backfill.
3. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
4. All air used shall pass through a single control panel.
5. Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig. greater than the maximum pressure exerted by the groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure exerted by the groundwater is greater than 4 psig., conduct only an infiltration test.
6. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig (greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe) shall not be less than that shown in the following table:

<u>Pipe diameter in inches</u>	<u>Minutes</u>	<u>Pipe diameter in inches</u>	<u>Minutes</u>
6	3.0	18	9.0
8	4.0	21	10.0
10	5.0	24	11.5
12	5.5	27	13.0
15	7.5		

E. Infiltration Test

1. For making the infiltration tests, underdrains, if used, shall be plugged and other groundwater drainage shall be stopped to permit the groundwater to return to its normal level insofar as practicable.
2. Upon completion of a section of the sewer, dewater it and conduct a satisfactory test to measure the infiltration for at least 24 hours. The amount of infiltration, including manholes, tees, and connections, shall not exceed 200 gal. per inch diameter per mile of sewer per 24 hours.

F. Exfiltration Test

1. For making the exfiltration tests, the sewers shall be subjected to an internal pressure by plugging the pipe at the lower end and then filling the pipelines and manholes with clean water to a height of 2 ft. above the top of the sewer at its upper end. Where conditions between manholes, may result in test pressures which would cause leakage at the stoppers in branches, provisions shall be made by suitable ties, braces, and wedges to secure the stoppers against leakage resulting from the test pressure.
2. The rate of leakage from the sewers shall be determined by measuring the amount of water required to maintain the level 2 ft. above the top of the pipe.
3. Leakage from the sewers under test shall not exceed the requirements for leakage into sewers as hereinbefore specified.

G. Closed-Circuit Television (CCTV) Inspection

1. In locations where the new sewer main pipe replaces an existing sewer, service connections are reconnected to the new pipe, and leakage tests cannot be performed, the sewer pipe shall be inspected by closed-circuit television (CCTV) equipment specifically designed for this purpose.
2. Inspection shall be conducted in accordance with Specification Section 02764.

END OF SECTION

SECTION 02626

HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR PRESSURE SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements to furnish, install, and test high density polyethylene (HDPE) pressure pipe, fittings, and appurtenant materials.

B. Related Sections

1. Section 02200 - Earth Excavation, Backfill, Fill and Grading.
2. Section 02215 - Aggregate Materials
3. Section 02619 - Underground Utility Marking Tape

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM).

1. D1248, Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
2. D3261, Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
3. D3350, Specification for Polyethylene Plastics Pipe and Fittings Materials.
4. F714, Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01300.

1. Pipe Installation Plan
 - a. The plan shall address temporary pipe storage, method of assembly, methods of installation, methods of fusion and qualifications of personnel performing the Work, pipe and joint inspection, and the hydrostatic pretest.
2. Shop Drawings
 - a. Showing pipe and fitting dimensions, schedules and other details for each size of pipe to be furnished for the project.
3. Samples
 - a. Samples of products if requested by the Engineer.

1.04 SITE CONDITIONS

A. Subsurface Data

1. NOT USED

B. Existing Utilities

1. Verify all existing utilities in accordance with Section 00700, 1.08.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe and Fittings

1. Pipe and fittings shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.
2. Materials used for the manufacture of polyethylene pipe and fittings shall be PE3408 high density polyethylene meeting cell classification 345444C or 345444E per ASTM D3350; and meeting Type III classification, per ASTM D 1248; and shall be Listed in the name of the pipe and fitting Manufacturer in PPI Plastic Pipe Institute) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73 °F.
3. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meets the above requirements.

2.02 METHOD OF MANUFACTURE

A. Pipe

1. Pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other faults.
2. Polyethylene pipe have a minimum SDR of 17 and shall be manufactured in accordance with ASTM F714, and shall be so marked.
3. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and ring tensile strength.

B. Fittings and Custom Fabrications

1. General
 - a. Molded or fabricated by the pipe manufacturer.
 - b. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe.
 - c. Fully rated for the same internal pressure as the mating pipe.
 - d. Pressure de-rated fabricated fittings are prohibited.
2. Molded Fittings.
 - a. Manufactured in accordance with ASTM D3261, and shall be so marked.
 - b. Each production lot of molded fittings shall be subjected to the tests required under ASTM D3261.
3. Fabricated Fittings.
 - a. Manufactured by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings.
 - b. Fully rated for internal pressure service at least equal to the full service pressure rating of the mating pipe.
 - c. Part drawings shall be submitted for the approval of the Project Engineer.

2.03 RESTRAINTMENT

A.

2.04 UNDERGROUND UTILITY MARKING

- A. In accordance with Specification SECTION 02629.

PART 3 EXECUTION

3.01 PROTECTION OF EXISTING STRUCTURES, UTILITIES, AND PAVEMENT

- A. Maintain all excavations, and dewatering systems to protect existing structures, utilities, and other facilities that are to remain in service.
- B. Obtain utility locations from the Owner and protect all existing utilities so that no damage occurs from construction. The contractor shall be solely responsible for all damage to utilities. Observe all rules and regulations governing utilities and notify utility owners in advance of all intended work involving or affecting utilities.
- C. Test Pits:
 - 1. Where determination of the exact location of pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations.
 - 2. When such test pits may be properly considered as incidental to other excavation, the Contractor shall receive no additional compensation, the work being understood to be included as part of the excavation.
 - 3. When the Engineer orders test pits beyond the limits of excavation he considers a part of the work, such test pits shall be paid for as specified in SECTION 01025.

3.02 ASSEMBLY

- A. The pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint.
- B. Threaded or solvent-cement joints and connections are not permitted.
- C. Equipment and procedures shall be used in strict compliance with the manufacturer's recommendations.
- D. The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure.
- E. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe.

3.03 INSPECTION

- A. Provide inspection of each joint.
- B. Defective joints shall be cut out and replaced at no cost to the Owner.

- C. Joints rejected by the Engineer shall be repaired in accordance with the manufacturer's recommendation at Contractor's expense.

3.04 REPAIR

- A. Repair or replace all damaged pipe. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Engineer shall be discarded and not used.

3.05 INSTALLATION

- A. Pipe shall be handled into its position in the trench only in such a manner, and by means as acceptable to the Engineer. Care shall be taken to avoid damaging the pipe fittings.
- B. Pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.
- C. Except as otherwise indicated on the Drawings, the pipe shall be supported along its entire length by compacted crushed stone. No pipe or fitting shall be permanently supported on saddles, blocking, or stones. Crushed Stone shall be as specified under SECTION 02215.
- D. If cutting is necessary the pipe shall be cut by means of a conventional hand or power saw or an acceptable pipe cutter in accordance with the recommendations of the manufacturer. All field cut ends shall be square and beveled to duplicate the machining of the factory ends as closely as possible in accordance with the recommendations of the manufacturer.
- E. Branch Connections
 - 1.
- F. Bedding Pipe
 - 1. After the pipe has been properly placed, enough crushed stone shall be placed between the pipe and the sides of the trench, and thoroughly compacted, to hold the pipe in correct alignment.
- G. Protection of Pipe
 - 1. The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench.
 - 2. At all times pipe installation is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs, or by other acceptable means.
 - 3. If water is in the trench when work is to be resumed, the plug shall not be removed until suitable provisions have been made to prevent water, earth, or other substances from entering the pipe.
 - 4. Pipelines shall not be used as conductors for trench drainage during construction.
- E. Backfilling Pipelines
 - 1. In accordance with SECTION 02200.

3.06 FIELD QUALITY CONTROL

- A. Provide qualified, certified fusion technicians to perform the work.
- B. Technical support, tools and required support systems used during the installation operation shall be provided by the Contractor.
- C. Butt Fusion Testing.
 - 1. On every day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, and then fusion test straps shall be cut out. The test strap shall be 12 inches (min) or 30 times the wall thickness in length with the fusion in the center, and 1 inch (min) or 1.5 times the wall thickness in width. Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
 - 2. Perform butt fusion joints in the presence of the Engineer. Record the temperature and corresponding time for each fusion joint.
- D. Pressure and Leakage Tests
 - 1. Except as otherwise directed, all pipelines shall be given combined pressure and leakage tests in sections of suitable length.
 - 2. The Contractor shall furnish and install suitable temporary testing plugs or caps; all necessary pressure pumps, pipe connections, meters, gages, relief valves, and other necessary equipment: and all labor required.
 - 3. Subject to the permission of the Engineer and provided that the tests are made with a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.
 - 4. Unless it has already been done, the section of pipe to be tested shall be filled with water of acceptable quality, and all air shall be expelled from the pipe. If hydrants or blowoffs are not available at high points for releasing air the Contractor shall make the necessary taps at such points and shall plug said holes after completion of the test.
 - 5. The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied. The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test and corrected to the gage location) to a pressure in pounds per square inch numerically equal to the pressure rating of the pipe but not to exceed 160 psi. Care shall be taken not to apply this pressure to items of equipment known to be incapable of withstanding such pressure.
 - 6. If the Contractor cannot achieve the specified pressure and maintain it for a period of one hour with no additional pumping, the section shall be considered as having failed to pass the test.
 - 7. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test and is considered acceptable by the Engineer.
 - 8. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure may be made as required and

permitted by the Engineer, but in any event the Contractor shall be fully responsible for the ultimate tightness of the line within the above leakage and pressure requirements.

END OF SECTION

SECTION 02629

UNDERGROUND UTILITY MARKING TAPE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for furnishing and installing metallic (detectable) and non-metallic (non-detectable) marking tape over buried pipelines and conduits.

1.02 REFERENCES

- A. A.P.W.A. - American Public Works Association

1.03 SUBMITTALS

A. Shop Drawings

1. Submit in accordance with SECTION 01300 - SUBMITTALS

B. Samples

1. Provide samples of submitted products.

1.04 DESCRIPTION

A. General

1. Marking tape to be installed over all pipe lines and conduits installed under this Contract.
2. Marking tape for non-ferrous pipe or conduits to be Detectable, magnetic type.
3. Marking tape for ferrous pipe or conduits to be Non-detectable, non-magnetic type.
4. Tape to be 6-inches wide.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Underground utility marking tape to be:

1. Detectable: Magnatec by THOR Enterprises, Inc., Sun Prairie, WI.
2. Non-detectable: Shieldtec by THOR Enterprises, Inc., Sun Prairie, WI.
3. Or product deemed equal by the Engineer.

2.02 MATERIALS

A. Detectable Underground Utility marking Tape

1. Minimum overall thickness: 5.0 mil (0.005”).
2. Aluminum foil core: 35 gauge (0.00035”) minimum.
3. Foil visible from both sides of tape.
4. Protective plastic jacket applied to both sides of foil.
5. Jacket adhesive applied directly to the film and foil.
6. No printing to extend to the edges of the tape.
7. No Dilutants, pigments or contaminants in the adhesive.
8. Adhesive formulated to resist degradation by elements normally found in soil.

B. Non-detectable Underground Utility marking Tape

1. Minimum overall thickness: 4.0 mil (0.004”).
2. Polyethylene plastic film: 100% virgin, low density acid and alkali-resistant.
3. Printing: Permanent, black, environmentally safe.
4. Coloring: color-fast, lead free, organic pigments suitable for direct burial and prolonged exposure to the elements normally found in soil.

C. Marking

1. Tape to printed with “BURIED *UTILITY* LINE BELOW”, replacing the word “*UTILITY*” with the word “WATER”, “SEWER”, “DRAIN”, “ELECTRIC”, “GAS”, or otherwise appropriate, repeating continuously every 30-inches max.

D. Color Code in accordance with A.P.W.A. Standards as follows:

- | | |
|----------------------------------|--|
| 1. Safety Red | Electric power and high voltage lines |
| 2. High Visibility Safety Yellow | Gas and oil distribution/Transmission
Dangerous materials/Steam |
| 3. Safety Alert Orange | Fiber optic/telephone/CATV |
| 4. Safety Precaution Blue | Water and irrigation lines |
| 5. Safety Green | Sewer/storm/sanitary systems, non-potable
water |
| 6. Safety Brown | Force mains and effluent lines |
| 7. Alert Purple | Reclaimed and effluent re-use lines |

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install marking tape directly above the pipe line or conduit tape is to identify, approximately 24-inches below the proposed finished grade.
- B. Install marking tape in accordance with manufacturers recommendations.
- C. Install marking tape over existing utilities disturbed by the Contractors operation.

END OF SECTION

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SECTION 02640

VALVES, HYDRANTS AND APPURTENANCES FOR WATER WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for furnishing and installing valves, hydrants and miscellaneous piping appurtenances, as indicated on the drawings and as herein specified.
2. The drawings and specifications direct attention to certain features of the equipment, but do not purport to cover all the details of their design. The equipment furnished shall be designed and constructed equal to the high quality equipment manufactured by such firms as are mentioned hereinafter, or as permitted by the Engineer. The Contractor shall furnish and install the equipment complete in all details and ready for operation.

B. Related Sections

1. Section 02642 – Water Service Connections

1.02 QUALITY ASSURANCE

- ###### A. Contractor is responsible for verifying outside diameter of pipe to be tapped.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. A48, Standard Specification for Gray Iron Castings
2. A536, Standard Specification for Ductile Iron Castings

B. American Water Works Association (AWWA)

1. AWWA C500, Standard for Metal-Seated Gate Valves for Water Supply Service.
2. AWWA C502, Standard for Dry-Barrel Fire Hydrants.
3. AWWA C504, Rubber-Sealed Butterfly Valves
4. AWWA C509, Resilient-Seated Gate Valves for Water-Supply Service
5. AWWA C515, Reduced-Wall, Resilient-Seated Gate Valves for Water-Supply Service
6. AWWA C550, Protective Epoxy Interior Coatings for Valves and Hydrants

C. National Standards Institute (ANSI)

1. ANSI C111/C21.11, Standard for Rubber-Gasket Joints for Ductile-Iron and Pressure Pipe and Fittings

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals

1. Manufacturer's specifications, catalog data, descriptive matter, illustrations, diagrams etc.
2. Operating instructions and parts list.

PART 2 - PRODUCTS

2.01 RESILIENT WEDGE GATE VALVE

A. Manufactured by Mueller Co., Decatur, Ill.; U.S. Pipe and Foundry Co., Birmingham, Ala.; M&H Valve, Anniston, AL; or acceptable equivalent.

B. General

1. Gates shall conform to all applicable sections of AWWA C-509.
2. Valve bodies shall be manufactured of ductile iron.
3. Gate valves shall be open **left (counterclockwise)**.
4. All valves shall allow replacement of upper "O" rings while the valve is under pressure in a fully-opened position.
5. Valves shall have a two-inch operating nut or hand-wheel as required for the particular application and as shown on the Drawings.
6. Exterior surfaces of all valves shall be coated with epoxy coated solution, on a rust-free casting, prior to shipment. Valve interiors shall have a two-part thermostat epoxy-protective coating system and meet all requirements of AWWA C550. The epoxy coating shall not impart taste or odors to the water. The coating shall comply to the NSF/ANSI Standard 61 for use in potable water and shall be so listed in the most current NSF summary of approved products. The coating shall be applied and cured in strict conformance with the coating manufacturer's cautions and instructions. The coating shall be applied by the valve manufacturer under controlled factory conditions, and field application is strictly prohibited.

C. Valves shall be designed for working water pressures as follows:

<u>Valve Size (Diameter)</u>	<u>Pressure</u>
3 to 12 inches	250 psi
14 to 24 inches	250 psi

2.02 DOUBLE DISC GATE VALVE

A. Manufactured by Mueller Co., Decatur, Ill.; U.S. Pipe and Foundry Co., Birmingham, Ala.; or acceptable equivalent.

B. General

1. Gates shall conform to AWWA C500.
2. Bronze gate-rings shall be fitted into grooves of dovetail or similar shape. For other shapes, rings shall be attached with bronze rivets. Operating nuts shall open right (clockwise) and an arrow shall indicate the open direction. Provide steel bolts and bronze nuts for stuffing box follower. O-ring stuffing boxes will be acceptable.
3. Valves shall be capable of being repacked under line pressure.

C. Valves shall be designed for working water pressures as follows:

<u>Valve Size (Diameter)</u>	<u>Pressure</u>
3 to 12 inches	150 psi
14 to 36 inches	150 psi

2.03 BUTTERFLY VALVES

A. Manufactured by B.I.F., Providence, RI; H. Pratt Co., Aurora, Ill., Allis-Chalmers, Inc., York, PA; or acceptable equivalent.

B. Valve Provisions:

1. Valves shall conform to the requirements as specified in the AWWA C504, except as modified or supplemented herein.
2. The valve design shall utilize a continuous rubber lining on the internal body surfaces and extending over the flanges. A disk which seats at an angle to the axis of the pipe will not be acceptable.
3. Mechanical-joint-end type valves shall be utilized, and shall be constructed of ASTM A536, grade 65-45-12 ductile iron.
4. Valves shall be designed for 200 psi working pressure.

C. The valve shall utilize body mechanical joint ends in accordance with ANSI A21.11.

D. Seat Provisions:

1. The valve shall utilize a molded natural rubber or synthetic rubber seat on the disk or in the body, and be mechanically fastened, not penetrated by the shaft. Type 316 stainless steel shall be utilized in the mating-seat. The seat shall be replaceable on 12-in. through 24-in. without removing the disk. It shall be mounted securely for complete immobility under operating conditions.
2. If the seat is on the disk, use a Class 40 cast iron disk conforming to ASTM A48, or a Grade 60-40-18 ductile iron conforming to ASTM A536.
3. If the seat is on the body, use a Class 40 cast iron disk conforming to ASTM A48, or a Grade 60-40-18 ductile iron conforming to ASTM A536, with a Type 316 stainless-steel seating edge, or all Type 316 stainless steel. The stainless-steel edge on cast iron or ductile iron disks shall be either mechanically secured or heat shrunk to the edge of the disk or welded overlay.

E. Disk Provisions: The disk shall rotate 90 degrees from full open to full close position.

F. Shaft Provisions: The shaft shall be manufactured from either Type 304 or Type 316 stainless steel. It must be a one-piece unit extended completely through the valve disk.

G. Miscellaneous Provisions: Type 304 stainless steel, taper pins, lock washers and nuts shall be utilized. The packing gland shaft seal shall be a one-piece cast-iron gland follower with bronze nuts. It shall be self-adjusting, split V-type, packing. The valve shall have a position indicator with pointer and scale plate.

H. Valve Operator Provisions: Buried valves shall be provided with gate boxes and operating wrenches as hereinafter specified. Where necessary, valves shall be furnished with steel extension stems or universal joint operating rods with 2-in. square operating nuts at the upper end and a suitable coupling to connect to the valve stem. Operating nuts for buried valves shall be turned right (clockwise) to open.

I. Buried or Submerged Service Provisions: Valves shall have permanent chevron "V" type packing requiring no adjustment, with self-compensating and self-adjusting seals, under pressure, for buried and submerged service.

2.04. BURIED VALVES

A. Buried valves shall be of the inside-screw type with mechanical-joint ends. An operating nut and extension stem shall be in lieu of hand wheel.

- B. The Contractor shall provide gate boxes, steel extension stems or universal-joint operating rods with 2-in. square operating nut at the upper end with coupling connected to the valve stem as required.
- C. If the depth from final grade to the top of the valve nut is greater than 6 feet an extension is required.

2.05 TAPPING SLEEVES AND VALVES

- A. Tapping sleeves and tapping type gate valves shall be manufactured by Mueller Co., Decatur, Ill., U.S. Pipe and Factory Co., Birmingham, Ala.; or an acceptable equivalent.
- B. Provisions: Tapping sleeves and valves shall be full circumference shall and seal 316 stainless steel. Please note that for existing asbestos cement pipe that exists in the distributions system, contractors should determine the pipe outside diameter (OD) by test pitting before ordering the sleeve. Sleeves that do not properly fit the OD will be rejected.

2.06 INSERTION VALVES

- A. Ductile iron insertion valves shall be resilient gate valve wedge designed for use in potable water systems. The design will allow the valve to be installed into an existing pressurized pipeline, in the range of 4"-16" diameters, while maintaining constant pressure and service.
- B. Insertion valves shall be produced in a plant of recognized reputation that is regularly engaged in the production of insertion type water valves conforming to the specified standards.
- C. Insertion valves shall have an epoxy protective coating system and conform to all applicable sections of AWWA C515, AWWA C550 standards and NSF 61 for use in potable water systems.
- D. Insertion valves shall have a ductile iron wedge fully encapsulated with EPDM molded rubber. The resilient wedge shall seat on the valve body and not the existing pipe to obtain the best isolation and flow control.
- E. Insertion valves shall be rated to 250 psi working water pressure.
- F. Insertion valves shall be constructed of ductile iron and feature a standard 2" square operating nut. Valves shall **open left (counterclockwise)**.

2.07 HYDRANTS

- A. Hydrants shall be Mueller Super Centurion traffic model, or governing water authority approved equal.
- B. Provisions:

1. Hydrant design shall be in accordance with AWWA C502, be suitable for buried depth as indicated and be of positive automatic drain type to prevent freezing.
2. The hydrant shall have a 5-1/4-in. valve, one 4-1/2-in. pumper and two 2-1/2-in. hose connections. The hose and pumper connections shall have National Standard Thread. The operating nuts shall be pentagonal in shape, 1-1/2-in. from point to opposite flat and shall **open left (counterclockwise)**. The hydrant shall be the hub or mechanical-joint type having a 6-in. pipe connection. The pumper port invert shall be located eighteen (18) inches above final grade. Barrel risers will be installed as required.
3. Hydrants shall have a gate valve attached to an anchoring tee.
4. Hydrants shall be painted in accordance with the Wareham Fire District color scheme and 4-1/2-in pumper port shall be painted as to indicate the main line diameter.

2.08 VALVE BOXES

A. Provisions:

1. Valve boxes shall be North American made, adjustable, telescoping, heavy-pattern type with the lower part manufactured of cast iron and the upper part of steel or cast iron. The valve box shall be designed and constructed to prevent direct transmission of traffic loads to the pipe or valve. Boxes shall be adjustable through at least 6 in. vertically without reduction of lap between sections to less than 4 in., inside diameter of boxes for valves shall be at least 5-1/4 in. and at least 3-in. for stops. The valve box shall measure the length from the valve body to the finished grade plus six (6) inches. All valve nuts shall be centered and plumb in the box at a depth of between four and one half (4.5) and six (6) feet below final grade. Valves buried greater than six (6) feet below final grade will require a centering extension rod drilled and tapped onto the valve nut. The top of the cover shall be flush with the top of the box rim. The word "water" an "arrow" and the word "open" shall be cast into the cover to indicate direction of turning to open the valve in top of water valve covers.

2.10 VALVE BOX EXTENSIONS

- A. Valve boxes may be brought to final grade utilizing 5¼ by 12 inch valve box flanged extensions. Pioneer style extensions are not acceptable for this application.

2.11 T-HANDLE OPERATING WRENCHES

- A. Provisions: A T-handle operating wrenches shall be provided in the number and lengths required, but not exceeding 8-ft., to permit operation of all valves and stops by operators of average height working in normal positions.

2.12 WATER SERVICES

- A. In accordance with Specification SECTION 02642.

PART 3 - EXECUTION

3.01 VALVES

- A. Erect and support valves in respective positions free from distortion and strain on appurtenances during handling and installation. Inspect the material for defects in

workmanship and material. Clean out debris and foreign material from valve openings and seats, test-operating mechanisms to check proper functioning, and check nuts and bolts for tightness. Repair, at no additional compensation, valves and other equipment that do not operate easily or are otherwise defective.

- B. Valves installed with stems below the horizontal, will not be allowed.
- C. Set plumb and support valves adequately in conformance with instructions of manufacturer.
- D. Provide valves with extension stems where required for convenience of operation. Provide extension stems for valves installed underground and elsewhere so that the operating wrench does not exceed 6 ft. in length.

3.02 HYDRANTS

- A. Set hydrants plumb, and center buried valve and valve box. Tamp earth fill carefully around the valve box to a distance of 4 ft. on all sides of the box, or to undisturbed trench face, if less than 4 ft. Install at least the same depth of cover on hydrant and connecting pipe as on the distributing main. Set the hydrant upon a slab of stone or concrete not less than 4-in. thick and 14-in. square. Firmly wedge side of hydrant opposite pipe connections against vertical face of trench with concrete thrust block. Place not less than 7 cu. ft. of crushed stone around the base of the hydrant at the location of drain holes. Backfill around hydrants as specified under Section 02200. Clean hydrant and valve interiors of all foreign matter before installation and inspect in opened and closed positions. Hydrants shall be painted in accordance with Owner's color scheme.

3.03 VALVE BOXES

- A. Provide a valve box for each buried stop and valve.

3.04 PAINTING

- A. Touch-up abraded areas of shop coat with paint of the same type as shop coat, even to the extent of applying entire coat if necessary, and clean deteriorated surfaces before applying touch-up coat.
- B. Shop coat exposed ferrous surfaces, not painted, with grease or other suitable protective coating. Uncoated surfaces in contact with potable water shall not be coated.

END OF SECTION

SECTION 02642

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for furnishing and installing potable water service connections.

1.02 SUBMITTALS

A. Shop Drawings

- 1. In accordance with Section 01300, submit manufacturer's specifications, catalog data, descriptive literature, illustrations, diagrams, etc.

1.03 REFERENCES

A. American National Standards Institute

- 1. NSF/ANSI 61 – Drinking Water System Components - Health effects

B. American Society for Testing and Materials (ASTM)

- 1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings
- 2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- 3. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
- 4. ASTM D2447 - Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.

C. American Water Works Association (ANSI/AWWA)

- 1. ANSI/AWWA C800, Underground Service Line Valves and Fittings.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fittings and accessories shall conform to the requirements of ANSI/AWWA C800 unless noted otherwise.

- 1. Corporation Stops shall be **open left** ball valve with a Mueller style compression pack joint (CPPJ) for CTS tubing and tapered CC thread manufactured by Mueller or approved equal.

2. Curb Stops shall be **open left** ball valve with Mueller style compression pack joints (CPPJ) on both ends and shall be compatible for use with CTS HDPE tubing manufactured by Mueller or approved equal.
 3. Other connection styles as approved by the Engineer.
- B. The **Wareham Fire District** has standardized on lead-free service connections as manufactured by Mueller Co., Decatur, IL or Ford Meter Box Company, Inc., Wabash, IN..
1. Brass goods furnished under this specification shall be new and unused.
 2. Any metal part of the fitting in contact with the water must be made of Sebiloy II per ASTM B584 (UNS Alloy C89520). Brass alloys not assigned an ASTM/UNS alloy designation are not acceptable. Plated components in contact with the water not made of Sebiloy II are not approved.
 3. Metal components that do not contact the water shall comply with the requirements of ASTM B62 or ASTM B584 copper alloy number C83600.
 4. All seats/seals must be of an elastomeric material that has verifiable experience in water systems using chloramines for disinfection. Fluoroelastomers such as unfilled Teflon that exhibit poor tear and cut growth characteristics are not approved.
 5. All service fitting shall be certified as suitable for contact with drinking water by an ANSI accredited organization in accordance with NSF/ANSI 61.
 6. All fittings shall be stamped or embossed with a mark or name indicating that the product is manufactured from the low-lead alloy as specified.
- C. Stops shall be ball valve style and have ends as required to suit type of pipe or tubing to be connected, and a combined cap and tee handle.
- C. Curb Boxes
1. North American made Buffalo style, 2 ½-inch, cast iron, heavy duty top section, sliding type with flare top and recess cover marked "WATER" and sliding type arched bottom section.
 2. Overall length shall be from curb stop to finished grade plus six (6) inches. All curb stops shall be centered and plumb in the box at a depth of between four and one half (4.5) and six (6) feet below final grade.
- D. Service Piping (for services 2-inch or less)
1. Polyethylene CTS tubing (HDPE)
 - a. In accordance with ASTM D2447.
 - b. Designed for a hydrostatic test pressure not less than 200 PSI conforming to AWWA C-901.
 - c. Connections to be cold flared, unions or couplings not allowed.
 - d. Services shall be installed with 12 gauge tracer wire.
- E. Stainless Steel Inserts
1. Stainless steel inserts shall be compatible for use with 200 psi CTS HDPE flexible water service tubing and shall be used with all compression fittings.
- F. Three Part Union

1. Three part unions shall have Mueller style compression type pack joints (CPPJ) on both ends and is compatible for use with CTP HDPE tubing.

G. Male and Female CPPJ X IP Adapters

1. Male and female CPPJ X IP Adapters are to be used with CTS HDPE tubing having a Mueller style compression type pack joint on one end, and an iron pipe thread on the other.

H. Service Saddle

1. All water services shall be saddled. No direct service or blowoff taps are permitted.
2. Model 317, manufactured by Smith Blair, Inc., Texarkana, TX.

PART 3 EXECUTION

- A. Water service and fire service connections shall be installed or replaced as required from the new water main corporation stop to the new curb stop and connected to the existing service. Remove and replace existing curb stop, remove service pipe from old main, tap new main, install new corporation stop, install polyethylene water service and fire service connection between new main and new installed curb stop.
- B. Service shall be maintained as continuously as possible, coordinate shut down with property owner.
- C. The tapping machine shall be rigidly fastened to the pipe as near the horizontal diameter as possible. The length of travel of the tap should be so established that when the stop is inserted and tightened with a 14-inch wrench, not more than one to three threads will be exposed on the outside. When a wet tapping machine is used, the corporation cock shall be inserted with the machine while it is still in place. Stops shall be tightened only sufficiently to be watertight. Care must be exercised not to overtighten.
- D. Service tubing shall be installed with care to avoid kinks or sharp bends. Do not allow tubing to contact ledge, rock or sharp stones which could cause damage.
 1. Wrap tubing with #12 tracer wire connected to the corporation and curb stop.
- E. Provide at least 6-inches of coarse grained sand or gravel with a maximum particle size of ½-inch adjacent to and above the service pipe. Backfill remainder of trench with approved backfill material.
- F. Services shall be flushed before activating to avoid meter clogging.
- G. The Engineer must observe all service connections under normal water main pressure prior to backfilling of the service trench to check for leakage.
- H. Service connections shall be free from leaks and may be pressure tested through the water main as directed by the Engineer.

- I. The curb service boxes shall be set in a true vertical position and if the boxes are within the limits of the roadway or within areas where the plowing of snow will take place, the tops of the boxes shall be set about ½-inch below the top of the finished grade. In locations where these boxes are not likely to be disturbed, the tops shall be set flush with the adjoining ground.

END OF SECTION

SECTION 02650

RELOCATION OF EXISTING UTILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements to relocate existing utilities which conflict with the proposed Work.
 - 1. Relocations by Contractor
 - a. The Contractor shall coordinate with the respective utility company to the extent necessary to relocate the conflicting utility with the Contractor's forces, comply with the Utility Company's requirements and not cause delays in this Contract.
 - 2. Relocation by the Utility Company
 - a. The Contractor shall coordinate with the respective utility company in order schedule the work with the Utilities forces and not cause delays in this Contract.

1.02 SUBMITTALS

- A. In accordance with Section 01300 submit utility relocation plans indicating limits and details of the relocation work.

1.03 PROJECT/SITE CONDITIONS

- A. Existing conditions
 - 1. The presence of utilities within the streets, roads and right of ways customarily indicate service lines connecting the buildings and structures along the route. Safeguard all utilities and there respective service connections from damage during the performance of the Work.
 - 2. The presents of utility poles indicates overhead wires for electric, telephone and cable TV also exist. Protect all overhead wires, including service lines, from damage caused by equipment used to perform the Work.
 - 3. Existing utilities, as indicated on the Drawings are from the best available information. The accuracy of such is not guaranteed.
- B. Relocation of Utilities
 - 1. Relocation of existing utilities will be required when;
 - a. Realignment of the proposed Work will have detrimental effects on the proposed Work or existing utility.
- C. Support of Utilities
 - 1. Support of existing utilities will be allowed when;
 - a. The location of the existing utility does not interfere with the proposed excavation, excavation support, installation of piping structures, and appurtenances.

- b. Support in place will not be detrimental to the utility itself.
- c. Support of utility is in accordance with the requirements of the utility in question.

1.04 SCHEDULING

A. Coordination

1. Coordinate all existing utility relocation work with the appropriate utility company.
2. Notify underground utility locating service (Dig Safe, Call Before You Dig, etc.) in accordance with State requirements.
3. Conduct test pits to identify utility locations needed to perform the Work only after coordination with the utility company and in time to prevent delay of the Work.
4. Coordinate with local water authority to operate water valves as required.

PART 2 PRODUCTS

2.01 MATERIALS

- A. As required by the utility company, or as specified, or as approved by the Engineer.
- B. To be new.

PART 3 EXECUTION

3.01 EXAMINATION

- A. After test pit excavations are performed, submit as built information to utility company and the Engineer.

3.02 INSTALLATION

- A. In strict accordance with the requirements of the Utility Company responsible for the Work.

3.03 TESTING

- A. Perform pressure and leakage testing on water lines relocated and infiltration or exfiltration testing on storm drains and sewers relocated in accordance with local agencies responsible for the utility.

3.04 INSPECTION

- A. Allow access to the relocation work for inspections and recording as-built information.

END OF SECTION

SECTION 02668

TEMPORARY POTABLE WATER BYPASS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements to furnish, install, disinfect, maintain and remove temporary potable water bypass pipe, connections, laterals and services required to adequately serve water customers.
2. The work includes excavation and backfilling, constructing ramps and/or burying piping at driveways and other access ways, replacement of temporary and permanent pavement, restoration of public and private property.

B. Related Sections

1. Section 01570 – Traffic Regulations
2. Section 02200 - Earth Excavation, Backfill, Fill and Grading
3. Section 02500 - Pavement
4. Section 02618 - Ductile Iron Pipe and Fittings

1.02 SYSTEM DESCRIPTION

A. Design Requirements

1. Review the Town's water plans, available at the office of the Department of Public Works to determine the extent of the by-pass, especially where dead ends and division gates may require bypass piping. No additional payment shall be considered for the extension of bypass to feed services fed from dead ended pipe or pipe where flow is interrupted by a division gate. This may or may not be noted on the plan. In either case the Contractor is responsible for determining the locations of all dead ends and all locations which require bypass piping.
2. Provide coordination with the Town DPW and as needed, obtain approval or any necessary permits with DPW.
3. The number of temporary hydrants to be installed within the bypass piping system shall be equal to the number of hydrants existing within that system.
4. Provide temporary services for the customers whose permanent service line is:
 - a. Out of service due to the main pipe to which it is connected to is being replaced.

- b. Out of service due to the main pipe to which it is connected to is being served only by the main being rehabilitated or replaced, including dead end pipes and pipes ending at division gates.
 - c. Out of service for any other reason in connection with work under this contract.
5. The bypass shall not be less than the sizes indicated in these specifications and in any case not less than 2-inch diameter. All temporary hydrants must be feed by either an in service hydrant or a direct connection to an underground water main with **6-inch** temporary bypass piping.
 6. Water for the temporary connection shall be from Owner's nearest available hydrants remaining in service.

B. Performance Requirements

1. The pipe and appurtenances utilized for temporary connections shall be suitable for potable water transmission and distribution and be capable of withstanding a service pressure of 200 psi.
2. Have readily available sufficient additional quantity of bypass pipe, connections, lateral and service material of suitable sizes to replace or supplement the temporary facilities in the event these prove inadequate in any way.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals,

1. Proposed layout plan and operations schedule for installing and removing temporary bypass, connections, services, valves and temporary hydrant locations.
2. Details of the installation, operation, maintenance, testing, disinfection and removal of temporary facilities including bypass, connections, laterals, customer services and customer connections and temporary fire hydrants.
3. List of materials with sizes for temporary bypass, connections and services.
4. Submit and obtain approval from the Engineer, for the temporary by-pass system prior to start of construction.
 - a. The Contractor is advised additional review by the local public agency may be required and he should schedule his submittals to avoid any delays in the Work.

1.04 QUALITY ASSURANCE

- A. The Engineer's permission will be required for bypass pipelines, connections, services, and laterals to be laid across streets.
- B. The Engineer's permission will be required to remove permanent customer services, laterals and water mains from normal services and to return these to normal service.

C. Safety

1. The proposed temporary connections shall be capable of preventing contamination of contiguous potable water distribution system and services.
2. Coordinate and cooperate with the Owner's water utility and fire department to maintain water distribution and fire protection capability.
3. Ensure that all precautions have been taken for public safety considerations.
4. The Contractor's attention is directed to requirements within the Specifications regarding water supply for Contractor's operations.
5. The Contractor's attention is directed to requirements of Section 01570 regarding traffic control.

PART 2 PRODUCTS

2.01 BYPASS PIPING

- A. Bypass pipe shall be installed to provide temporary service connections for property owners adjacent to the construction area, at the back of sidewalk wherever possible.
- B. All pipes, fittings, hoses, connections, and valves suitable for potable water services must be NSF approved and shall be capable of supplying a service pressure of a minimum of 200 psi and have prior approval of the Engineer.
- C. Bypass pipe shall be High Density Polyethylene Material (HDPE), 2-in., 4-in., or 6-in. in diameter. Mainline bypass valves shall be installed with not more than 400 feet between each valve.
- D. For bypass connection to hydrant, install a National Standard Threads (NST), double-valved tee directly on 4½-in. hydrant nozzle. One branch of tee shall be used for temporary bypass connection, and other shall be left without bypass attachments for Fire Department use.
- E. The Contractor will not be allowed to use water from the temporary bypass pipes for any other purpose other than to supply the bypass system.

2.02 TEMPORARY HYDRANTS

- A. Temporary hydrants shall be set in such a manner as to minimize difficulty of connection by the Fire Department and minimize the interference with pedestrian and automobile traffic. Temporary fire hydrants shall be 4½-inch NST nozzles. Maintain caps on temporary hydrants.

PART 3 EXECUTION

3.01 EXAMINATION

A. Fire Service lines

1. The Contract Drawings provide the size and location of most known fire service pipes on the main streets impacted by the construction. The Contractor shall become familiar with the existing water systems and be responsible for the adequate temporary feed of all fire service lines.
2. Coordinate the connection/disconnection of fire service piping with the buildings fire service contractor.

3.02 PREPARATION

A. Obtain all street opening permits required by the Town and/or State if applicable.

B. Notify the Owner, the Owner's water utility and the fire department 48 hours in advance of the time of connecting and disconnecting temporary and permanent facilities so that representatives of the Owner's water utility and fire department may be present at installation or removal of permanent and temporary connections and to permit the Owner to inform customers and users as the Owner deems necessary.

1. Assist in distribution of all customer notices.

3.03 OPERATION OF EXISTING VALVES

A. In accordance with the requirements of the Town DPW.

3.04 INSTALLATION

A. Furnish, install, maintain and later remove devices necessary to ensure public safety as required and as approved.

B. Excavation and backfill in accordance with Section 02200.

C. Do not operate the Owner's valves, stops and hydrants without the Owner's prior approval.

D. Temporary bypass, connections, laterals, and customer services shall not be installed across streets except as permitted and approved by the Engineer.

E. Water main laterals that are to remain in service shall be connected to the temporary bypass.

F. Work on existing water mains to be in accordance with Section 02618.

- G. Bypass piping shall be looped at all times from 2 separate sources with adequate supply.
- H. The bypass shall be laid out of the traveled way in a manner as to protect the bypass piping from damage. Whenever possible the temporary bypass shall be laid in the gutter unless otherwise directed by the Engineer.
- I. Where bypass has received prior approval to cross streets and street intersections, it must be valved on both sides and should be laid in a trench with temporary pavement placed over it except as permitted otherwise, by the Engineer.
- J. Where the bypass crosses driveways and similar access ways to properties, suitable ramp shall be constructed of cold bituminous patch to allow driving and passing over the pipe except where the Engineer requires bypass to be laid in a trench with temporary pavement placed over it. All 6-inch bypass crossing driveways, handicap ramps and similar access ways shall be buried to a minimum depth of 3-inch or as directed by the Engineer.
- K. The bypass shall have shut off valves approximately every 400 feet.
- L. During freezing, stormy and inclement weather, no work shall be done except work incidental to temporary connections or as directed by the Engineer.
- M. Backflow device shall be installed at all feed hydrants.

3.05 HYDRANTS

- A. Keep existing fire hydrants in service and make appropriate connections to the bypass or install and maintain temporary fire hydrants adjacent to each existing fire hydrant affected by work until the existing fire hydrants are restored to services. All hydrants temporarily out of service shall be bagged.
- B. At locations where hydrants are out of service due to work under this contract, the Contractor shall provide temporary hydrants. A hydrant being used to feed temporary hydrants must be fed by a 4½ -inch bypass pipe including whip connections.
- C. Provide each temporary fire hydrant with individual valve control.
- D. The temporary fire hydrants which the bypass is connected to for the temporary water supply shall be flushed satisfactorily prior to making connections to prevent stagnant or discolored water from entering the bypass.
- E. The existing hydrants which the bypass is connected to for the temporary water supply shall be flushed satisfactorily prior to making connections to prevent stagnant

or discolored water from entering bypass. A separate valved connection from the steamer/pumper nozzle (4-inch) must be supplied for fire service.

3.06 TEMPORARY SERVICE CONNECTIONS

- A. Furnish, install, maintain and later remove the temporary service connections from the bypass to each building and service required to be supplied by the water main to be removed from service.
- B. Temporary connections shall be laid out of the traveled and access ways where possible.
- C. Temporary service connections shall be ramped or installed in a trench where directed and approved by Engineer.
- D. Temporary service connections shall be of equal size than the permanent service connections.
- E. Install and maintain pressure regulators for temporary services where necessary.
- F. The installation and removal of temporary service connections and back cleaning of permanent services shall take place only at times when the work can be observed by the Engineer and other representatives of the Owner.
- G. Coordinate and cooperate with the service user and the Owner's water utility and fire department to assure the minimum disturbance to the user's fire protection system and other special and automated use.
- H. The temporary service connections shall be made to the user's service line at the sill cock or other convenient and reasonable point or where acceptable to Engineer.
- I. Temporary "wye" fittings must be supplied at the sill cock to accommodate use of garden hoses, etc.

3.07 TESTING

- A. The temporary connections shall be tested to be shown to be of sufficient pressure and without leaks as demonstrated to the Engineer.
- B. If the bypass proves inadequate for the temporary service, the Contractor shall replace or supplement the bypass as appropriate to provide adequate temporary service, including replacement with a larger diameter bypass, as approved by the Engineer.

3.08 DISINFECTION AND FLUSHING PIPELINES

- A. Disinfect temporary facilities prior to use to Owner and Engineers satisfaction in accordance with Specification Section 02618, 3.08, Disinfecting and Flushing.

- B. Demonstrate that all valves are operational prior to activation and there is an adequate supply of on site replacement material.

3.09 MAINTENANCE

- A. Providing labor, materials, and equipment on a twenty-four (24) hour stand-by status to maintain continuous water service to all water costumers (connected to the temporary potable water bypass) at no additional cost to the Owner. Any service interruptions, whether caused by defective piping, pipe jointing or other components; physical damage by vehicles; vandalism; frost action; or other unforeseen reasons, shall be immediately corrected and repaired so as to restore the temporary service to all water customers as soon as possible.
 - 1. Provide the Owner contact information for 24/7 service.

3.10 RESTORATION

- A. After water mains are returned to service, the Contractor shall remove all temporary facilities not required for remaining work, and restore and clean up affected areas.
- B. Pavement restoration to be in accordance with Section 02500.

END OF SECTION

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SECTION 02763

PIPELINE CLEANING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for cleaning and TV inspection of sewer pipes.

B. Related Sections

1. Section 01570 - Traffic Regulations (Massachusetts)
2. Section 02149 - Maintaining Existing Flow
3. Section 02764 - Television Inspection
4. Section 02767 – Disposal of Materials

1.02 REFERENCES

A. National Association of Sewer Service Companies

1. NASSCO Recommended Specifications for Sewer Collection System Rehabilitation.

1.03 CLEANING AND DISPOSAL REQUIREMENTS

- A. The Contractor's attention is directed to the requirements set forth by the Commonwealth of Massachusetts, Department of Environmental Protection (MADEP) regarding "Special Wastes" and the proper disposal thereof. All waste materials and debris, as designated by the Owner and/or Engineer including but not limited to any pump station, sewers and associated structures, or any portions thereof, including but not limited to sludge, grit sediment, dirt, sand, rock, grease, roots and other liquid, solid or slime-solid material contained therein, shall be considered, "Special Wastes".
- B. Remove dirt, grease, rocks, sand, iron tuberculation and other materials and obstructions from the pipeline.
- C. Pipeline Cleaning shall be performed by hydraulically propelled or high velocity jet cleaning equipment. Selection of equipment shall be based on such field conditions as access availability and type of debris to be removed.
- D. Clean pipeline to restore a minimum of 95 percent of the original carrying capacity of the pipe, and suitably to permit lining of the pipeline.

- E. The Contractor is required to test and dispose of any waste material removed from the pipeline in accordance with State and Federal requirements. Testing of waste material will be at the Contractor's expense.
- F. The Contractor shall notify the Engineer of the proposed disposal location and requirements of that disposal facility to allow disposal of waste material.
- G. The Contractor is required to store any waste material until all testing requirements of the proposed facility have been met and shall submit copies of all test results to the Engineer.

1.04 SUBMITTALS

- A. Submit in accordance with Specification Section 01300.
 - 1. Provide detailed plans and descriptions outlining cleaning and television inspection procedures and all provisions and precautions regarding the handling of existing sewage flows.
 - 2. The Engineer reserves the right to limit and/or otherwise restrict the Contractor's operations, including equipment selection, without claim should the Engineer deem it to be in the Owner's or public's best interest to do so.

1.05 QUALITY ASSURANCE

- A. Perform general work in accordance with NASSCO recommended specifications for sewer collection system rehabilitation.

1.06 QUALIFICATIONS

- A. Company specializing in performing the work of this section with minimum of three (3) years experience.

1.07 TRAFFIC CONTROL

- A. In accordance with Specification Section 01570.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION

3.01 CLEANING PROCEDURES

- A. Sewer Cleaning

1. The designated pipelines shall be cleaned using hydraulically propelled or high velocity jet cleaning equipment.
2. Selection of the equipment used shall be based on the conditions of the lines at the time the work commences.
3. Equipment and methods selected shall be satisfactory to the Engineer.
4. Equipment selected for cleaning shall be capable of removing dirt, grease, rocks, sand, iron tuberculation and other deleterious materials and obstruction from the pipelines.

B. Material Removal

1. Sludge, dirt, sand rocks, grease and other solid or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole of the section which could cause line stoppages.

C. Disposal of Materials

1. Solids or semi-solids resulting from the cleaning operations shall be removed from the site and disposed in accordance with Specification Section 02767.

D. Cleaning Precautions

1. During all pipeline cleaning operations, satisfactory precautions shall be taken to protect the pipelines from damage that might be inflicted by the improper use of cleaning equipment.
2. Whenever hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force or any tools which retard the flow of water in the pipeline are used, precautions shall be taken to ensure that the water pressure created does not cause any damage or flooding to public or private property.
3. The flow of sewage in the sewer lines shall be utilized to provide necessary pressures by hydraulic cleaning devices whenever possible.
4. When additional quantities of water from fire hydrants are necessary to avoid delay in normal working procedures, the water shall be conserved and not used unnecessarily.
5. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant nor shall a hydrant be used for the purpose described unless a vacuum break is provided.

E. Root Removal

1. Any visible roots shall be removed as required by the Engineer.
2. Roots shall be removed in all sections by mechanical methods.

3. Chemical root treatment shall also be used as approved by the Engineer. No cleaning shall occur prior to chemical root control application. No cleaning shall occur a minimum of seven (7) after chemical root control application.
 - a. Herbicide to be EPA approved.
 - b. Herbicide must be integral part of chemical sealant material.
 - c. Application to be done in accordance with manufacturers written instructions.
 - d. Any surrounding vegetation damaged due to Contractors operation shall be replaced at no expense to the Owner.

F. Pumping and Flow Bypassing

1. The Contractor shall supply the necessary pumps, conduits and other equipment to divert the flow of sewage around the pipeline section in which work is to be performed.
2. Handling existing sewage flows and bypass pumping shall be in accordance with Specification Section 02149.

G. Flow Control Precautions

1. Whenever flows in a sewer line are blocked, plugged or bypassed, sufficient precautions must be taken to protect the sewer lines from damage that might be inflicted by excessive sewer surcharging.
2. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.
3. Coordination with private property owners is required.

3.02 FIELD QUALITY CONTROL

- A. After cleaning, the sewer pipes shall be visually inspected by means of closed-circuit television. The inspection shall be recorded on DVD's and printed TV inspection logs in accordance with Specification Section 02764.
- B. After videotaping the cleaned pipeline any pipe not sufficiently cleaned shall be cleaned again to obtain satisfactory results at no additional cost to the Owner.
- C. Provide two digital video disks (DVDs), one original and one copy to document conditions following completion of the cleaning process.

END OF SECTION

SECTION 02764

TELEVISION INSPECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for television inspection of pipelines.

B. Related Sections

1. Section 01570 - Traffic Regulations
2. Section 02149 - Maintaining Existing Sewage Flow
3. Section 02763 – Pipeline Cleaning

1.02 REFERENCES

A. National Association of Sewer Service Companies

1. NASSCO Recommended Specifications for Sewer Collection System Rehabilitation.

1.03 SUBMITTALS

A. In accordance with Specification Section 01300, submit the following:

1. Outline of the procedures proposed to accomplish the work. Include a detailed description of the methods and equipment to be used for each operation. Outline TV inspection procedures and all provisions and precautions regarding the handling of existing sewage flows.

1.04 QUALIFICATIONS

A. Company specializing in performing the work of this section with minimum five (5) years documented experience.

PART 2 PRODUCTS

A. TV Inspection Logs:

1. Printed location records clearly showing the location, in relation to an adjacent manhole of each infiltration point observed during inspection and other points of significance such as locations of building sewers, unusual conditions, roots, storm

sewer connections, broken pipe, presence of scale and corrosion, deposits, and other discernible features.

2. The logs shall list the upstream manhole, downstream manhole, survey direction (with/against flow), date of inspection, time of inspection, size of pipe, material of pipe and inspectors name.

B. DVD Recordings:

1. Color video and audio record documenting TV inspection of conditions subsequent to cleaning.
2. The purpose of recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed.
3. At the beginning of each recording it shall list the upstream manhole, downstream manhole, survey direction (with/against flow), date of inspection, time of inspection, size of pipe, material of pipe and inspectors name.
4. Video recording playback shall be at the same speed that it was recorded. Slow motion or stop-motion playback features may be supplied at the option of the Contractor.
5. Title to the tape shall remain with the Contractor; however, the Owner reserves the right to purchase any additional DVD's at the completion of the project.
6. Provide two (2) sets of DVD's complete in the required format.

PART 3 EXECUTION

3.01 PREPARATION

- A. Control traffic in accordance with Specification Section 01570.
- B. Bypass sewage flow to allow performance of work. Handling existing sewage flows and bypass pumping shall be as specified in Specification Section 02149.
- C. Clean sewer lines in accordance with Specification Section 02763.

3.02 TV INSPECTION

- A. TV inspect sewer pipes following initial cleaning and following rehabilitation work prior to putting the line back in service.
- B. After cleaning, the sewer pipes shall be visually inspected by means of color closed-circuit television. The inspection shall be recorded on DVD and printed TV inspection logs.

C. Equipment:

1. Television Camera to be specifically designed and constructed for such inspection; equipped with a light to allow a clear picture of the entire periphery of the pipe; operative in 100 percent humidity conditions; and equipped with manual or power winch, TV cable, powered rewinds or other devices that do not obstruct the camera view to move the camera through the line.
 2. Camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute. At areas of interest, the camera shall be capable of rotating its lens 360-degrees to obtain a clearer, more direct viewing angle. The camera must be capable of rotating to view up into all laterals for inspection recording purposes post lining. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.
 3. Camera, television monitor, recording device and all other components of the video system shall be capable of producing picture quality acceptable to the Engineer.
 4. TV inspection equipment shall be equipped with a meter device to locate defects by measurement. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be acceptable to the Engineer.
 5. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communication between members of the crew.
- D. If, during the inspection operation, the television camera will not pass through the entire manhole section, set up equipment so that the inspection can be performed from the opposite manhole.

3.03 FIELD QUALITY CONTROL

A. TV Inspection Records

1. Complete records shall be kept of TV inspection performed in each manhole section. The records shall identify the following information:
 - a. Identification of the manhole section tested.
 - b. Location (footage) of problem.
2. Record on DVD all footage inside the sewer pipe. All DVD's and necessary playback equipment shall be readily accessible for review by the Engineer during the project.

END OF SECTION

SECTION 02769

DISPOSAL OF MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for disposal of materials resulting from the cleaning of sewer pipes.

1.02 SUBMITTALS

- A. In accordance with Specification Section 01300, submit the following
 1. Outline of the procedures proposed to accomplish the work.
 2. Include a detailed description of disposal methods and locations of disposal.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION

3.01 DISPOSAL PROCEDURES

- A. Material encountered in the cleaning of sewer lines is considered “Special Waste” by the Commonwealth of Massachusetts, Department of Environmental Protection (MADEP). The materials include sludge, sand, grit, debris, etc.
- B. The Contractor is required to test and dispose of any waste material removed from pipeline, manholes, etc. within the project area in accordance with State and Federal requirements. Testing of waste material will be at the Contractor’s expense.
- C. The materials being removed from the pipelines and manholes during the cleaning process shall be deposited in such a manner as to not endanger the public, plant personnel or persons performing the work. Such debris deposits may be of such nature, high in biological organic contents, or chemically aggressive that they will require proper disposal in a safe, health risk free, environment. The Contractor shall contact the Owner and Engineer and all agencies having jurisdiction thereof, for approval of debris disposal methods and locations of disposal, prior to disposing of any or all debris removed from pipe cleaning methods. All solids or semi-solids resulting from the cleaning operations shall be removed and satisfactorily disposed of off-site at the Contractor’s expense. **No temporary storage will be allowed in Town.**

- D. Debris must be transported in a watertight vehicle. The Contractor must ensure that no water leaks from the vehicle in any manner during the transportation. The Contractor is solely responsible for any cleanup of debris on route to disposal at a licensed disposal facility. The Contractor is also responsible for the payment of any fines that are incurred as a result of any incident which occurs during the transportation and/or disposal of the contents of the vehicle.

- E. Disposal must be at a licensed facility that is regulated to accept and properly dispose of the debris that is normally expected to be in a wastewater collection system.

END OF SECTION

SECTION 02930
LOAMING AND SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for loaming, fertilizing, seeding, and related work in areas disturbed in the process of performing the Work under this contract.

1.02 SUBMITTALS

- A. In accordance with SECTION 01300 submit the following:

1. Submit with seed, certificates confirming seed mixture, purity, germinating value, and crop year identification.
2. Submit test samples of loam.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Fertilizer:

1. Delivered mixed as specified in standard size, unopened containers showing weight, analysis, and name of manufacturer.
2. Store in weather proof place.

- B. Seed:

1. Delivered in original unopened containers with mixture listed.

PART 2 PRODUCTS

2.01 LOAM

- A. Fertile, natural topsoil, typical of locality, without admixture of subsoil, refuse or other foreign materials, and obtained from well-drained arable site. Mixture of sand, silt and clay particles in approximately equal proportions. Free of stumps, roots, heavy or stiff clay, stones large than 1 inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other deleterious matter.
- B. Not less than 4 percent nor more than 20 percent organic matter as determined by loss on ignition of oven-dried samples.
- C. Loam test samples dried to constant weight at temperature of 230 degrees. F., plus or minus nine degrees.

- D. Use loam, having prior vegetative growth that did not contain toxic amounts of either acid or alkaline elements.

2.02 LIME, FERTILIZER AND SEED

- A. Ground agricultural limestone containing not less than 85 percent of total carbonates.
- B. Complete fertilizer, at least 50 percent of nitrogen derived from natural organic sources of ureaform and containing following percentages by weight:

Nitrogen 10% Phosphorus 10% Potash 10%

- C. Turf grass seed, clean, high in germinating value and latest year's crop mixture as follows:

Name	Minimum Proportion by Weight	Percent Purity	Percent Germination
Kentucky bluegrass	20%	87%	85%
Merion Kentucky bluegrass	20%	87%	85%
Red Chewings fescue	45%	98%	85%
Italian rye	15%	98%	90%

PART 3 EXECUTION

3.01 GENERAL

- A. Supply suitable quantities of water, hose and appurtenances.

3.02 LOAM

- A. Spread loam on areas to 6-inch depth after compaction, fine grade and compact.

3.03 LIME, FERTILIZER AND SEEDING

- A. Apply lime by mechanical means at rate of 3000 pounds per acre.
- B. Apply fertilizer at rate of 1200 pounds per acre.
- C. Remove weeds or replace loam and reestablish finish grades, if any delays in seeding lawn areas and weeds grow on surface or loam is washed out prior to sowing seed and

without additional compensation. Sow seed at rate of 175 pounds per acre on calm day, by mechanical means. "Hydro-Seeding" not permitted unless otherwise permitted or required by Engineer. Sow one-half of seed in one direction, and other half at right angles to original direction. Rake seed lightly into loam, to depth of not more than 1/4 inch and compact by means of an acceptable lawn roller weighing 100 to 150 pounds per linear foot of width.

- D. Water lawn areas adequately at time of sowing and daily thereafter with fine spray, and continue throughout maintenance and protection period.
- E. Seed during approximate time periods of April 1 to May 15 and August 15 to October 1, and only when weather and soil conditions are suitable for such work, unless otherwise permitted.

3.04 MAINTENANCE OF SEEDED AREAS

- A. Maintain lawn areas and other seed areas at maximum height of 2-1/2 inches by mowing at least three times. Weed thoroughly once and maintained until time of final acceptance. Reseed and refertilize with original mixtures, watering or whatever is necessary to establish over entire area of lawn and other seeded areas a close stand of grasses specified, and reasonably free of weeds and undesirable coarse native grasses.
- B. Begin maintenance immediately after each portion of lawn is seeded and continue for minimum of 45 days.
- C. Repair or replace all seeded areas which, in judgment of Engineer, have not survived and grown in satisfactory manner, for a period of one year after acceptance.
- D. Seeding replacement, same seed mixture as specified and furnished and installed as specified.

3.05 TEMPORARY COVER CROP

- A. Sow a temporary cover crop of buckwheat, domestic rye grass or other acceptable seed if there is insufficient time in the planting season to complete seeding, fertilizing, and permanent seeding at the option of Contractor or order of Engineer. Cut and water cover crop as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into soil, the areas shall be fertilized and permanent seed crop sown as specified.

END OF SECTION

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DIVISION 3

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for furnishing and installing forms, reinforcing steel, concrete and expansion and/or construction joints

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. A185, Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. A615, Specification for deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
3. C31, Practice for Making and Curing Concrete Test Cylinders in the Field.
4. C33, Specification for Concrete Aggregates.
5. C39, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
6. C42, Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
7. C94, Specification for ready Mixed Concrete.
8. C143, Test Method for Slump of Hydraulic Cement Concrete.
9. C150, Specification for Portland Cement.
10. C172, Practice for Sampling Freshly Mixed Concrete.
11. C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. C260, Test Method for Air-Entraining Admixtures for Concrete.
13. C494, Specification for Chemical Admixtures for Concrete.
14. C920, Specification for Elastomeric Joint sealants.
15. D994, Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
16. D1056, Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
17. D1751, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

B. American Concrete Institute (ACI):

1. ACI 301, Specification for Structural Concrete for Buildings.
2. ACI 304, Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
3. ACI 305, Recommended Practice for Hot Weather Concreting.
4. ACI 306, Recommended Practice for Cold Weather Concreting.
5. ACI 315, Building Code Requirements for Reinforced Concrete.

6. ACI 347, Guide to Formwork for Concrete.
- C. Concrete Reinforcing Steel Institute (CRSI):
1. Manual of Standard Practice.

1.03 SUBMITTALS

A. Submit Shop Drawings in accordance with SECTION 01300 for the following:

1. Reinforcing Steel
 - a. Furnish in detail and completeness that all fabrication and placement at the site can be accomplished without the use of contract drawings for reference.
 - b. Include number of pieces, sizes, and grade of reinforcing steel, accessories, and any other information required for fabrication and placement.
 - c. Show joint layout and design
 - d. Check structural and site drawings for anchor bolts, anchors, inserts, conduits, sleeves, and any other items which are required to be embedded in concrete, and make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.
2. Concrete mix designs.
3. Grout manufacturer/design mix (if included in this section)
4. Manufacturer's data for ancillary materials such as joint fillers and sealants, epoxy bonding compound.

1.04 QUALITY ASSURANCE

A. Selection of testing laboratory in accordance with SECTION 01410.

B. Sample and Test Concrete as follows:

1. Test Specimens: Make, cure and have tested, a minimum of one set of four test specimens from the concrete of each day's pour and for each fifty cubic yards of concrete cast in accordance with ASTM C172, C31 and C39. One cylinder shall be broken after seven days and three cylinders after twenty-eight day.
2. Slump: A slump test shall be made for each truckload of concrete in accordance with ASTM C143. Slumps greater than design mix limit will be grounds for rejection of the concrete.
3. Air Content: An air content test shall be made from each day's pour of concrete by the pressure method in accordance with ASTM C231. Air contents above or below the limits specified will be grounds for rejection of the concrete.
4. In the event the compressive strength of the cylinders, when tested, is below the specified minimum, the Engineer may require test cores of the hardened structure to be taken by the Testing Laboratory in accordance with ASTM C42. If such test indicates that the core specimen is below the required strength, the concrete in question shall be removed and replaced without cost to the Owner. Any other work damaged as a result of this concrete removal shall be replaced with new materials to the satisfaction of the Engineer at no additional cost to the Owner. The cost of coring will be deducted from the contract amount. Where the Testing Laboratory has taken core cylinders and the concrete proves to be satisfactory,

core holes shall be filled in a manner satisfactory to the Engineer at no additional cost to the Owner.

5. The Contractor shall coordinate the date and location of tests with the Engineer before any concrete work is started.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Reinforcing steel.

1. Transport to the site, store, and cover in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease, or any other cause that might impair bond to concrete or chip protective epoxy coating.
2. Store on the site at all times, a supply of approved reinforcing steel to ensure that there will be no delay of the work.
3. Identification of steel shall be maintained after bundles are broken.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement.

1. In accordance with ASTM C150, Type II of U.S. manufacture.
2. Only one brand of cement shall be used on the project.

B. Aggregates.

1. Fine aggregate, in accordance with ASTM C33, clean and graded from 1/4 inch to fines.
2. Coarse aggregate, in accordance with ASTM C33, clean and graded from 1/4 inch to maximum sizes hereinafter specified.

C. Air Entraining Agent.

1. In accordance with ASTM C260.

D. Water Reducing Agent.

1. In accordance with ASTM C494 Type A.

E. Microsilica Admixture.

1. Packaged in easily dispersing form.

F. Water.

1. Clean and potable,
2. Free of impurities detrimental to concrete.

G. Reinforcing Bars.

1. New, deformed billet steel bars, in accordance with ASTM A615, Grade 60.

H. Welded Wire Fabric

1. In accordance with ASTM A185.

I. Accessories.

1. Reinforcement accessories, consisting of spacers, chairs, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place.
2. All accessories shall be dielectric coated steel or approved plastic accessories, conforming to the applicable requirements of the CRSI Standards.

J. Tie wire.

1. 16 gauge or heavier black annealed wire.

K. Form Ties and Spreaders.

1. Standard metal form clamp assemble and plastic cone, of type acting as spreaders and leaving no metal within 1 inch of concrete face.
2. Provide form tie with water stop for all walls to be in contact with earth or liquid.
3. Inner tie rod shall be left in concrete when forms are removed.
4. No wire ties or wood spreaders will be permitted. Use ½" x 1" C.T. plastic cones for sinkages.

L. Form Coatings.

1. Non-grain raising and non-staining type that will not leave residual matter on surface of concrete or adversely affect proper bonding of subsequent application of other material applied to concrete surface.
2. "Nox-Crete Form Coating" as manufactured by Nox-Crete Company, or approved equal.
3. Coatings containing mineral oils or the non-drying ingredients will not be permitted.

M. Grout.

1. High-strength, non-shrink grout with saltwater resistance.
2. Five Star Special Grout 120 or equivalent.

2.02 CONCRETE STRENGTHS AND PROPORTIONS

- A. Cast-in-place concrete shall have the minimum compressive strength at 28 days as indicated on the Drawings.
- B. The exact proportions for the mix, including amounts admixture (if any), and water, shall be determined by the concrete supplier.
- C. The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed not he work, but without permitting the materials to segregate or excess free water to collect on the surface.
- D. Air-Entrainment: The air content in all concrete shall be maintained at 5 to 7 percent.

2.03 PREMOLDED JOINT FILLER

A. Bituminous Type.

1. In accordance with ASTM D994 or D1751.

B. Sponge Rubber Type.

1. Neoprene, closed-cell, expanded in accordance with ASTM D1056, Type 2C5, with a compression deflection, 25 percent deflection (limits), 17 to 24 psi (119 to 168 kPa) minimum.

2.04 POURABLE JOINT FILLERS

A. Filler for Nonpotable Water Structures

1. Specific Gravity: Greater than 1.0 for cured, in-place filler.
2. Vertical and Sloped Joints: Furnish gun grade material that will remain as placed in joints and will not run down slope.
3. Suitable for continuous immersion and exposure to liquid being contained in the structure.

2.05 JOINT SEALANTS

A. In slabs.

1. In accordance with ASTM C920 for poured 2-component polyurethane sealant.
2. Sikaflex-2c, as manufactured by Sika Corporation or approved equivalent.

B. In walls.

1. Type II, Class A, compound conforming to Interim Federal Specification TT-S-00227E (3) (COM-NBS) for Sealing Compound; Elastomeric Type, Multi-Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).
2. Sikaflex-1a, as manufactured by Sika Corporation or approved equivalent.

2.06 EPOXY BONDING COMPOUND

- A. The epoxy bonding compound shall be a three-component, solvent-free, moisture-tolerant, epoxy modified, cementitious product specifically formulated as a bonding agent and anti-corrosion coating. The product shall have suitable contact time, fluidity, and application temperature for this type of application.

PART 3 EXECUTION

3.01 FORMWORK

A. Falsework for Forms

1. Build and maintain necessary false work for the forms.

B. Construction of Forms

1. General
 - a. Construct in accordance with ACI 347.
 - b. Construct of sound material, to the correct shape and dimensions, mortar tight, of sufficient strength, and so braced and tied together that the movement of men, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position.
2. Embedded Items
 - a. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - b. Do not embed wood, other than necessary nailing blocks, in concrete.
 - c. Extended complete cooperation to suppliers of embedded items in their installation.
 - d. Secure information for embedded items from other trades as required.
 - e. Securely anchored embedded items in correct location and alignment prior to placing concrete.
3. Openings for Items Passing Through Concrete
 - a. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 - b. Coordination work of this nature in order that there will be no unnecessary cutting and patching of concrete.
 - c. Cutting and repairing of concrete as a result of failure to provide for such openings shall be paid for by the Contractor at no additional expense to the Owner.

C. Removing Forms and False work

1. Forms shall not be removed for at least 72 hours after concrete has been placed.
2. Forms shall not be removed until the concrete has attained sufficient strength to insure stability.

3.02 REINFORCING STEEL

A. General

1. Place reinforcing steel in accordance with the drawings and approved shop drawings and the applicable requirements of the CRSI, Manual of Practice.
2. Install reinforcement accurately and secure against movement, particularly under the weight of workmen and the placement of concrete.

B. Reinforcing Steel Supports

1. Support bars on approved plastic or dielectric-coated metal chairs or spacers, accurately placed and securely fastened to forms or steel reinforcement in place.
2. Supply additional bars, whether specifically shown on the drawings or not, where necessary to securely fasten reinforcement in place.
3. Support legs of accessories in forms without embedding in form surface.
4. Spacing of chairs and accessories shall conform to CRSI, Manual of Standard Practice. Accurately space hoops and stirrups and wire to the reinforcement.
5. Permit no loose wood inside forms.

6. Lifting of welded wire fabric into proper position while concrete is being poured rather than supporting fabric on chairs will not be permitted.

C. Placing and Tying

1. Set in place, space, and rigidly and securely tie or wire with tie wire at all splices and at all crossing points and intersections in the positions shown, or as directed.
2. Rebending of bars on the job to accommodate existing conditions will not be permitted without the written approval of the Engineer.
3. Points ends of wire ties away from forms.

D. Spacing

1. Minimum center to center distance between parallel bars shall be in accordance with the details on the drawings, or, where not shown, the clear spacing shall be 2 times the bar diameter but in no case less than 1½ inches or less than 1½ times the maximum size aggregate.

E. Splices

1. Maximum 50% of steel spliced occurring within lap length.
2. Top bars shall be 1.3 times values given in 3.01.D.5.c.
3. Splice lengths.
 - a. #6 bars and smaller: 50-bar diameter
 - b. #7 bars and larger: 60-bar diameter

F. Concrete Covering

1. In accordance with ACI 315, except where shown otherwise on drawings.

3.03 CONCRETE

A. Mixing of Concrete

1. All concrete shall be ready-mixed concrete, and shall be mixed and delivered in accordance with ASTM C 94. The batch plant of the concrete producer shall be certified for compliance with the standards established by the National Ready-Mixed Concrete Association.
2. In the event concrete is mixed at a central batching plant, the delivery shall be arranged so that intervals between batches are kept to a minimum, and in any event not more than thirty (30) minutes. Trucks shall be in first class condition and kept in constant rotation during delivery.
3. Concrete shall be placed within 90 minutes after cement has been mixed with aggregate or 45 minutes after addition of water and admixtures.
4. No admixtures, except those mentioned in paragraph 2.01 shall be used. Calcium chloride will not be permitted.
5. Truck delivery slips of all concrete delivered to the job shall indicate the quantity and quality of concrete, additives, date and time of batching and delivery, and the location of placement. Delivery slips shall be forwarded to the Engineer at the end of each pour.

B. Cold Weather Concreting.

1. In accordance with ACI 306.

2. Concrete shall not be mixed or placed when the temperature is below 40 degrees F, or when conditions indicate that the temperature will fall below 40 degrees F within 72 hours unless precautions are taken to protect the concrete.
3. Concrete temperature shall be maintained, when deposited, at not less than 60 degrees F. Reinforcement, forms, and ground which concrete will contact must be completely free of frost.
4. Concrete and formwork must be kept at a temperature of not less than 50 degrees F. for not less than 96 hours after placing.
5. Calcium chloride shall not be used.

C. Hot Weather Concreting.

1. In accordance with ACI 305.
2. The maximum temperature of the concrete, when deposited, shall be 85 degrees F. If the weather causes the placing temperature to exceed 85 degrees F., the mix shall be cooled by methods approved by the Engineer.
3. No concrete shall be deposited when the air temperature is greater than 90 degrees F.

D. Conveying and Placing Concrete.

1. In accordance with ACI 304.
2. Notification: Before placing concrete, forms shall be thoroughly inspected. All chips, dirt, etc., shall be removed, all temporary bracing and cleats taken out, all openings for pipes, etc., properly boxed, all forms properly secured in their correct position and made tight, all reinforcement, anchors, and embedded items secured in their proper places. Concrete which may be on the forms or reinforcement, and which is set and dry, shall be cleaned off, and the forms and steel washed off before proceeding. Remove all foreign matter from forms and excavations.
3. Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Engineer. Any flow of water into an excavation shall be diverted through proper side drains into a sump, or shall be removed by other approved methods which will avoid washing away the freshly deposited concrete.
4. Soil on which concrete will be poured shall be thoroughly wetted (except in freezing weather).
5. Anchors and Embedded Items: Anchors, bolts, sleeves, inserts, wood blocking, and any other items to be embedded in concrete shall be accurately secured in position before the concrete is placed. Aluminum shall not be embedded in concrete.
6. Handling and Depositing
 - a. Before any concrete is placed, notify all whose work is in any way connected with or influenced by the concrete work, and give them reasonable time to complete all portions of their work that must be completed before concrete is deposited.
 - b. Immediately before concrete is placed, inspect all forms to insure that they are in proper position, sufficiently rigid, thoroughly clean, properly oiled and free from foreign materials, and that all reinforcement is in proper position.
 - c. Concreting, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed.

- d. Concrete shall be conveyed as rapidly as practicable from the mixer to the place of final deposit by methods that prevent the separation or loss of ingredients. It shall be deposited, as nearly as practicable, in its final position to avoid rehandling or flowing.
 - e. Concrete shall not be dropped freely where reinforcement will cause segregation, nor shall it be dropped freely more than six (6) feet. Concrete shall be deposited to maintain a plastic surface approximately horizontal.
 - f. Concrete that has partially hardened shall not be deposited in the work.
7. Pumping
- a. Concrete may be placed by pumping if first approved in writing by the Engineer for the location proposed.
 - b. Equipment for pumping shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials.
 - c. The concrete mix shall be designed to the same requirements as herein before specified, and may be richer in lubricating components in order to allow proper pumping.
 - d. Concrete shall not be pumped through aluminum pipes.
8. Vibrating and Compacting
- a. All concrete shall be thoroughly consolidated and compacted by suitable means during the operation of placing, and shall be thoroughly worked around reinforcement, embedded items, and into the corners of the forms. All concrete against forms shall be thoroughly spaded. Internal vibrators shall be used under experienced supervision, and shall be kept out of contact with reinforcement and wood forms. Vibrators shall not be used in a manner that forces mortar between individual form members.
 - b. Vibrators shall be flexible electric type or approved compressed air type, adequately powered and capable of transmitting to the concrete not less than seven thousand (7,000) impulses per minute. Vibration shall be sufficiently intense to cause the concrete to flow or settle readily into place without separation of the ingredients. A sufficient number of vibrators shall be employed so that complete compaction is secured throughout the entire volume of each layer of concrete. At least one (1) vibrator shall be kept in readiness as a spare for emergency use. Vibrators shall be such that the concrete becomes uniformly plastic with their use.
 - c. Vibration shall be close to the forms but shall not be continued at one spot to the extent that large areas of grout are formed or the heavier aggregates are caused to settle. Care shall be taken to not disturb concrete that has its initial set.
 - d. Where conditions make compacting difficult, or where the reinforcement is congested, batches of mortar containing the same proportions of cement to sand as used in the concrete shall first be deposited in the forms, to a depth of at least one inch.
 - e. The responsibility for providing fully filled out, smooth, clean, and properly aligned surfaces free from objectionable pockets shall rest entirely with the Contractor.

3.04 CONSTRUCTION JOINTS

- A. Construction joints shall be located a maximum of 40 feet apart. If, for any reason, the contractor feels a change is necessary, he shall prepare a placing plan and submit it to the Engineer for approval.
- B. Where a joint is to be made, the surface of the concrete shall be sandblasted or thoroughly picked, thoroughly cleaned, and all laitance removed. In addition to the foregoing, joints shall be thoroughly wetted, but not saturated, and slushed with a coat of grout immediately before the placing of new concrete.
- C. Approved keys shall be used at all joints, unless detailed otherwise.
- D. Forms shall be retightened before placing of concrete is continued. There shall be an interval of at least 48 hours between adjacent pours.
- E. Bonding Concrete at Construction Joints
 - 1. To new concrete construction joints:
 - a. Thoroughly clean and saturate joint with water.
 - b. Cover horizontal wall surfaces as specified in this Section, and immediately place concrete.
 - c. Limit concrete lift placed immediately on top of bonding compound to 12 inches thick.
 - d. Thoroughly vibrate to mix and consolidate bonding compound and concrete together.
- F. Bonding new concrete to old concrete:
 - 1. Mechanically roughen existing concrete surfaces to a clean, rough surface using appropriate mechanical means to remove the existing concrete surface, and provide a minimum roughness profile of 1/4-inch.
 - 2. Saturate surface with water for 24 hours, cover with epoxy bonding compound and place concrete as specified for new concrete.
- G. Expansion Joints
 - 1. Expansion joints shall be located as shown on contract drawings.
 - 2. The joint shall include a joint filler, a bond breaker and joint sealant and installed as indicated on contract drawings.
- H. Joint Sealants.
 - 1. Prepare surface in accordance with manufacturers directions.
 - 2. Apply primer as recommended by sealant manufacturer.
 - 3. Install sealant with the proper tools and methods as directed by the sealant manufacturer.
- I. Patching
 - 1. Immediately after stripping forms, patch minor defects, form-tie holes, honeycombed areas, etc., before concrete is thoroughly dry.

2. Repair gravel pockets by cutting out to solid surface, form key, and thoroughly wet before placing patching mortar consisting of 1 part cement to 2 parts fine sand; compact into place and neatly finish. Honeycombed areas or gravel pockets which, in the Engineer's opinion are too large and unsatisfactory for mortar patching as described above, shall be cut out to solid surface, keyed, and packed solids with matching concrete to produce firm bond and surface.
3. The Contractor shall do all the cutting as required by himself or other trades. All such work shall be of the minimum size required. No excessive cutting will be permitted, or shall any structural members or reinforcement be cut.
4. The Contractor shall do all patching after work by other trades has been installed, where required, using Portland Cement Mortar 1:2 mix.

J. Protection and Curing

1. Protect concrete from injurious action of the elements and defacement of any nature during construction operations.
2. Keep concrete in a thoroughly moist condition from the time it is placed until it has cured, for at least (7) days.
3. Carefully protect exposed concrete corners from damage.
4. Allow no slabs to become dry at any time until curing operations are complete. In general, slabs shall be cured with non-staining curing paper, hosing or fog spray; vertical surfaces shall be curing with Burlene or fog spray or an approved curing compound.
5. Protect fresh concrete from drying winds, rain, damage, or spoiling. Curing paper shall be lapped 4 inches minimum at joints and sealed with waterproof tape.

K. Concrete Finishes

1. Unexposed Surfaces: All unexposed surfaces shall have any form finish, at the Contractor's option.
2. Wearing Surface Finish: Float the surface by hand using a wooden or magnesium float. Finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the slab.
3. Addition of Material: The addition of cement, sand, water, or mortar to slab surfaces while finishing concrete is strictly prohibited.

L. Defective Work

1. The following concrete work shall be considered defective and may be ordered by the Engineer to be removed and replaced at Contractor's expense:
 - a. Incorrectly formed.
 - b. Not plumb or level.
 - c. Not specified strength.
 - d. Containing rock pockets, voids, honeycomb, or cold joints.
 - e. Containing wood or foreign matter.
 - f. Otherwise not in accordance with the intent of the Drawings and Specifications.

END OF SECTION

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APPENDIX A

**WAREHAM FIRE DISTRICT
PLANNING, MATERIAL AND CONSTRUCTION SPECIFICATIONS
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APPENDICES35

1.0 PREFACE

The intent of these rules is to provide customers, contractors, engineers, developers and others with a uniform set of regulations and standards by which any proposed or actual water work must adhere to these standards. These specifications may be amended from time to time at the discretion of the Board of Water Commissioners or their designee. Failure to know of, or conform to these specifications shall not be considered reason for deviation from these standards. It is the equal responsibility of the property owner and contractor to ensure proper compliance with the specifications as prescribed at the time of the work.

Property owners and contractors are encouraged to arrange for on-site pre-design and pre-construction meetings with the Superintendent or designee (Ph: 508-295-0450) to determine compliance with these specifications. Exceptions to these specifications may be granted if the deviation is in the benefit of the Wareham Fire District - Water Department (WFD), and upon written approval from the Board of Water Commissioners or their designee. Failure to comply with these rules may result in the termination of service. Any rule, regulation, or standard previously adopted by the Board of Water Commissioners or by the District not specifically addressed in these rules shall be enforceable as if it is part of these rules.

2.0 DEFINITIONS

Board or BoWC– Board of Water Commissioners

Certificate of Acceptance – Written verification from the Board of Water Commissioners or their designee, that all water system work is complete and without any outstanding deficiencies. Certificates of acceptance shall be issued by no sooner than one year after substantial completion of the work as determined by the WFD, and only if all deficiencies have been corrected.

Curb Stop Fee – A minimum fee charged to all inactive accounts as provided for in the rate schedule. A curb stop fee shall apply only to those accounts which 1) the water meter has been physically removed and returned to the Water Department, and 2) the curb stop is shut off. Inactive accounts that do not meet both conditions shall be charged the minimum fee even if shut off at the curb stop. The curb stop fee shall be charge twice annually to each account of record until such time the service is physically removed from the water system at the corporation stop.

Development Fees – A system development fee shall be paid for each new connection to either an existing main or a new service. The fee shall be paid prior to the connection being made by each new water taker. The development fee shall be based on tap size as listed in the rate schedule at the time service is required.

Dig Safe - Dig Safe® is a not-for-profit clearinghouse that notifies participating utility companies of your plans to dig. In turn, these utilities (or their contract locating companies) respond to mark out the location of their underground facilities. Dig Safe is a free service, funded entirely by its member utility companies and can be found at <http://www.digsafe.com/> or by calling 811. Note:

1. Dig Safe does not mark utility lines. Participating utilities mark out utility locations.
2. WFD is not part of Dig Safe. All mark out requests must be made separately to WFD.

District – The Town of Wareham, Massachusetts less the area served by the Onset Fire District.

Engineer - The Districts' Consulting Engineer or his designated representative.

Inspector - The WFD Superintendent or his designated representative.

Inspection Service Fee – Three percent (3%) of the calculated total worth of the improvement to be paid prior to the commencement of work or time spent on site by WFD personnel at the current labor rates, whichever is greater.

Lateral or Non-Metered Connection – A water connection to any and all detached residential dwellings or commercial buildings after a meter. Each building serviced off a single meter shall be counted as a lateral connection and charged as prescribed in the rate schedule. Lateral water usage shall be included in the metered service allowance per billing.

Lead Free - The District only accepts service material, fittings, and meters which are considered "lead free." Lead free is as defined in the latest laws and regulations promulgated as well as associated amendments by the United States Environmental Protection (e.g. Lead and Copper Rule, Lead Contamination and Control Act, PART 141- National Primary Drinking Water Regulations: Part I, etc.), or Massachusetts Department of Environmental Protection.

Fire Protection (District) – Includes only those fire hydrants owned by the WFD and which are located within the public right-of-way. The water department is responsible for the repair, replacement and maintenance of fire hydrants owned by the WFD.

Fire Protection (Private and Town) – Includes both sprinkler systems and hydrants that: (1) provides exclusive protection to public or private building or parcel; or (2) is located on private property. Each privately/Town owned sprinkler and hydrant shall pay an annual "readiness to serve" charge in lieu of usage as prescribed in the rate schedule. The WFD is not responsible for the repair, replacement or maintenance of any private hydrant or sprinkler service.

Minimum Fee – A fee as described in the rate schedule charged to all active and inactive service accounts that have a water meter installed, or that are charged a flat fee (i.e. permitted manufactured housing or non-domestic un-metered accounts). The minimum fee shall be charge twice annually to each account of record.

Outside Water Sale – Water purchased from the tap at the Water Office at 2550 Cranberry Highway or from a metered hydrant.

Private - The term private is used to denote features and items which are not owned or accepted by the WFD.

Retainage– A specified amount retained by the District as a non-interest-bearing receipt calculated as two percent of the total worth of the improvement payable on substantial completion. The minimum retainage held as security shall be not less than \$2,000.00. Said retainage shall be released only upon receipt of a written certificate of acceptance from the WFD.

Service Call – A service call is any customer initiated request for service. Service calls include but are not limited to, turn on/off, final readings, missed meter appointments, missed service appointments, relocating or reinstalling remote reading devices and meters, seasonal installations, inspections, and damaged meter replacements. A separate charge shall be established for scheduled and un-scheduled service calls. An un-scheduled service call is one where the service is provided on the day it is requested.

Specifications- Wareham Fire District Water Department Standard Specifications, Rules & Regulations as published and amended from time-to-time by the Board of Water Commissioners or their designee.

Standards - As a default position, the WFD uses American Water Works Association (AWWA) Standards and manuals of practice as the basis for products and practices. Where not specifically referenced here within, it should be understood these are the standards for materials and practices the WFD adheres to for day to day operation. The WFD also adheres to other industry standards common in the industry such as the Ductile Iron Research Association (DIPRA), National Sanitary Foundation (NSF), American National Standards Institute (ANSI) standards or as specifically reference here within. Where there is a conflict in one of these standards, the stricter standard will be adhered to for the product or practice.

Substantial Completion - The point in the work at which the WFD determines the installation is complete and all noted deficiencies as of that date have been corrected. Substantial completion does not constitute final approval or acceptance of the work for the release of retained funds held by the District.

Superintendent - The Water Superintendent of the Wareham Fire District Water Department.

Warranty Deposit - Funds held for addressing improper road cut trench and subsequent repairs. If road cut is within the paved area of the road, a \$1,000 deposit will be held for 365 days. If road cut is within shoulder of the road, a \$500 deposit will be held for 180 days. A request at the end of the time period must be made to WFD to release funds. At this time the WFD will inspect the road cut and if found satisfactory will refund the deposit. If the road cut is unsatisfactory, the contractor shall make the necessary repairs. If the contractor refuses to make the necessary repairs, the deposit will be used to make necessary repairs. Any remaining deposit after repairs will be provided back to owner.

Water - Potable water produced and supplied by the WFD.

Water Department or WFD - The Wareham Fire District Water Department, (WFD)

Water System (System) - Any pipe, valve, meter, fixture, facility, apparatus, or appendage that is in any way associated with the production, storage, transmission, and/or use of municipal water. The water system also can be referred to as the treatment and distribution system.

Work - The furnishing of materials, equipment, labor, and all incidentals necessary for adherence to these specifications.

3.0 GENERAL NOTES

Contractors should contact the Superintendent or designee at (508) 295-0450 for a pre-construction meeting, and an estimate of inspection charges, warranty charges, retainage charges, or any other charges, at least ten business days before the scheduled start of work.

Phased installation of water mains shall not be permitted in any new development unless specifically approved by the BoWC. The District reserves the right to retain water related securities until such time the installation, testing, and final inspection of all work is complete and deficiencies corrected for a period of one year after substantial completion.

Department personnel shall inspect water system improvements during the installation. The contractor is responsible for notifying the WFD five days before any work is to take place. WFD inspectors must be on site for the following:

1. Test pits, taps, tie-ins, or the installation of mains, hydrants and services.
2. When crossing any culvert, drainage pipe, stream or obstacle requiring a change in pipe material, direction, elevation, or as deemed necessary by the Superintendent.
3. Flushing, pressure testing disinfecting operations, dechlorination, and acceptance sampling 24 hours and 48 hours after dechlorination.

The Superintendent shall issue a Notice of Completion to the contractor when the improvements reach the point of substantial completion and all fees due to the WFD are paid in full. A Notice of Completion provided to the contractor does not relieve the property owner from correcting items identified as deficient during later inspections. WFD policy requires additional inspections of system improvements until the improvement is fully accepted. The WFD shall note each deficiency and may retain water related securities until the deficiencies are corrected. Property owners are encouraged to coordinate with the Superintendent before making a request for refunding securities to avoid delays in the release of securities.

Only licensed persons in the employment of the WFD shall operate any gate valve, hydrant, or curbstop on any main or service for turning water on or off.

No water shall be sold or taken from any hydrant, blowoff, corporation, or curbstop for any construction, paving, dust control, or hydro-seeding, or any other purposes without the permission of the Superintendent. All non-account water sold shall be through a meter and backflow owned and supplied by the WFD. The

charge for water sold shall be at current water rates. Any unauthorized use of water shall be reported by the WFD to the police for prosecution.

4.0 WATER MAIN MATERIALS

All water main materials used within the WFD system shall conform to ANSI/AWWA standards, and where applicable, have National Sanitary Foundation approval. All material must be installed as to have no leakage under 150 pounds hydrostatic pressure. In general, the WFD has standardized on lead-free materials and ductile iron for pipe and fittings. Cast iron fittings shall not be accepted.

PIPE: All water main pipe shall be buried at a depth of no less than 4.5 feet and not more than 6 feet deep and conform to one of the following standards:

a) District owned water mains

- i. Class 52 (or better) or pressure class 350 North American made cement lined ductile iron pipe. Pipes will be manufactured by McWane Ductile, US Pipe, American Pipe, or approved equal.
- ii. Pipe shall meet the latest revision of the following standards:

ANSI/AWWA	C104/A21.4	Cement - Mortar Linings
ANSI/AWWA	C105-A21.5	Polyethylene Encasement for Ductile Iron Pipe
ANSI/AWWA	C110/ A21.10	Ductile-Iron and Grey-Iron Fittings, 3 Inch Through 48 Inch for Water
ANSI/AWWA	C111/A21.11	Rubber - Gasket Joints
ANSI/AWWA	C115/A21.15	Flanged Pipe
ANSI/AWWA	C150/A21.50	Design
ANSI/AWWA	C151/A21.51	Water Pipe
ANSI/AWWA	C153/A21.53	Fittings - Ductile Iron
ANSI/AWWA	C600	Installation

- iii. All products shall be constructed of ductile iron. Cast iron products are only acceptable if written permission is provided by the WFD.
- iv. Exterior of pipe shall be provided with zinc coating as follows:
 - i. Consists of a layer of arc applied or paint applied, 99.99% pure zinc coating having a mass of 200g/m².
 - ii. Has a finish layer of standard shop applied bituminous paint in accordance with AWWA C-104.
 - iii. Pipe markings shall include the word "Zinc" in the pipe markings or label required by AWWA C-151 and/or other markings as deemed appropriate by the manufacturer.
 - iv. Shall comply with all applicable parts of ISO 8179 for zinc coatings.
 - v. Minor scratches in the zinc coating will not need to be repaired due to the self-healing nature of zinc coatings but larger areas shall be repaired by field application of a zinc rich paint in accordance with ISO 8179.

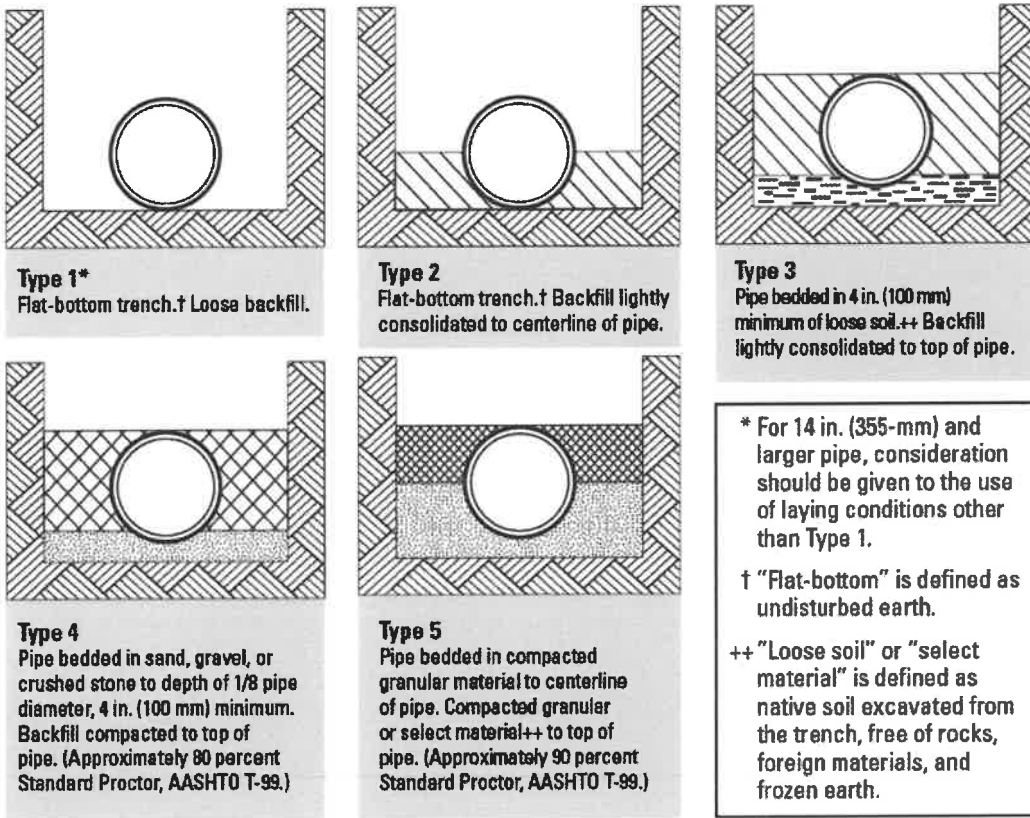
b) Private owned mains - Beyond District owned gate valves:

- i. Material listed in paragraph a) above or
- ii. C-900 DR-14 PVC (Permitted only beyond District owned gate valves)
 - i. Where organic contaminants exist (e.g. petroleum) in the soil that are not compatible providing safe water with PVC pipe, PVC pipe shall not be used. In such situations only ductile iron pipe shall be acceptable.
- iii. Fittings shall be ductile iron.

c) Pipe Laying Conditions: Pipe laying conditions shall be Type 5 (Table 1).

Table 1: Pipe Laying Conditions (Source: McWane Ductile)

LAYING CONDITIONS



Notes:

Consideration of the pipe-zone embedment conditions included in this figure may be influenced by factors other than pipe strength. For additional information on pipe bedding and backfill, see ANSI/AWWA C600.

American Association of State Highway and Transportation Officials, 444 N. Capitol St. N.W., Suite 225, Washington, DC 20001.

- d) **Minimum Size:** The sizing of water mains shall be based on sound engineering principals. All water mains shall be minimum 8-inch nominal diameter. All hydrant connections shall be minimum 6-inch diameter.
- e) **Minimum Length:** Pipe length for water mains shall be no less than 18 feet.
- f) **Pipe Protection from Corrosion:** Where there is possible excessive corrosion due to corrosive soil conditions, a polyethylene encasement for ductile iron pipe shall be implemented per ANSI/AWWA C105/A21.5 or ASTM A674. Soil corrosivity testing shall be performed by a N.A.C.E. International certified personnel. All contractors installing pipe are required to perform this test and provide the results to the WFD.
- g) **Restraining System:** All pipes shall be restrained. Restraints shall be provided by Sure Stop 350 gaskets for sizes 3 inch to 24 inches in diameter and TR Flex over 24 inches in

diameter or equal by approved manufacturers (Field Lok 350, Fast grip) . Where soil is believed to provide the necessary friction for restraint, permission shall be obtained by the WFD in writing and calculations by certified by a professional engineer in the state of Massachusetts shall be provided. Thrust blocks or mechanical joint restraints can be provided as described below are acceptable alternatives where appropriate.

- h) **Water Body Crossing:** When it is necessary to cross a body of water requiring only a small deflection in the joints, restrained standard push-on or mechanical joint pipe can be used. If the water is deep and the angle of deflection in the joint necessary to follow the contour of the river bed is great, ball and socket pipe—with a deflection up to 15 degrees should be used. A combination of restrained and ball and socket joints shall be used.
- i) **Gaskets:** Gaskets shall be used for appropriate application and contaminants present and meet AWWA standards. Nitrile gaskets shall be used where petroleum contamination exists. Manufacture recommended joint lubricants shall be used during assembly.
- j) **Electrical Grounding:** No electrical grounds shall be made on water pipes, water services, fitting, water meters, or any other appurtenance. Electrical grounding shall be provided in accordance with the Massachusetts Electric Code.
- k) **Looping:** Dead ends shall be minimized by looping of all mains when practical, from one part of the system to another. When dead end mains are allowed by WFD in writing, they shall be equipped with the means to provide adequate flushing which will give a velocity of 3.0 feet per second or greater in the main being flushed or provided with an automatic flushing unit at the discretion of the WFD. The WFD may also require a meter pit and meter associated with the automatic flushing unit.

PIPE FITTINGS: All pipe fittings shall be mechanical joint ductile iron class 350 conforming to AWWA standard C-153 and constructed of ductile iron. All mechanical joints shall be secured with a restraint as defined below.

All studs and bolts shall be provided with a sacrificial zinc end caps meeting ASTM B418-80 as manufactured by MARS (6 oz) of Ocala, Florida, Northtown Company of Huntington Beach, CA, or approved equal.

Exterior shall be provided with zinc coating as follows:

- a. Consists of a layer of paint applied, 99.99% pure zinc coating having a mass of 200g/m².
- b. Has a finish layer of standard shop applied bituminous paint in accordance with AWWA C-104.
- c. Pipe markings shall include the word “Zinc” in the pipe markings or label required by AWWA C-151 and/or other markings as deemed appropriate by the manufacturer.
- d. Shall comply with all applicable parts of ISO 8179 for zinc coatings.
- e. Minor scratches in the zinc coating will not need to be repaired due to the self-healing nature of zinc coatings but larger areas shall be repaired by field application of a zinc rich paint in accordance with ISO 8179.

Similar to pipe, the fitting shall be wrapped in polyethylene if the soil conditions are found to be corrosive.

MECHANICAL JOINT RESTRAINTS: Retaining glands shall be provided wherever any water pipe is inserted into any valve, hydrant, or fitting, unless approved by WFD to do otherwise. Due to the varied pressures found in the system, the use of non-restraint type mechanical joint glands for the purpose of inserting pipe into any valve, hydrant or fitting is not authorized and will require replacement if used. The use of thrust blocking in addition to mechanical restraints is at the discretion of the contractor. The following retaining devices are approved for fittings, hydrants, and valves:

- a. Mega-Lug® restraints
- b. GripRing® restraints
- c. or approved equal.

All studs and bolts shall be provided with a sacrificial zinc end caps meeting ASTM B418-80 as manufactured by MARS (6 oz) of Ocala, Florida, Northtown Company of Huntington Beach, CA, or approved equal.

VALVES: All gate, hydrant, and tapping valves shall open left and conform to AWWA Standard C-509 for resilient wedge valves constructed of ductile iron. The distance from the top of the valve nut to final grade should be no greater than six (6) feet. Valves buried greater than six (6) feet below final grade require an extension on the valve nut. Valves shall be operated through a 5¼ valve box. AWWA C515 - Standard for Reduced-Wall Resilient Seated Gate Valves for Water Supply Service shall only be acceptable if provided in writing by the WFD. Gate valves shall be constructed of ductile iron.

TAPPING SLEEVES: Tapping sleeves shall be full circumference shell and seal 316 stainless steel. Please note that for existing asbestos cement pipe that exists in the distribution system, contractors should determine the pipe Outside Diameter (OD) by test pitting before ordering the sleeve. Sleeves that do not properly fit the OD will be rejected.

AIR RELEASE VALVES: Air release valves are not permitted for use in the WFD system unless specifically approved in writing by WFD.

TESTING AND BLOWOFF ASSEMBLIES: Blowoff assemblies for air purging, pressure testing, and disinfection shall be temporary installations. The WFD requires a one (1) inch assembly consisting only of a tapping saddle, one-inch corporation, and HDPE tubing. Ten feet of tubing should remain above grade for pressure testing and disinfection purposes. Assemblies should be installed as close to the main line tap as possible, yet be safely out of the travel way. Consideration should be given to the need to re-excavate the corporation once testing is complete. Upon successful completion of required testing, the tubing will be removed from the corporation, and the corporation closed at the saddle. Hydrants located "in-line" at the end of any main may be used for flushing instead of a blowoff assembly.

FIRE HYDRANTS: All fire hydrants shall meet AWWA C502: Standards for Dry-Barrel Fire Hydrants. Hydrants shall be 5¼-inch diameter open left valve Mueller Super Centurion traffic model hydrants. All hydrants shall have a gate valve attached to an anchoring tee. Hydrants shall be painted in accordance with WFD color scheme. Steamer port shall be painted as to indicate main line diameter. The steamer port invert shall be 18 inches above final grade. Barrel risers will be installed as required.

VALVE BOXES: All gate and hydrant valves shall be operated through a North American made water valve box. The box shall consist of a cover marked "water", a bell or flared base, and a 5¼-inch diameter top flanged sliding top. The valve box shall measure the length from the valve body to the finished grade plus six (6) inches. All valve nuts shall be centered and plumb in the box at a depth of between four and one half (4 ½) and six (6) feet below final grade. Valves buried greater than six (6) feet below final grade will require a centering extension rod drilled and tapped onto the valve nut.

VALVE BOX EXTENSIONS: Valve boxes may be brought to final grade utilizing 5¼ by 12 inch valve box flanged extensions. Pioneer style extensions are not acceptable for this application.

COUPLINGS: Couplings used in the installation, joining, or repair of water main pipe shall be "Dresser" style constructed of ductile iron. All couplings will be of the same nominal diameter as the pipe. Gaskets and end rings shall be sized to compensate for variations in pipe OD and materials.

PIPE REPAIR CLAMPS: Leaks along the longitudinal length of a pipe may be repaired in place using clamps. Repair clamps shall be full circumference shell and seal 316 stainless steel sized to properly fit the OD of the pipe being repaired.

BELL JOINT LEAK CLAMPS: Leaks from pipe bell joints may be repaired in place using joint clamps properly sized for the pipe.

5.0 WATER SERVICE MATERIALS

Water services shall be either one (1) or two (2) inch taps. All connections shall be compression type fittings with stainless steel inserts; flared fittings are not permitted. All material must be installed as to have no leakage under pressure. Water services shall be sized in accordance with AWWA M-22. The use of polyethylene pipe and tubing shall be used for water services 2 inches in diameter and smaller. Water services that are larger than 2-inches in diameter shall use cement lined ductile iron water pipe. The WFD has standardized on lead-free service connections manufactured by either Mueller or Ford.

No electrical grounds shall be made on water service pipes. Electrical grounding shall be provided in accordance with the Massachusetts Electric Code.

RESIDENTIAL METERS: Residential meters shall be 5/8" x 3/4" electromagnetic type capable of providing 25 gallons per minute maximum flow with an accuracy rating of >98.5 percent. Check with WFD on current makes and models accepted by the WFD. Meters, regardless of size, shall only be purchased from the WFD. All meters shall remain the sole property of the District. Requests for a meter larger than 5/8" x 3/4" will require the submission of a fixture analysis prepared in accordance with AWWA M-22 standards and Massachusetts Statutes and Regulations.

INDUSTRIAL/COMMERCIAL METERS: Industrial/commercial meters are 1 inch or greater in size and purchased through the WFD and installed by WFD or a licensed plumber. Check with WFD on current model(s).

The WFD shall inspect the installation before final approval.

SERVICE SADDLES: All water services shall be saddled. No direct service or blowoff taps are permitted. Saddles shall be CC threads with double anodized steel bands, and high strength ductile iron body sized to properly fit DI, PVC or AC pipe. Zinc caps shall be provided to protect steel bands.

WATER SERVICE TUBING: All water service tubing shall be Copper Tube Size (CTS) Polyethylene (HDPE) tubing with a working pressure of no less than 200 PSI, conforming to AWWA C-901. Tracing wire on plastic tubing is required for locating the pipe. Tracing wire shall be 12 gauge wire or thicker.

CORPORATION STOP: Corporation stops shall be an open left Mueller style compression ball stops with a tapered CC thread and a compression pack joint (CPPJ) for CTS tubing conforming to AWWA C-800 standards. Corporation stop shall be manufactured by Mueller or approved equal.

STAINLESS STEEL INSERTS: Stainless steel inserts shall be compatible for use with 200 psi CTS HDPE flexible water service tubing and shall be used with all compression fittings.

CURB STOP: Curb stops shall be open left ball valve with Mueller style compression type pack joints (CCPJ) on both ends, and shall be compatible for use with CTS HDPE tubing. Curb stop shall be manufactured by Mueller or approved equal.

THREE PART UNION: This service fitting has a Mueller style compression type pack joints (CCPJ) on both ends and is compatible for use with CTS HDPE tubing.

MALE and FEMALE CPPJ X IP ADAPTERS: Adapters are to be used with CTS HDPE tubing having a Mueller style compression type pack joint on one end, and iron pipe thread on the other.

CURB BOX: All water service boxes shall be North American made "Buffalo" Style 2½ inch to include cover, slide top and base. The curb box shall measure the length from the curb stop to the finished grade plus six (6) inches. All curb stops shall be centered and plumb in the box at a depth of between four and one half (4 ½) and six (6) feet below final grade.

BACKFLOW DEVICES: A backflow device shall protect all services. A Watts #7 dual check valve shall protect residential services. A pressure vacuum breaker, reduced pressure zone device, or a testable double check valve shall independently protect irrigation systems. A device as specified by the WFD consistent with the hazard potential shall protect commercial and industrial services. A testable double check valve or reduced pressure zone device shall protect fire protection systems as specified by the WFD.

6.0 WATER SERVICE APPLICATION PROCEDURE

APPLICATION – The property owner or their designated representative shall complete a Water Service Application Card upon which the property owner or their designated representative shall receive a copy of the "RESIDENTIAL WATER SERVICE APPLICATION RULES". Applications are available at the Water Department. The system development fee shall be paid at the time the application is made. Building permit signoffs require completion of a Water Service Application Card. Note: Filing the application activates the account for billing.

Filing of Water Service Application shall include payment of all fees due and if deemed necessary shall include the cost for running a hydraulic model by the WFD engineer. Applications should be submitted ten (10) business days before the installation of the service. Application fees include a 5/8th inch meter and initial turn on fee. Tapping fees are additional¹. Meters larger than 5/8th - inch shall be paid for in whole by the applicant. All meters regardless of size shall be purchased from the WFD.

SCHEDULING SERVICE TAP

Upon application, the owner/contractor can schedule the tap with the Operations Manager, (580) 295-0450. A pre-installation site visit is required. Owner is responsible for road cut, trenching, backfill, road repair, and traffic control within the right-of-way. Installers must be on WFD's approved contractor list which can be obtained from the District front office. Meter pits may be required depending on site conditions as determined by the WFD. On water services that are greater than 200 feet in length, the owner will be required to purchase and install a meter pit. The meter pit shall be as close to the road as possible and at the direction and approval of WFD.

Owner shall obtain all permits for the road cut, including:

1. Dig safe number
2. Wareham Municipal Maintenance Excavation Permit, which can be obtained for applicant by WFD
3. State Department of Transportation trenching permit (State Roads Only)

SERVICE LINE INSPECTION FROM CURB STOP TO FOUNDATION- Only licensed master plumbers or drain layers are permitted to install water service lines. Installers must be on WFD's approved contractor list which can be obtained from the District front office. Inspections shall be scheduled with the water department at 508 295-0450. Inspections must be scheduled before 2:00 PM on the workday before the actual installation. There is no charge for scheduled inspections. Requests for same day inspections require a \$70.00 service fee.

Inspections must be done before backfilling the trench. Backfill shall be suitable material free of debris and stones greater than 4-inch in size. Inspection on backfilled lines requires a pressure test. A valve must be

¹ Tapping charge (if required) pays only for the equipment, material and labor for the water main tap to curbstop. No excavation or road repair work is included. Chargeable items include; tapping/boring machine, vehicles /equipment, corporation stop, PVC tubing; curb stop, 2 ½ inch curb box, and hours of total labor. Road boring costs for cross road services shall be additional. All additional material and labor costs incurred by the District because of owner or contractor inefficiency, delay, cancellations, or site conditions shall be charged to the owner. Police details, Town of Wareham Road opening permit (e.g. excavation permit), and all other permits required shall be paid for by the owner.

installed on the service line inside the foundation for the inspection to be performed. Owner shall be responsible for all costs associated with installing the service line from curb stop to meter.

Service lines shall be installed in Type 3 laying conditions (See Table 1).

METER INSTALLATION - The meter setup and backflow device must be installed according to WFD specifications before the meter can be set. Water meters shall be installed and water turned on only by water department personnel. Meter appointments shall be scheduled with the water department at (508) 295-0450. Meter installations must be scheduled before 2:00 PM on the workday before the actual installation. There is no charge for scheduled appointments. Requests for same day installations require a \$70.00 service fee.

7.0 PLANS

SINGLE SERVICES - Plans for a single residential service shall be required. The proposed location of the water service shall be shown on plan in relation to the dwelling and roadway. The precise location of the water service may be altered in the field with the concurrence of the WFD. A detail plan may be required for installations >150 feet in length, that cross wet or wooded lots, are within 10 feet of a septic system, require a meter pit, or where a plan would benefit the WFD. No water service will be permitted to any building connected to a well and obtain water service from the well. Buildings on properties with wells may be serviced provided there is no physical connection between the well and the plumbing serviced by District water. If deemed necessary, the WFD may require a water model be run by the WFD's engineering to confirm water availability and pressure. Cost for this model shall be covered by the owner.

WATER MAINS - Requests for water mains must be pre-approved by the BoWC. The minimum main for sub-division greater than ten units shall be eight (8)-inch. Sub-divisions of less than ten units may install a six (6)-inch pipe if adequate fire flow is documented by hydraulic modeling by the WFD's engineer. The pre-approval of water mains requires the submission of plans prepared by a professional engineer. All plans shall contain the note: "Installation of all mains, valves, hydrants and services shall be in accordance with the latest published WFD Specifications and Rate Schedules". The WFD requires the submission of the following plans for approval.

1. **WATER MODEL PLANS** – Water availability models are required for all developments, unless chosen by WFD to do otherwise. Two (2) copies of modeling plans shall be provided directly to the Superintendent during the planning phase of the development. Modeling plans are conceptual in nature used to determine the District's ability to provide adequate fire flow (750 gpm or better) while maintaining residual system pressure (25 psi) under peak demand conditions. Modeling plans shall be prepared on **one (1) sheet** and contain both a plan and profile view of the proposed extension. The plan view shall include lot lines, and the pipe layout. The profile view shall show pipe depth in relation to existing and final grades. Both the plan and profile views shall depict stations at 100 foot intervals. Plans should be clearly delineate water assets. Plans, which contain excessive topographical, drainage, landscaping, roadway, or other non-water, related notes, details or drawings, will be rejected without review. A data block shall include sub-division name, developer and engineer contacts, lot numbers, average lot and dwelling sizes, type of development, connecting and proposed street names, pipe size and type and other necessary information.
2. **TECHNICAL REVIEW PLANS** - The technical review (TR) plan shall be similar to the model plan only in greater detail and without the profile view. TR plans shall indicate the general layout of the water improvements in relation to other underground utilities and lots. In place of the profile view will be the notes and details necessary for the Superintendent to review the plan. TR plans should be prepared on **one (1) sheet**. TR plans, which contain excessive topographical, landscaping or other non-water related notes, details or drawings, will be rejected without review. Two copies of the TR plan will be supplied directly to the WFD.
3. **FIELD PLANS** - Field plans are the TR plans except they contain the revisions noted during the review process. Field plans are used by the WFD during pre-construction and construction activities for planning and inspection purposes. Construction plans are not acceptable for use as field plans.

During pre-construction and construction activities, the Superintendent may agree to, or require, minor modifications to the field plan if the revision benefits the District. Field plans shall be prepared on **one (1) sheet** and contain no non-water related information. Two copies of the field plan will be supplied directly to the WFD before the pre-construction site meeting.

4. **AS BUILT PLANS** - As-Built plans shall be submitted to the District upon completion of the work. As-built plans shall accurately reflect the installation of the water main. As-built plans shall be clearly marked as such. As-built plans will be used in retainage reduction inspections of the completed work. Submission of as-built plans to the WFD is required before the release of any water related securities held by the District. As built plans shall be similar to field plans, but include the measurements, swing ties, depths and other information relating to the installation. As-built plans shall be prepared and stamped by a professional engineer or land surveyor in accordance with the requirements of the Superintendent.

8.0 INSPECTIONS, TESTS, PERMITS, AND RECORDS

Contractor shall coordinate with the Superintendent for inspections and the calculation of the inspection services fee. The contractor shall arrange and pay for all required tests. WFD must be present on-site at the initiation of the test for it to be validated by the Superintendent. The contractor is responsible for obtaining and having on site, excavation permits to include Digsafe, Wareham Municipal Maintenance Department or Mass DOT excavation road cut permits. No water work shall take place without the proper permits and details in place. The property owner is responsible for keeping accurate records to produce "as-built" plans. Any fees required for obtaining permits are the responsibility of the contractor.

Inspection services provided by the WFD do not guarantee the quality of workmanship or the functionality of the improvement at the time of installation or thereafter. Inspections provided by the WFD are to determine that materials used and the installation procedure complies with these specifications. No District approval of the work, design, materials or installation is expressed or implied with an inspection.

9.0 EXCAVATIONS

Excavations shall follow all local, State, and Federal safety regulations. The following are specific rules and requirements for excavations within the WFD. Where there is a conflict here with the Wareham Municipal Maintenance Department rules and regulations for road, the guidelines from the Wareham Municipal Maintenance Department rules and regulations shall apply over the Water Department rules and regulations for road repairs.

- a) Excavation Permits
 1. Excavation permits obtained by the WFD on behalf of another party shall require the posting of a cash deposit of \$500.00 for unimproved roadway or shoulder excavations, and \$1,000.00 for improved or paved road excavations. The deposit shall be retained without interest until a release of the permit is granted from the Town. Deposits are released upon written request and release.
- b) No excavation shall remain open after working hours (7:30 a.m. to 4:00 p.m.) unless provided in writing by the WFD. All excavations shall be backfilled and paved, or covered with steel plates as approved by DPW at the end of work each day. During working hours, open excavations shall be attended to help prevent falls in unauthorized access.
- c) The maximum length of open trench permissible at any time shall be two hundred (200) feet, and no greater length shall be opened for pavement removal excavation, construction, backfilling, repairing, or any other operation without the express written permission of the WFD.
- d) Excavations across Town or State roadways will require the utilization of "trenchless technology" and/or the use of a "flowable fill" type material as discussed below. Deviations from this will be required in writing from the WFD.

- e) Workmanship:
1. The Contractor shall furnish all materials and conduct the job in an orderly, timely, quality-controlled manner.
 2. The Contractor shall keep a competent foreman and sufficient competent employees to carry on the work with proper speed and in accordance with the requirements of law and other public authorities and to the reasonable satisfaction of the WFD
 3. The Contractor shall conduct the work in a manner that will not unreasonably interfere with other work being done by the Town or WFD, by contract or otherwise. If deemed necessary by the WFD, the work done under these standards shall conform to the progress of said other work. The Contractor shall cooperate with the contractors or employees who may be doing work for the Town or WFD, and with public service corporations affected by the work in arranging for storage places, temporary support for structures, repairs, etc.
 4. All temporary repairs shall be properly maintained by the Contractor to assure good rideability conditions until the end of the guarantee period or until permanent restoration has been made, whichever first occurs.
 5. Permanent pavement restoration accomplished by utility companies shall be properly maintained to assure good rideability conditions until acceptance by the WFD and Town.
- f) Removal of asphalt pavement:
1. All initial excavations into paved street surfaces shall be precut in a neat line with pavement breakers or saws.
 2. Saw cutting is the preferred method for work done for the WFD. The use of hydro-hammers or heavy-duty pavement breakers for breaking pavement are limited on all streets unless written permission is granted by the WFD for their use after due consideration of the location, the condition of the street, and the depth of saw cutting required ahead of the use of the hammers.
 3. No irregular pavement cut shapes will be allowed. No shape will be allowed that would prevent compaction equipment from adequately compacting all of the area.
 4. The shape of pavement cutouts shall be rectangular, or a combination of rectangular and square shapes unless otherwise agreed to by the WFD and Contractor.
 5. Pavement edges shall be trimmed to a neat vertical face free of loose materials and neatly aligned with the centerline of the trench.
 6. Unstable pavement shall be removed over cave outs and overbreaks and the subgrade shall be treated as the main trench.
 7. The Contractor shall make every effort to avoid damage to existing pavement to remain. Any damage shall be promptly repaired by the Contractor.
- g) Removal of concrete pavement:
1. Sawcutting of reinforced Portland cement concrete is required with the depth of the cut being the full depth of the pavement unless otherwise directed by the WFD to retain reinforcement.
 2. Sawcutting may be required by the WFD outside of the limits of the excavation over cave-outs, overbreaks and small floating sections.
 3. Reinforced concrete pavement, to the extent possible, shall be removed without cutting the reinforcement. The bars or mesh, when cut, shall be severed as close to the center of the trench as practicable and bent back to permit accomplishment of the work. When the pavement is ready to be permanently replaced, the reinforcement shall be bent back into position and reinforced with other bars or mesh which shall overlap the ends of existing reinforcement not less than twelve (12) inches and be securely wired together.
 4. Contact faces between new and existing concrete pavement shall be bonded using an approved epoxy binding agent installed and applied in accordance with the manufacturer's instructions, unless otherwise directed by the WFD.
- h) All material excavated from trenches and piled adjacent to the trench or in any street shall be piled and maintained in a manner that will not endanger those working in the trench, pedestrians or users of the streets, and so that as little inconvenience and obstruction as possible is caused to those using

streets and adjoining property. The excavated material shall be hauled away from the site by the end of each working day.

- i) The Contractor shall secure the necessary permission and make all necessary arrangements for all required storage and disposal sites.
- j) When excavated material is laid along the side of the trench, it shall be kept trimmed. Whenever necessary in order to expedite the flow of traffic or to abate the dirt or dust nuisance, toe boards or bins may be required by the WFD to prevent the spreading of dirt into traffic lanes. If any portion of the excavated material is allowed to be used as backfill, it shall be stockpiled separately from all other materials.
- k) Sections of sidewalks and curbs shall be removed to the nearest real joint or scoreline.
- l) Tunneling, boring or other methods may be required by the WFD to avoid or minimize pavement removal.
- m) Special Condition(s)
 - 1. Traffic Management Plan
 - i. The Contractor shall prepare, and submit to the WFD, a plan that shows the routing of traffic during construction. The plan shall show the area and dimensions of the roadway pavement available for traffic during each stage of the work. The plan shall include all temporary barriers, signs, pavement markings, drums and other traffic control devices required to maintain traffic together with the limits of temporary pavement and necessary steel plates. The plan shall include all the requirements by the Town of Wareham Municipal Maintenance for road openings, or MassDOT requirements.
 - 2. Steel Plates
 - i. Design Requirements:
 - 1. The Contractor shall select and design the temporary steel plate and supporting system. The design calculations and Drawings shall be prepared, signed, and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts experienced in design of temporary traffic decking.
 - 2. Design shall be in accordance with Loads and Design Criteria standard to the industry for this type of work, and with the following requirements:
 - a. For vehicular ramps, limit maximum grade to 5 percent.
 - b. For pedestrian ramps, limit maximum grade to 8 percent.
 - c. Conform with Americans with Disabilities Act Accessibility Guidelines (ADAAG) at all pedestrian traffic locations.
 - d. Design of support members shall allow clearances for existing and relocated utilities.
 - e. Provide access to utilities, fire hydrants, and other facilities requiring unique access. Requirements at each site shall be obtained from the respective agencies affected.
 - f. Plates shall overlap the trench width by at least 2 feet on each side.
 - ii. Construction Methods:
 - 1. Install and maintain the temporary steel plate systems only with express WFD approval.
 - 2. Not more than two (2) steel plates shall be used at any time.
 - 3. Steel plates shall not be used between November 15 and April 15 or at any time when snow is forecasted.
 - 4. Place 48" x 48" orange and black construction sign, stating "Steel Plates 100 feet" to provide drivers with advanced notice.

5. Provide wood wedges under plate edges at uneven surfaces to minimize movement.
 6. Provide temporary asphalt at the plate edges to provide lessen impact to vehicle traffic or trip hazard to pedestrian traffic and to assist in holder plate in place.
- iii. Maintenance:
1. Inspect the condition of temporary steel plates at least once a day. Continuously maintain plates to conform to design requirements and construction requirements. Immediately repair defects such as broken, bent, or loose plate members, and protruding fasteners. Patch adjacent paving as potholes develop, and immediately re-secure and bed loose transition members, plates, and ramps to the existing pavement.
 2. Maintain steel plates free of accumulations of snow, ice, water, mud, and debris.
 3. Perform maintenance, repair, or replacement whenever there is noticeable deterioration of any material or component from its original conditions

10.0 TRENCHING, BACKFILLING, and PAVING

The minimum depth of cover over the spring line, crown, or top of the pipe shall not be less than 4½ feet and no more than 6 feet at the time of installation. In such cases where 4 ½ feet of cover is not possible, the piping shall be appropriately insulated water pipe. Where there is a conflict here with the Wareham Municipal Maintenance Department rules and regulations for road repair (temporary and permanent), the guidelines from the Wareham Municipal Maintenance Department rules and regulations shall apply over the Water Department rules and regulations for road repairs.

The trench bottom and sidewalls shall be free of boulders, protruding ledge, stones larger than four inches, roots, trash, asphalt, debris or other unsuitable materials. Backfill shall likewise be free of boulders, ledge, stones larger than four inches, roots, trash, asphalt, debris, clay, fine sand or other unsuitable materials. Pipe laying shall be type 5 for water mains and type 3 for service lines (See Table 1).

The following are the rules and requirements for trenching, backfilling, and paving:

- a) Trenching
 1. Any trench or backfill that is unsuitable in the opinion of the WFD due to depth, stability, wetness or clay content shall be rejected for use.
 2. Trench bottoms shall be at a uniform depth to grade at installation. Irregular trench bottoms may be made uniform using a bedding material six inches in depth. Bedding material shall meet the same standards as the backfill previously described. Pipes shall be installed only in dry trenches. All open ends of pipe shall be closed off to prevent water, dirt, animals, or other foreign substances from entering the pipe.
- b) Backfill
 1. Before backfilling, the Contractor shall notify the WFD for inspection. Backfilling shall not occur without WFD approval.
 2. In unpaved areas, excavations shall be backfilled as directed by the WFD with approved material thoroughly compacted in layers not to exceed twelve inches (12 inches) in thickness until flush with the surrounding ground surface. If the backfilled material settles, additional approved materials shall be installed by the Contractor, as required, to keep the surface even. After settlement is completed, the excavated area shall be left by the Contractor in as good a condition as before the work was started.
 3. Temporary sheeting and bracing used to support the side walls shall be removed, unless otherwise directed by the WFD, as backfilling progresses. When backfilling has reached the bottom of a brace, the latter and its horizontal ranger shall be removed, and this

procedure shall be repeated throughout the backfilling operation. The sheeting shall be pulled in short increments, care being taken to avoid significant lateral movements of the sides of the trench. During and after pulling the sheeting, the backfill in the space formerly occupied by the sheeting shall be compacted.

4. Whenever water is found standing in the excavation area, the water shall be removed by pump or other means before backfilling operations may commence.
5. Backfilling shall be performed as soon as practicable so that the least possible subsequent settling will occur. In most cases backfilling shall occur on the same day as the excavation was begun. If this is not feasible due to the complex nature of work, emergency, or unpreventable conditions, the Contractor shall notify the WFD that same day, if not sooner, and take appropriate measures to protect public safety and infrastructure until work commences again the following day.
6. Backfill in paved areas shall be granular gravel borrow, processed gravel, sand or crushed stone material (dependant on the specific utility) placed to a depth of 1 foot over the utility. In paved areas, trenches shall be backfilled in 12-inch lifts. Each lift shall be thoroughly compacted by means of a vibratory or mechanical compactor before the next lift is laid in place. The backfill shall be placed up to the pavement subgrade surface.
7. Broken pavement, large stones, roots and other debris shall not be used in backfill. Unused excavated material shall be removed from the jobsite and disposed of in a manner that will minimize interference and obstruction with pedestrian and vehicular traffic. No material shall be left within the right-of-way once the repair and/or installation is complete.
8. WFD may require the use of Excavatable Controlled Density Fill (CDF or Flowable Fill) during backfilling. Within the limits of the pavement, the trench shall be backfilled with Flowable Fill to an elevation of four (4) inches below the top of the paved surface. The following additional conditions must be met:
 - a. Only Type IE, Excavatable Fill will be allowed.
 - b. This material shall not be used for bedding material or in situations that will cause floating of the utility lines, or in the presence of cast iron or steel pipes.
 - c. CDF placement in trenches shall be fully barricaded or police protected for a minimum of three (3) hours after the pour or until a set is reached that will prevent a hazard to animals or humans.
 - d. CDF shall be separated from gas lines with a minimum of six (6) inches of sand cover over the lines.
 - e. Excavations that cross or extend into the public right-of-way shall be saw cut and backfilled with a "flowable fill" type material to grade and allowed to cure for at least 24 hours before the application of the binder coat. Contractor is responsible for maintaining at least one lane of traffic flow using road plates or barricades as well as meeting all State and Federal safety requirements.

c) Temporary Pavement

1. Upon the completion of proper backfilling, the Contractor shall install temporary pavement. The Contractor shall take all reasonable measures to complete temporary pavement on the same day excavation work was begun. If same day paving is not achievable due to complexity of work, emergency, or unpreventable conditions, the Contractor must notify the WFD as soon as practicable that same day, if not sooner, and take appropriate measures to protect the public safety and infrastructure until work commences again the following day. The most stringent measures will be required on primary streets. Same day paving will typically be required if work is not expected to be continued the next day, regardless of location.
2. The Contractor shall notify the WFD 24 hours prior to beginning paving operations for inspection. All hot mixed asphalt paving must first be approved by the WFD as to depth and materials; this applies to both temporary and permanent paving activities.
 - a. Notification of the anticipated timing of all paving activity must be acknowledged by the WFD. Any notification delivered by facsimile machine must be preceded or followed up by a telephone conversation to assure its proper and timely receipt.

- b. Contractors shall endeavor to make a follow-up notification by 9:00 a.m. of each workday that paving is still anticipated. In the event of schedule changes or emergencies, the Contractor shall provide a minimum of one-hour notification to assure inspection availability.
 - c. If a WFD inspector is not able to be on site within 24 hours of the acknowledged anticipated start time of paving activity, the Contractor may be allowed to commence paving. Inspector may sample in-place material for specification compliance.
 - d. Contractors who do not provide proper notification of paving activities may be subject to required removal and replacement of pavement for the purpose of inspection.
3. All temporary pavement shall be hot mixed asphalt, conforming to MassDOT Standard Section 460, placed in one and a half (1.5) inch compacted courses to a total depth of three (3) inches. If a layer of concrete, cobblestone, granite pavers, or other supporting material also exists, the Contractor shall install concrete to match that depth prior to installing temporary pavement.
 4. If excavation (or pavement damage) occurs at or within twenty four (24) inches of the edge of trench, the Contractor shall place temporary pavement to the edge of existing sound pavement.
 5. Hot mixed asphalt paving of trenches deemed by the WFD to be major excavation shall be paver applied, unless otherwise authorized by the WFD.
 6. The Contractor shall maintain the temporary pavement and shall keep the temporary pavement in acceptable condition until the end of the guarantee period, or until permanent pavement is installed. At this time, the temporary pavement shall be excavated to the required grade in order to place the permanent bituminous concrete pavement.
 7. The Contractor shall perform any necessary restoration beyond the limits of the street pavement, including lawns, esplanades, shrubs, gardens, curbing, sidewalks, underdrains, separations fabrics, fences, walls, etc. if they have been damaged during their construction work. Upon completion of the permanent repairs outside the limits of the street pavement, the Contractor shall notify the WFD in writing that the permanent repairs and/or replacements have been completed, setting forth the date of completion. The Contractor shall maintain the repaired area outside of the pavement for a period of one (1) year after completion, with the exception that once proper horticultural growth has been established, no further horticultural maintenance will be required.
 8. Refilling of bar holes made in the street or sidewalk shall immediately, upon completion of the work, be filled with compacted, granular material up to three (3) inches below the paved surface and the remaining three (3) inches filled with an approved asphalt plug.
 9. All traffic control signs (i.e. STOP, YIELD, DO NOT ENTER, ONE WAY, NO PARKING, SPEED LIMIT, CURVE WARNINGS, etc.) approved by the WFD via the Municipal Maintenance Department for removal, relocation, replacement, etc. shall be immediately replaced by the Contractor, unless otherwise directed by the WFD. No such traffic control sign shall be removed, relocated or replaced without the express approval of the WFD.
 10. All traffic devices, signs, pavement markings or traffic loops disturbed, damaged, altered or removed by the Contractor shall be promptly replaced by the Contractor, unless otherwise directed by the WFD, in accordance with Town and State of Massachusetts rules and regulations at the expense of the Contractor. The Contractor shall promptly repair all other damage caused by the work or activities. Street markings (centerlines, crosswalks, stop bars, lane markings, etc.) and traffic loops shall be replaced no later than thirty (30) days after completion of work or as may be directed by the WFD. If work disturbs centerlines or lane markings on primary streets, the Contractor shall place temporary reflective markers immediately after the pavement is placed.
- d) Permanent Pavement
1. The existing pavement shall be sawcut a minimum of six (6) inches beyond the initial excavation limits to expose a six (6) inch width of undisturbed soil.

2. The temporary pavement, backfill and undisturbed soil shall be removed to the depth of the proposed pavement and disposed of off the site.
 3. The permanent pavement shall be:
 - i. Binder coat shall be a minimum of three (3) inches in depth set in place as to accommodate a minimum of two (2) inches of finished topcoat. Finished asphalt shall be rolled to a flat uniform surface. The Wareham Municipal Maintenance Department shall issue a road cut permit which may include additional conditions or requirements.
 - ii. Binder shall be founded on 4 inches of Dense Graded Crushed Stone on 8 inches of Processed Gravel or Dense Graded Crushed Stone. This pavement structure shall be placed on the backfill.
 - iii. If pavement depth is greater than 5 inches, the Contractor will be required to match the existing pavement thickness. Increased depths of pavement may be considered on a case by case basis.
 4. Trench backfill shall be checked for compliance with 95 percent compaction requirement. If compaction is found to be less than 95 percent, trench shall be re-compacted before paving will be allowed.
 5. Permanent pavement restorations shall not be allowed to commence until at least one freeze/thaw season has passed since the installation of approved temporary hot-mixed asphalt pavement.
 6. In cases where the existing pavement adjoining a proposed excavation is in need of rehabilitation, the WFD and Contractor may enter into a mutual agreement such that the Contractor undertakes the pavement rehabilitation as part of their pavement restoration.
 7. Contractor will not be required to repair or replace damaged pavement existing prior to commencement of the work unless excavation operations result in small, unstable sections. These shall be removed and replaced as part of the work.
 8. Each course of hot-mixed asphalt shall be compacted separately, meeting the requirement of 92 percent minimum compaction of standard laboratory theoretical maximum density for the specific material.
 9. Mechanical compactors will be permitted for repairs less than 10 square yards. Repairs exceeding 10 square yards shall be rolled with an appropriately sized, power-driven, steel-wheeled roller to obtain specification density.
 10. Hot-mixed asphalt materials shall be laid upon an approved clean, dry, compacted surface, spread and struck off to the established grade and elevation, giving regard to the loss in depth between loose and compacted mixtures. Immediately after the hot mix asphalt mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted.
 11. All sawcut vertical faces of existing pavement shall be neat, free of loose materials, and tack coated with an approved asphalt emulsion by applying the emulsion material in conformance with MassDOT Standard Specifications Section 460.62, to fully cover the surfaces prior to pavement installation.
 12. A tack coat shall be applied to the sub-base surface, or previous course surface.
 13. If two or more excavations are made for the same utility or client in the same construction season and are within six (6) feet of each other, edge to edge, they shall be permanently restored as one trench, including the pavement between excavations.
 - i. Same requirement shall apply, if in a future season, an excavation for the same utility or client occurs within six (6) feet and the first has not yet been permanently restored.
 14. If an excavation for the same utility or client falls within six (6) feet of another excavation already permanently restored, the permanent pavement of the second excavation shall include all surface pavement between both excavations.
- e) Material Specification
1. Granular gravel borrow and processed gravel material backfill shall conform to MassDOT Spec. M1.03.0, Gravel Borrow Type (b) and MassDOT Spec. 1.03.1, respectively or as amended.

2. Sand borrow shall conform to MassDOT Spec. 1.04.0 or as amended.
3. Controlled Density Fill (CDF) Type IE Excavatable shall conform to MassDOT Spec. 4.08.0.
4. Pavement structure subbase material shall be either MassDOT M1.03.1 Processed Gravel for Subbase or MassDOT M2.01.7 Dense Graded Crushed Stone for Subbase. The material shall be spread in layers not exceeding eight (8) inches in loose depth and compacted to no less than 95 percent of the maximum dry density of the material, ASTM D1557.
5. Temporary pavement shall be hot-mixed asphalt MassDOT Type I top course material conforming to MassDOT M3.01.0 and M3.11.07.
6. Steel Plates.
 - i. Plates and supporting members shall be steel, either new or used.
 1. All materials shall be sound and free of damage or deterioration that would adversely affect functions.
 2. Load and deflection calculations shall be used on ASTM A36 / A36M steel unless Contractor provides evidence that all steel used for the plate systems will be a higher strength grade.
 - ii. Steel plates in vehicular and pedestrian traffic areas shall be coated with an approved skid-resistant coating. Preparation of the surface and application of the coating shall be in accordance with all of the manufacturer's guidelines. Coatings shall be maintained on 100 percent of the surface of plates carrying vehicular and pedestrian traffic. Repairs shall be made to worn or deficient areas.
7. Permanent pavement materials shall conform to the same MassDOT Standard Specifications as required for temporary pavement.
8. Portland Cement Concrete shall conform to the requirements of Section M4 of the MassDOT Standard Specifications.
9. Reinforcing shall be FIBERMESH fibers (100 percent virgin polypropylene, collated, fibrillated fibers) at a rate of 1.5 lbs. per cubic yard of concrete will be allowed for non-structural reinforcement. Installation shall be per manufacturer's recommendations.
10. Loam shall conform to MassDOT Standard Specification Section 1.05, Loam Borrow. Loam shall have a finished depth of six (6) inches (minimum).
11. Seeding shall conform to MassDOT Specification Section M6.03. Contractors shall be required to continually seed and water areas of loam until a satisfactory growth of grass is established.
12. Filter fabric for underdrain shall be equivalent to Mirafi 140 by Fiber Industries.

f) References

1. All materials and execution shall conform to the highest applicable standards. If there is a conflict between other standards and these Design standards, then the most stringent criteria shall be used.
2. These standards draw and refer to the Commonwealth of Massachusetts Massachusetts Highway Department: Standard Specifications for Highways and Bridges (1995 et seq.) and the Commonwealth of Massachusetts - Massachusetts Highway Department: Construction and Traffic Standard Details (1996 et seq.). These two documents are referred to collectively as the MassDOT Standards. The latest revision of each standard shall be referenced.

11.0 PRESSURE, CHLORINATING, AND BACTERIA TESTING

Municipal Lines

Leakage Test: All pipelines shall be tested for leakage before the installation of service taps. Methods of testing and plans showing sections to be tested shall be submitted to the WFD for approval as requested. All pressure testing must be in conformance to a written plan submitted to, and approved by, the WFD.

No more than 2,000 feet of water main shall be tested in a single test. During this test all hydrant laterals shall be in the open position. The Contractor will not perform a pressure test against existing valves unless authorized by the WFD.

Contractors will retain the WFD to conduct acceptance tests as prescribed in the rate schedule utilizing the following procedure:

1. Pipes will be filled slowly with water through valves operated by the WFD.
2. Hydrostatic testing is performed as follows using the bump test (see Appendix A for descriptions and forms):
 - a. Internal pressure of the pipeline shall be gradually increased to a steady reading of the WFD choice (typically 50, 100, and 150-psi gage) on three separate tests.
 - b. After the initial 30 minute sit period, repump the line to 50 psig and measure the amount of the water pumped into the system.
 - c. Repeat the same 30-minute sit & recovery at 100 psi and 150 psi and record the results.
 - d. If the recovery volume at these increasing pressures, whether its ounces or gallons, stays the same or decreases, the pipeline is tight and is not leaking water but simply compressing a contained air bubble, which expands when the pumps cease.
 - e. Increasing recovery volumes at increasing pressures is a clear statement that trapped air is not affecting the pressure reading but a leaking valve, a leaking joint, a defective item, or some other issue that must be further diagnosed or repaired / replaced.
 - f. Any loss of pressure at this phase of the test requires the termination of the test until the leak is located and repaired.
 - g. All visible leaks shall be corrected regardless of results above.

All pipelines must pass the hydrostatic pressure test before initial flushing and the introduction of chlorine for disinfection.

The Contractor shall submit a written report to the WFD summarizing the results. The Contractor shall repair all leaks discovered under any of the required tests and retest the pipe. The WFD will not accept any installation where a final test has not been passed.

Disinfection Test: Disinfection shall meet ANSI/AWWA C651 - Disinfecting Water Mains. A written Disinfection Plan shall be provided by the Contractor. The Disinfection Plan shall summarize the intended type of chlorine dosage and the method for establishing that dosage. The disinfection may be accomplished by introducing into all the various parts of the new water mains a liquid solution in such volume that the rate of dosage to the water mains shall be at least 25 parts per million of available chlorine. The Disinfection Plan shall document the locations and methods for applying the chlorine into the pipeline as well as methods for dechlorination. Connections at cuttings shall be swabbed with a 50-PPM solution of chlorine at locations when other methods are not applicable. The Contractor shall not proceed with the disinfection procedures until the Disinfection Plan has been approved by the WFD. No more than 1,000 feet of water main shall be disinfected in a single test.

The WFD preference is for chlorine in the form of liquid or tablet (either sodium hypochlorite or calcium hypochlorite) applied at a minimum dosage of 25 parts per million. If gaseous chlorine is to be used, then a hazard mitigation plan and coordination with the fire department will be required. The WFD reserves the right to reject disinfection plans with gaseous chlorine if the WFD deems the hazard to the public to be too great. The pipeline shall remain chlorinated for at least 24 hours and maintain at least 80% of the starting residual at the end of the test.

All chlorinated water shall be de-chlorinated using a neutralizing agent to meet all State and Federal Standards (generally <0.02 ppm). Dechlorination shall take place at the point of discharge in a manner approved by the WFD. Tables are provided in AWWA C651 to guide the contractor in chemical dosing and removal.

All water used in de-chlorination process shall be charged at the base rate for 2,000 cubic feet per flushing event. If more volume than 2,000 cubic feet of water is used, then the current tier rate for that volume of water used above the base will be charged.

After each chlorine treatment the WFD will assist the contractor with dechlorination of the pipeline by operating the distribution valves. Dechlorination will continue until no measurable residual is detected.

Bacterial samples shall be collected both at 24 hours and 48 hours after the line is dechlorinated and delivered for analysis by the WFD by a State certified laboratory. Samples shall be obtained at the approved sampling sections of the main. New water mains will be required to be sampled for both bacteria and heterotrophic plate count (HPC) analysis.

The contractor is permitted to "split" the sample for independent analysis if desired. If any pipeline sample tests positive for bacteria, the entire site shall require additional chlorine disinfection. Flushing is not an acceptable means of removing bacteria from a pipeline. All costs associated with flushing, chlorinating, dechlorinating and sampling shall be paid for by the contractor/owner. Water used for flushing shall be charged at the base rate for 2,000 cubic feet per flushing. If more volume than 2,000 cubic feet of water is used, then the current tier rate for that volume of water used above the base will be charged.

Fire Service Lines

Fire services lines will be disinfected in the same manner as municipal lines. Hydrostatic pressure tests for fire service lines shall be 100, 150, and 200 psig with no loss over 30 minutes using method described above). A test certificate for underground piping shall be provided to the Wareham Fire Department by the owner/tester.

12.0 METER SET-UP

The property owner shall pay for meters in accordance with the rate schedule at the time of service application. All meters shall be supplied and installed by the WFD. All meters shall be the sole property of the WFD and register in cubic feet. All services shall be fitted with a 5/8-inch meter. Requests for larger meters will be considered if documented by a fixture analysis per AWWA M-22 and/or State Statutes and Regulations. All meter set-ups shall include a quarter turn ball valve before and after the meter, meter couplings, meter, suitable backflow device, and a pressure-reducing valve if required. All fixtures, fittings, couplings, and piping from and including the curbstop connecting fitting (except the meter) shall be owned and maintained by the property owner. Meters shall be owned and maintained by the WFD. The property owner must keep meter on his/her premises easily accessible for reading and servicing at all times. The Water Department reserves the right to read, inspect or service the meter at any time (M.G.L. 165, paragraph 11D).

13.0 METERS REQUIRED

Meters shall be required to any building or parcel which takes water from the WFD for any use. All single family residential properties shall meter individually with a 5/8th inch meter. Managed residential multi-unit rental properties (i.e. duplex, apartments, and multi-family) shall have each building metered as one. Multi-unit non-managed, non-rental residential properties (i.e. condominiums, townhouses, dual owner duplex units) shall be metered individually. Commercial properties, other than manufactured housing, shall have individual meters for each building served with water for any use other than fire protection.

WFD owns the service curb stop as well as the water meter itself. All other service material (e.g. isolation valves etc.) is owned by the property owner.

WFD retains the right to replace the water meter on a periodic basis (typically every 10-15 years), when the meter fails, or operating improperly. WFD retains the right to turn off the water service if reasonable access is not provided to read or service the meter.

Lateral connections which exist prior to the adoption of these rules shall pay an "in lieu of meter" lateral connection fees as defined in the rate table.

14.0 METER PITS

The policy of the WFD is to discourage the use of meter pits. However where deemed necessary by the District, meter pits will be paid for, owned, installed and maintained by the property owner. Meter pits will only be required if, in the opinion of the WFD, it is in the best interest of the WFD (i.e. high ground water tables, excessive service length, lateral connections, seasonal services, no suitable inside meter location). All meter pits shall require the installation of a dual spring-check valve and ball valve.

Meter pits shall be required when the service line is greater than 200 feet. In these cases, the meter pit shall be installed as close to the start of the service line as possible. In cases where a meter pit/vault (or backflow prevention pit/vault) is considered by OSHA regulations to be confined space, the owner will provide a positive air flow system (e.g. fan) meeting OSHA requirements to allow entry as a remediated confined space entry. Owner will be responsible to maintaining the system in working order.

15.0 MANUFACTURED HOUSING - UNIT CHARGE and MASTER METERS

Manufactured housing parks shall be billed the minimum fee per billing for the total number of permitted units. The minimum fee shall be calculated as the minimum allowance per cubic feet (currently 2,000 cf) multiplied by the number of permitted units. The following also apply for manufactured housing parks:

1. Manufactured housing parks shall be master metered solely for paying any usage overage.
2. Usage overage will be charged at the current tier water rates.
3. Manufactured housing parks shall not be subject to lateral connection fees, but are subject to fire protection or other readiness to serve fees.
4. No credit will be provided for vacancies.
5. It should be noted that the WFD no longer provides service repair work on private water lines.

16.0 SERVICE INACTIVATION

All water accounts shall remain active for the payment of the "curb-stop" fee until such time the service is disconnected from the water main at the corporation. All costs associated with the removal of a service shall be the responsibility of the property owner.

17.0 BACKFLOW DEVICES

A backflow device shall protect all water services installed. A Watts #7 dual check valve shall protect residential services. A pressure vacuum breaker, reduced pressure zone device, or a testable double check valve shall independently protect irrigation systems. A device as specified by the WFD consistent with the hazard potential shall protect commercial and industrial services.

A testable double check valve or reduced pressure zone device shall protect fire systems as specified by the WFD. All water services requesting a change-in-use/ownership, building or other permits shall be retrofitted with a suitable backflow device as directed by the Superintendent prior to the WFD sign-off of the permit.

All installed testable backflow devices shall be tested by a WFD certified tester on an annual or semi-annual basis. In cases where the backflow is located in a pit/vault, and the location is considered by OSHA regulations to be confined space, the owner will provide a positive air flow system (e.g. fan) meeting OSHA requirements to allow entry as a remediated confined space entry. Owner will be responsible to maintaining the system in working order.

18.0 WATER SERVICE CONFLICTS WITH SEPTIC OR SEWER

Water mains and services should have a lateral separation of ten (10) feet. Should local conditions prevent a lateral separation of ten feet, a sewer may be laid closer than ten feet from a water main if:

- Approved by DPW in writing.
- The elevation of the top (crown) of the sewer will be at least 18 inches lower than the bottom (invert) of the water main. If the WFD has information or believes that the groundwater is elevated in the area of the sewer and water pipe such that a possible cross contamination could exist, the WFD reserves the right to have the water main sleeved or concrete encased.

Water services that fall within the minimum ten (10) foot setback from septic systems or the minimum ten (10) foot sewer setback that do not fall in the above categories must be sleeved or encased in concrete using the following guidelines:

1. Sleeve shall be at least twice the diameter of the water service pipe.
2. Sleeve shall be either SDR35 pipe with push on joints, or a continuous length of 200-psi HDPE tubing.
3. Any portion of the service installed within the ten foot separation limit shall be sleeved to a point at least five feet beyond the setback limit.
4. The sleeve shall extend through the building foundation to the curb stop if the above requirement cannot meet.
5. Sleeve shall be sealed at either end using an expanding foam type insulation sealant.
6. A backflow device on the service is required. In certain applications (i.e. high groundwater), the WFD may require the installation of a meter/backflow pit.
7. The installation must be inspected by the WFD before backfilling. One-day prior notice is required.

19.0 FIRE SERVICE

Fire services shall enter the building separate from the domestic service. Water taps that support both fire and potable water services shall be independently gated immediately outside the building so that neither gate operation will affect the other in use. The following apply to Fire Services:

1. The WFD does not require meters on fire services. All fire services shall pay an annual fee as described in the WFD fee schedule.
2. An approved fire service backflow device shall protect all fire service lines immediately after the point of entry to the structure.
3. Fire services that include an additive for corrosion or freeze protection shall require a reduced pressure backflow device.
4. An annual readiness to serve fee shall apply to all private fire sprinkler systems and private hydrants as prescribed in the fee schedule. This fee shall only provide for the availability of water at the shutoff valve and does not extend to repairs, replacement, painting, landscaping or maintenance associated with the fire protection system or hydrant. Nor does the fee grant to the taker any guarantees or warranties either specific or implied as to the adequacy or lack thereof of pressure, flow rate, and quantity of water available. The fee is billed once a year and is not pro-rated for the year.

HYDRANT PLACEMENT

The placement of fire hydrants within residential developments constructed shall be no more than 500 feet apart. The spacing of fire hydrants in commercial and industrial developments or at sites proposing a specific fire hazard shall be at the discretion of the Fire Chief or their designee, with high hazard areas requiring no more than 300 foot spacing.

For all new water/fire service mains a fire hydrant shall be placed at the point where the water/fire service line either terminates, or is at the maximum distance from an existing hydrant. The spacing of hydrants shall be determined beginning from the hydrant placement as prescribed in the preceding sentence. Cul-de-sacs hydrants may be installed "in-line" eliminating the need for the hydrant tee and blow off assembly.

PRIVATE HYDRANTS

Private hydrants will be assessed an annual readiness to serve charge. Inclusive of that charge shall be a requirement for the WFD to periodically flush, check for drainage, operability, and paint the hydrant, and make repairs to the hydrant equal to the value of the annual charge. The cost of repairs in excess of the value of the annual fee shall be paid by the owner. No water may be taken from any hydrant for purposes by any individual not approved to do so by the WFD.

20.0 IRRIGATION SERVICES

Water used for irrigation shall be an independent tap off the domestic service downstream of the meter. No independent meter for irrigation is required. A suitable backflow device as described in the state plumbing code shall independently protect all irrigation systems. Installation of irrigation requires a plumbing permit.

21.0 NON-PAYMENT SHUT OFF POLICY

All water bills are due and payable within thirty days. Water bills in arrears greater than thirty days are subject to a past due notice and interest charges as prescribed in the rate schedule. The following actions will be taken after the past due notice is provided:

1. If the bill is still outstanding after that notice's due date, a shut-off notice is sent.
2. If the bill is still outstanding 60 days after the original invoice and no contact is made to arrange for a payment plan, a letter of termination of water service is sent certified mail.
3. If payment is not received as previously described, service may be terminated on the first day after receipt of the certified mail return card or after fourteen days, whichever occurs first.
4. On the day the service is to be terminated, Water Department staff will attempt to provide verbal notice to any occupant of the premises (or a door tag will be left) that service is to be terminated.
5. A service charge as defined in the rate schedule shall be assessed for collection of payments made at the time of termination.

Any customer, prior to the termination of service, may agree to a written payment plan with the WFD. Any customer requesting a payment plan to avoid shut-off shall be afforded the opportunity to participate in a payment plan provided the account is not in default of a current payment plan.

22.0 PAYMENT PLAN POLICY

Notice of Termination for Nonpayment

When the WFD does not receive payment for bill, the WFD will provide a Notice of Termination. If no payment plan is established and the account reaches the termination level, but the water is not physically turned off, the customer must pay one-half of the termination amount due immediately to avoid termination. The remaining balance must be paid WITHIN two weeks of the first payment. If full payment not received within two weeks, the water will be turned off without further notice.

Restoration of water service to properties whose service is terminated for non-payment or default of a payment plan requires payment in full of all charges due the WFD on the date of termination and any other associated fees as outline here within.

Six Month Payment Plan

The WFD encourages customers to pay their water bills in full at the time they are due. However, in the event a customer is not able to pay the water bill in full, the WFD will allow the customer to pay the bill in installments of 1/6 the total bill plus finance charges for six months. Full payment can be made at any time during this period. If the bill is not paid in full by the end of the 6-month period, the account will move into termination phase.

The first payment shall be due on the first or fifteenth of the month (customer choice) following the execution of the re-payment plan agreement. If the business day is a Saturday, Sunday or a recognized national or state holiday, then the payment will be due on the next business day thereafter. Any customer who fails to comply with the terms of their re-payment agreement with the WFD including the terms and conditions set forth in

the preceding paragraph shall be considered in default and shall have their service terminated without the benefit of additional notice.

Any customer who is a party to a re-payment agreement with the WFD, who notifies the WFD in no less than five (5) calendar days in advance of the next payment due, of their inability to make such scheduled payment, shall not be considered in default for that payment, provided that payment is made in full prior to the next monthly payment date and the next month's payment is made in full. Customers who do not meet this requirement are considered in default and will have their service terminated without the benefit of additional notice.

The first payment shall be due on the first or fifteenth of the month (customer choice) following the execution of the re-payment plan agreement. If the business day is a Saturday, Sunday or a recognized national or state holiday then the payment will be due of the next business day thereafter. Any customer who fails to comply with the terms of their re-payment agreement with the WFD including the terms and conditions set forth in the preceding paragraph shall be considered in default and shall have their service terminated without the benefit of additional notice.

Breach of Repayment or Termination Bill

A breach of the repayment agreement either from the six-month payment plan or the default payment plan, or a bill associated with termination will allow the WFD: (i) exercise all legal rights and remedies available to the WFD and/or (ii) to cause a lien to be committed upon the property for collection that will incur statutory interest until paid in full.

Commitment of Liens

All accounts that are equal to or greater than 9-Months late in payment, or are in default of a six-month payment plan, SHALL be subject to cause a lien to be committed upon the property.

Hardship

In cases where hardship can be demonstrated to the Board of Water Commissioners (e.g. hardship relief granted by the electric utility), the Board of Water Commissioners at their discretion, can modify the terms of repayment.

23.0 FINAL READINGS FOR PROPERTY TRANSFER

The WFD requires final meter reads for all property transfers. Failure of a prospective owner to obtain from an existing owner verification of a final reading and billing shall not be deemed as a means of relief from any charges due the water department prior to assuming ownership. A service charge for this service as defined in the rate schedule shall be charged to the account.

24.0 RETURN CHECK POLICY

Checks payable to the WFD for the purchase of water, materials, labor, fees, and/or services to any account to which the WFD is entitled payment shall be subject to the provisions of MGL c. 266 § 37. The return of any instrument from the institution on which it is drawn, shall require a cash payment of the debt in full, including any additional fees associated with the return of the instrument to avoid or reverse termination of service. Upon receipt of a returned instrument of payment, the WFD shall return said instrument to the drawer by certified mail. Included with the returned instrument of payment shall be a service termination notice. Service may be terminated on the first day after receipt of the certified mail return card or after fourteen days, whichever occurs first. A service fee as described in the rate schedule, and the cost associated with the certified mail, shall be applied to the account for each occurrence an instrument of payment is returned.

25.0 CUSTOMER REQUESTS FOR METER TESTING OR REPLACEMENT

Customers may request that their water meter be tested. The request shall be in writing and state the reason for the test. If a customer believes a meter is over registering consumption, the period to which the over

registering claim is made must be stated in the correspondence requesting the test. Failure to specify the period to which the claim is made, shall limit the claim to the last consumption billing period.

Meters found to be operating within two percent of the manufacture's specifications for accuracy shall be deemed accurate. If a meter tests either above or below the accuracy parameters by greater than two (2) percent an adjustment to the bill will be made for the period stated in the request for the meter test.

The WFD for a fee as described in the rate schedule shall test all meters. However, a customer may request that an independent testing company test the meter provided the customer pay for the independent test plus the service fee. A chain of custody shall accompany all meters to be tested.

Any customer requesting a replacement meter in lieu of testing may have a new meter of equal size for the cost of the new meter. A service fee as described in the rate schedule shall be assessed for the installation of the new meter. Meters replaced at the customer's request under this section, will not constitute a basis for an adjustment to charges.

26.0 STANDARD METER REPLACEMENT SCHEDULE

All water meters older than ten (10) years may be replaced at the discretion of the WFD. Costs associated with the replacement of meters shall be as prescribed. All 5/8 meters shall be replaced without cost to the customer. It is the policy of the WFD to reduce meter sizes whenever possible. If a meter is to be reduced in size, the WFD will supply and install the necessary fittings.

The standard meter for most residential and commercial use is 5/8-inch. Customers wishing to keep or install larger meters, may at their own expense, provide the Superintendent a fixture analysis prepared by a qualified professional engineer in accordance with AWWA M22 Standards. Based on the findings contained in the fixture analysis the Superintendent may provide a larger meter.

If, after notification by certified mail and/or door hanger a water taker refuses entry to read, inspect, repair, replace and/or install a meter the District may (1) terminate service, or (2) assess a five hundred (\$530.00) annual service fee in addition to any water usage or other charges incurred by the taker.

27.0 UTILITY MARK OUTS

The WFD is neither required to be, nor is a member of Dig Safe. As such, any rules pertaining to the accuracy of marking utilities as prescribed by that organization do not apply to the Wareham Fire District. This rule is considered by the WFD to be notice to all persons doing any excavations that all water main and service utility markings provided by the WFD shall be considered a directive to the excavator to use all means of due diligence, to include hand digging, to positively locate all water services and mains when excavating. Any damages done to any water main or service because of an excavation other than by hand digging shall be recoverable by the WFD.

The owner or owner's representative shall be required to sign a Water Service Location Survey Waiver / Indemnity Release in which the Owner who receives this service fully understands that the WFD does not own complete surveyed record drawings delineating the precise location of water service lines and other underground lines and structures. As such, the actual location of the water service and other underground lines and structures is unknown. Nevertheless, as a courtesy to the community, the WFD has agreed to use common non-destructive techniques in an attempt to locate and mark out the location of the water service line.

28.0 SEASONAL DEMAND MANAGEMENT & SERVICE LINE LEAKS

Seasonal Demand Management Policy

The purpose of this section of these rules is to provide a means for conserving the water supply during the peak summer demand months and on those occasions of anticipated or actual shortages and when deemed

necessary for the health or welfare of the WFD's customers. At a minimum, the WFD shall enforce demand management policies during the period of May 1st to September 30th on an annual basis. This timeframe may be modified and/or extended based on the drought status determined by the State of Massachusetts.

1. The duration of these mandatory restrictions for lawn and landscaping watering using sprinklers shall be for the period between May 1st and September 30th of each and every year. Irrigation of lawns, gardens, and landscaping by a sprinkler, be it either installed or by a hose, is limited to properties corresponding to the day of the month and said properties legal address as follows (e.g. ODD/EVEN authorized watering):
 - a. Address ending in an even number or any fraction of a number or a letter may irrigate on even number calendar days from May 1st and September 30th on an annual basis.
 - b. Address ending in an odd number may irrigate on odd number calendar days from May 1st and September 30th on an annual basis.
2. Owners of newly seeded or sod lawns may apply to the Superintendent for a twenty (20) day exclusion from this rule. A Notice of Exclusion shall be provided by the District. A service fee shall be charged for preparation of the Notice of Exclusion. Exclusions are not transferable, and the notice shall be displayed in a window of the property so as to be visible from the street. The twenty day exclusion shall be for a period not to exceed twenty consecutive calendar days. During drought periods as defined by the State, the WFD may elect not to issue these permits.
3. Enforcement: The BoWC through their designated representatives shall enforce the provisions of this rule. The BoWC shall for each and every violation of this section provide written notice of violation. Said notice shall be issued at the time the violation is observed by the BoWC or their designated representatives. Said notice of violation shall be given to an occupant of the property if one is present or left at the premises if no occupant is present to receive the notice. Said notice shall require the immediate termination of the violation. Advisory notices may be sent to properties reported to the WFD as being in violation of this section. An advisory notice shall not be counted as a violation for the assessment of a service fee.
4. Violations: Written notice of violation as described in the presiding paragraph for the first offense, and thereafter and subsequent violations as prescribed in the rate schedule.
5. The provisions of this section do not apply to watering of lawns, gardens and landscape, or any other water use by a hose held in the hand. Nor shall the provisions of this rule be enforced on the 31st day of any month except as provided for in paragraph (6). Nor shall these rules apply to any customer who uses a separate water supply such as a well or surface water for irrigation.
6. The BoWC, at their discretion, may impose temporary water use restrictions more stringent than those provided for in this section. Said temporary restrictions shall be imposed as the result of a declared water emergency and shall supersede any seasonal water demand measures in place at the time. A water emergency may be declared by the BoWC at any time during drought alerts or advisories issued by the State, or due to circumstances or conditions of a well, storage tower or the distribution system which warrant such a declaration. At a minimum, a declared water emergency shall prohibit the irrigation of lawns, gardens, and landscaping by a sprinkler, be it installed or by hose. Other water restrictive use measures may be imposed by the BoWC at any time during a declared water emergency if conditions warrant additional restrictions. A water emergency once declared by the BoWC shall remain in effect for no less than five days and until further notice is provided.
7. The provisions of this section shall not apply to independent sources of water used for lawn irrigation such as private wells, streams, or ponds.

Service Line Leaks

Notice of leaks on the service line owned by the homeowner shall be repaired by a WFD approved contractor within thirty (30) calendar days of receiving written notice by the WFD, or approved alternative timeline by the WFD in writing. Service lines which are not repaired in the timeline provided will be provided with a warning of shutoff. If no action occurs after seven (7) calendar days of receiving the shut off warning, the water will be turned off until such time the service line is repaired and inspected by the WFD.

29.0 RESIDENTIAL WATER SERVICE APPLICATION RULES

WATER SERVICE APPLICATION PROCEDURE – The property owner or their representative shall complete a Water Service Application Card at the Water Department. Applications should be submitted at least ten (10) days before the installation of the service. The system development fee shall be paid at the time the application is made. Building permit signoffs require completion of a Water Service Application Card. (Note: Filing the application activates the account for billing.) No water service will be permitted to any building connected to a well. Buildings on properties with wells may be serviced provided there is no physical connection between the well and the interior plumbing.

PLANS FOR RESIDENTIAL SERVICES – A simple plot plan is required for new installations. The plan shall show the proposed location of the water service in relation to the roadway and the dwelling. The plan does not have to be prepared by an engineer, unless the lot is to have a septic system. The location of the service may be altered in the field with the concurrence of the Superintendent or his designee. A detail plan may be required for installations greater than 150 feet in length, that cross wet or wooded lots, are within ten (10) feet of a septic system, require a meter pit, or some other condition exists where a plan would benefit the water department. Services installed under slab foundations shall be sleeved.

SCHEDULING SERVICE TAP - For new curb stops, the owner/contractor shall schedule the tap with the WFD. A plot plan is required. Owner is responsible for road cut, trenching, backfill, road repair, safety, and traffic control within the right-of-way. Meter pits may be required depending on site conditions. Owner shall obtain a Dig Safe number and all permits for State roads. The WFD will obtain excavation permits on behalf of the applicant for work with Town's right-of-way. Applicants should consult the WFD for a cost estimate for the tap work.

SCHEDULING SERVICE LINE INSPECTION FROM CURB STOP TO FOUNDATION - Inspections must be done before backfilling the trench. No inspections will be performed on service lines not connected to an active curb stop. A ball valve and trace wire must be installed on the service line inside the foundation for the inspection. Service lines installed within a slab foundation shall be sleeved. Owner shall be responsible for all costs associated with installing the service line from curb stop to meter. Inspection on previously backfilled or dry installed lines requires a pressure test. Inspections shall be scheduled before 2:00 p.m. on the workday before the actual installation. There is no charge for scheduled inspections. Requests for same day inspections require a \$70.00 service fee.

WATER SERVICE MATERIALS - All residential water taps shall be one (1) inch. Service tubing shall be sized per AWWA M-22. All backfill shall be suitable material free of debris and stones greater than 4-inch in size. All connections shall be compression type fittings with stainless steel inserts; flared fittings are not permitted. All material must be installed as to have no leakage under pressure. All water service tubing shall be Copper Tube Size (CTS) 200 psi Polyethylene (HDPE) tubing conforming to AWWA C-901. Tracing wire on plastic tubing is required.

All curb boxes shall be North American made "Buffalo" Style 2½-inch to include cover, slide top, and base. The curb box shall measure in length from the curb stop to the finished grade plus six (6) inches. All curb stops shall be centered and plumb in the box at a depth of between four and six feet below *final* grade. The owner is responsible for the final placement of the curb box.

SCHEDULING METER INSTALLATION - The residential meter setup, spacer bar, and backflow device must be installed before the meter can be set. Water meters shall be installed and water turned on only by water department personnel. Meter appointments shall be scheduled before 2:00 p.m. on the workday before

the actual installation. Plumbers/owners may pick-up a spacer from the WFD. There is no charge for scheduled appointments. Requests for same day installations require a \$70.00 service fee.

All meters shall be supplied, installed, and owned by the WFD. All services shall be fitted with a 5/8-inch meter. The meter set-up shall include a quarter-turn ball valve before and after the meter, meter couplings, meter, suitable backflow device, and a pressure-reducing valve if required. All fixtures, fittings, couplings, and piping from and including the curbstop connecting fitting (except the meter) shall be owned and maintained by the property owner. A Watts #7 style backflow device shall protect all services. **Please consult the local plumbing inspector for applicable codes.**

SCHEDULING OCCUPANCY PERMIT INSPECTION – Final inspections for occupancy permits shall be scheduled with the water department. Sign-off inspections must be scheduled before 2:00 p.m. on the workday before the sign-off is needed. It is strongly recommended that the sign-off inspections be requested 3-5 days prior to the need of the permit so that any noted deficiencies can be corrected. There is no charge for scheduled appointments. Requests for same day sign-offs require a \$70.00 service fee. All noted deficiencies must be corrected prior to the sign-off of the permit.

30.0 PLUMBING FAILURE – ABATEMENT POLICY

Abatements shall be given at the discretion of the Board of Water Commissioner's based on the following criteria:

1. A written request submitted in a timely manner.
2. An abatement will not be provided if an insurance company has or can cover the bill.
3. The water leak must be repaired. Evidence that the repair has been fixed must be provided.
4. One abatement will be provided per property owner for the period of ownership of the house. The owner will be determined by the name on which the water service is assigned to in the billing software. If the owner changes, another abatement will not be allowed for a period of 10 years after the date of the previous abatement.
5. Calculate the abatement as follows:
 - a. Deduct the allowance from the total consumption so that only excess consumption is left. The allowance in FY19 is 2,000 cubic feet.
 - b. Determine the normal consumption by averaging the most recent four summer periods or four winter periods that match the period of the requested abatement. If no use is used during one of the seasonal periods (e.g. foreclosure, seasonal, etc.), the most recent season of use average will be utilized.
 - c. Subtract the overage from the average overage consumption over the allowance for the period. This will be considered the excess water associated with the leak.
 - d. Abate 50% of the excess water at the highest tier rate at which the water was billed.
6. This policy can be changed or revoked by the Board of Water Commissioners by an affirmative vote.

31.0 WATER METER TAMPERING POLICY

Meters will be supplied by the Water Department. All existing and supplied Water Meters are the property of the Water Department.

Any person employed by the Wareham Fire District, at the direction of the Water Superintendent, may at any time enter any premises supplied with municipal water for the purpose of examining or removing meters, pipes, fittings and works for supplying or regulating the supply of water and of ascertaining the quantity of water consumed or supplied in accordance with the Massachusetts General Laws and Board policies and regulations. (M.G.L. c. 165 § 11 et seq)

The Department reserves the right to remove, repair or replace any meter at any time as it deems necessary in its sole and absolute discretion. Meters shall be repaired and replaced from time to time as deemed necessary in order to ensure their accuracy in recording water usage at any facility serviced with municipal water.

If a meter fails to register or under-registers outside the manufacturer acceptable accuracy range for any cause other than tampering, the charge for the water shall be based on the average amount registered by the meter when in order for similar billing periods, using available billing records over the previous 5 years. Charges will be calculated covering the probable use period over which the meter was not registering correctly. Charges shall constitute water usage and as such, if not paid when billed, shall be committed as a lien to the Town Treasurer/Collector for real estate tax purposes consistent with applicable law.

All repairs or injuries to meters from freezing, hot water, or external causes shall be charged to the consumer.

No person shall change, or tamper in any way, with the water meter, including appurtenances. All settings and repairs will be made by the Water Department personnel. Tampering with a meter, such that said meter does not record the true and accurate water usage at a facility serviced with municipal water, will result in a \$1,000 fine.

Should there be evidence of tampering which has resulted in reduced water bills, the Department shall calculate a charge based on the two highest uses for the winter and summer billing periods over the past 10 years, or available records, and adjust the bills to these usage amounts for the period of probable reduced water bills. The Water Department shall bill the amount so calculated as water usage, the non-payment of which when due and payable, shall be committed as a lien to the Town Treasurer/Collector for real estate tax purposes consistent with applicable law. In addition, the user will be charged for staff time and/or legal time spent to address the matter, the cost of a replacement meter if required, as well as a fine of \$200 per billing cycle where meter tampering led to a reduced bill. Massachusetts law allows additional penalties for tampering with a water meter, including up to one year in prison, which the Board may pursue at its discretion.

32.0 SCHEDULE OF RATES, FEES & CHARGES

A. DEFINITIONS

BETTERMENT DEVELOPMENT FEE: Any lot having frontage on a public or private way that was part of a previous betterment project, annexation, or area of special assessment of the WFD that had not been previously assessed a betterment in that project will pay an amount equal to the per unit betterment charge assessed for that project and any cost to bring water service to that location. This betterment/assessment also applies to lots which may obtain an easement to water mains that were part of a bettered project area.

1. No amortization will be applied except for out of District properties.

WATER MAIN EXTENSION FEE: Water main extensions constructed by the WFD, which are tapped off of or otherwise extended from an existing water main, that was not installed under a betterment project and are intended to serve one or more properties will be assessed a water main extension fee.

The amount derived from the water main extension project undertaken by the WFD divided by the whole number of residential units then eligible to be connected to that individual project as determined in accordance with the provisions of G.L. c. 40 §§ 42 (G) – 42 (K).

1. All connection development fees shall be paid at the time of application in full to the WFD and are not refundable.
2. All work must be constructed completely by WFD approved contractors duly licensed and authorized to do such work at the applicant's sole cost and expense.

B. WATER SYSTEM BETTERMENT OR EXTENSION FEE

Residential:

1. **Existing Housing Units:** Any existing housing unit not previously serviced by municipal water having access to municipal water shall pay a connection development fee as set forth in Table No. 5 – New Service Development and Meter Charge, plus a water system development fee per unit of either the ***Betterment Development Fee*** per unit or ***Water Main Extension Fee*** per unit whichever is greater as those terms are hereinafter defined.
2. **New Residential Construction Units:** Newly constructed residential units with access to municipal water shall pay a connection development fee as set forth as set forth in Table No. 5 – New Service Development and Meter Charge plus a water system development fee per unit constructed of either the ***Betterment Development Fee*** per unit or ***Water Main Extension Fee*** per unit, whichever is greater as those terms are hereinafter defined.

Non-Residential:

Shall pay a connection development fee as set forth in Table No. 5 – New Service Development and Meter Charge plus a water system development fee per unit of either the ***Betterment Development Fee*** per unit or ***Water Main Extension Fee*** per unit whichever is greater as those terms are hereinafter defined.

In all cases, fees shall be paid in full at the time of application.

C. CHARGES APPLIED BY THE WAREHAM FIRE DISTRICT

The following tables are a listing of the rates, fees and charges applied by the WFD.

Table 1: Billing Rates

FISCAL YEAR BEGINNING 1 JULY	2021	2022	2023	2024
Water Consumption Bin	\$ Flat Fee			
BASE RATE MINIMUM <2,000 CUBIC FEET	\$ 120.00	\$120.00	\$120.00	\$125.00
	\$/Hundred Cubic Feet (HCF)			
OVER 2,000 TO 4,000 CUBIC FEET	\$ 0.85	\$ 0.85	\$0.85	\$0.85
4,001 to 10,000 CUBIC FEET	\$ 3.40	\$ 3.40	\$3.40	\$3.40
10,001 CUBIC FEET	\$ 3.85	\$ 3.85	\$3.85	\$3.85

Table 2: Capital Improvement Project (CIP) and Water Quality Management Fees

FISCAL YEAR BEGINNING 1 JULY	\$/ Hundred Cubic Feet (HCF)				
	2020	2021	2022	2023	2024
CIP WATER TOWER/MIXER	\$0.1915	\$0.1542	\$0.1497	\$0.1389	TBD
CIP WATER MAIN REPLACEMENT	\$0.3217	\$0.3122	\$0.3026	\$0.2801	TBD
WATER TREATMENT PLANT	\$0.9896	\$1.2459	\$1.5247	\$1.5058	TBD
CIP MAPLE PARK WELL	\$0.5049	\$0.4942	\$0.4833	\$0.4521	TBD
GROUND WATER PROTECTION LAND	\$0.2001	\$0.1994	\$0.1181	\$0.1107	TBD

Notes: Non-Metered CIP/WQMF Minimum: 2,000 cubic feet per rate schedule

Table 3: Miscellaneous Fees

Item	Cost
Non-Metered Active Lateral Service Fee	\$20.00 per building
Hydrant Water Rentals	5/8 Meter/Backflow Device Rental of \$20.00 per week or hydrant meter \$55.00 per week plus; minimum for the first 100 cubic feet, plus; overage per 100 cubic feet additional.
Frozen or damaged meter replacement	List price of meter plus service call charges as required.
Certified Mail Notice	Mailing cost plus \$2.10 administrative surcharge.
Interest	Fourteen percent (14%) semi-annually, compounded on outstanding balances thirty days past due.
Return Check Processing Fee	\$30.00 plus postage and mailing administrative surcharge
Site Plan Review	
Single Residential Connection	No Charge
Up to Three Connections	\$105.00
Up to Ten Connections	\$210.00
Greater Than Ten Connections	\$320.00
Commercial Site Plan Review	\$380.00
Inspectional Services	
New Residential Scheduled Service Line Inspections	Included in the system development fee.

Item	Cost
New Residential Same Day or Unscheduled Service Line Inspections	\$70.00
Commercial Development Inspection Services	Three percent (3%) of improvement or hourly on-site rate.
Outside Water Sales	
Water considered an outside water sale shall be charged the following:	
1. Administrative Labor Fee	
2. A flat fee for the first HCF of water	
3. Water after the first HCF will be billed at the tiered rates in Table 1	
Fire Protection Charges	
The Prudential Committee shall pay a fee equal to eleven (11%) of the total Water Department budget adopted at the annual District Meeting for each fiscal year.	

Table 4: Service Call Fees

Service Calls	Cost
During Non-Holiday Regular Business Hours.	
Scheduled Service Call (all categories except meter testing)	\$45.00 each
Meter Bench Testing	\$80.00 each
Out of Office Collection to avoid service termination	\$45.00
Non-scheduled Service Calls	\$70.00 each
Seasonal meter removal and install	\$55.00 each
Service line locating main to curb box	No Charge
Service Calls – Other Than Regular Business Hours	
All after hour, weekend, holiday emergency service calls	\$185.00 each
New Service Installation	
WFD shall make all taps for one and two-inch services. Tapping costs shall be job specific based on current material, labor and equipment charges. NOTE: Tapping charge pays only for the material and labor for the water main tap to curbstop. No excavation, road repair, permits, or a police detail is included. The Superintendent or designee will provide an estimate for taps on request.	
Water Conservation Fines¹	
Sprinkler Non-Compliance 1 st Notice	Written Warning Notice
Sprinkler Non-Compliance 2 ^d Notice	\$20.00 each
Sprinkler Non-Compliance 3 ^d Notice	\$40.00 each
Sprinkler Non-Compliance 4 th and Subsequent Notices	\$55.00 each
Sprinkler 20-Day Exclusion Notice	\$25.00 each
Miscellaneous Service Charges	
Turn off of un-authorized turn on	\$240.00 each
Backflow Inspections/Testing	\$75.00 each
Fire Flow Test Technical Support	\$160.00 each

Notes

1. The State Executive Office of Energy and Environmental Affairs has four levels of Drought: Advisory, Watch, Warning, and Emergency. During Emergency status, the Water Conservation Fines will double the values shown in Table 4 and no 20-day exclusion notice shall be provided. WFD reserves the right to turn off water for significant non-compliers during emergency drought events. More information on Drought status can be found under the State's drought monitoring webpage.

Table 5: New Service Connection Development Fees and Meter Charge

Service Tap or Meter	Development Fee
1-inch with 5/8 meter	\$ 903.89
1 ½-inch	\$ 1,255.64
2-inch	\$ 2,141.97
3-inch	\$ 8,124.71
4-inch	\$10,340.81
6-inch	\$15,510.81
8-inch	\$21,419.69
12-inch	\$35,721.37
Fire Service 4-inch or less	\$ 1,477.22
Fires Service > 4-inch & hydrants	\$ 2,954.44

Notes

* Charged per billing.

** Included in minimum fee.

Table 6: Meter Maintenance Charge (Billed Every Billing Period - Currently Every 6 Months)

Meter Size	Fee
5/8- inch	N/A
3/4-inch	\$18.30
1-inch	\$19.40
1 ½-inch	\$37.00
2-inch	\$45.90
Sizes 3 -inch and above	TBD for project

Table 7: Fire Protection Readiness to Serve Charge (Private/Town)

Readiness to serve charge includes usage required for fire suppression and testing.

Fire Line Size ²	Multiplier (2-inch equivalent)	Annual Readiness to Serve Charge
2-inch	1.0	\$56.42
3-inch	2.8	\$157.98
4-inch	5.7	\$323.86
6-inch	11.2	\$631.93
8-inch and larger	32.0	\$1,805.51
Hydrants	2.5	\$141.06

² As measured on diameter of rise pipe when it first comes through floor or slab of the building

APPENDICES

Appendix A: Hydrostatic Testing Procedure and Associated Forms

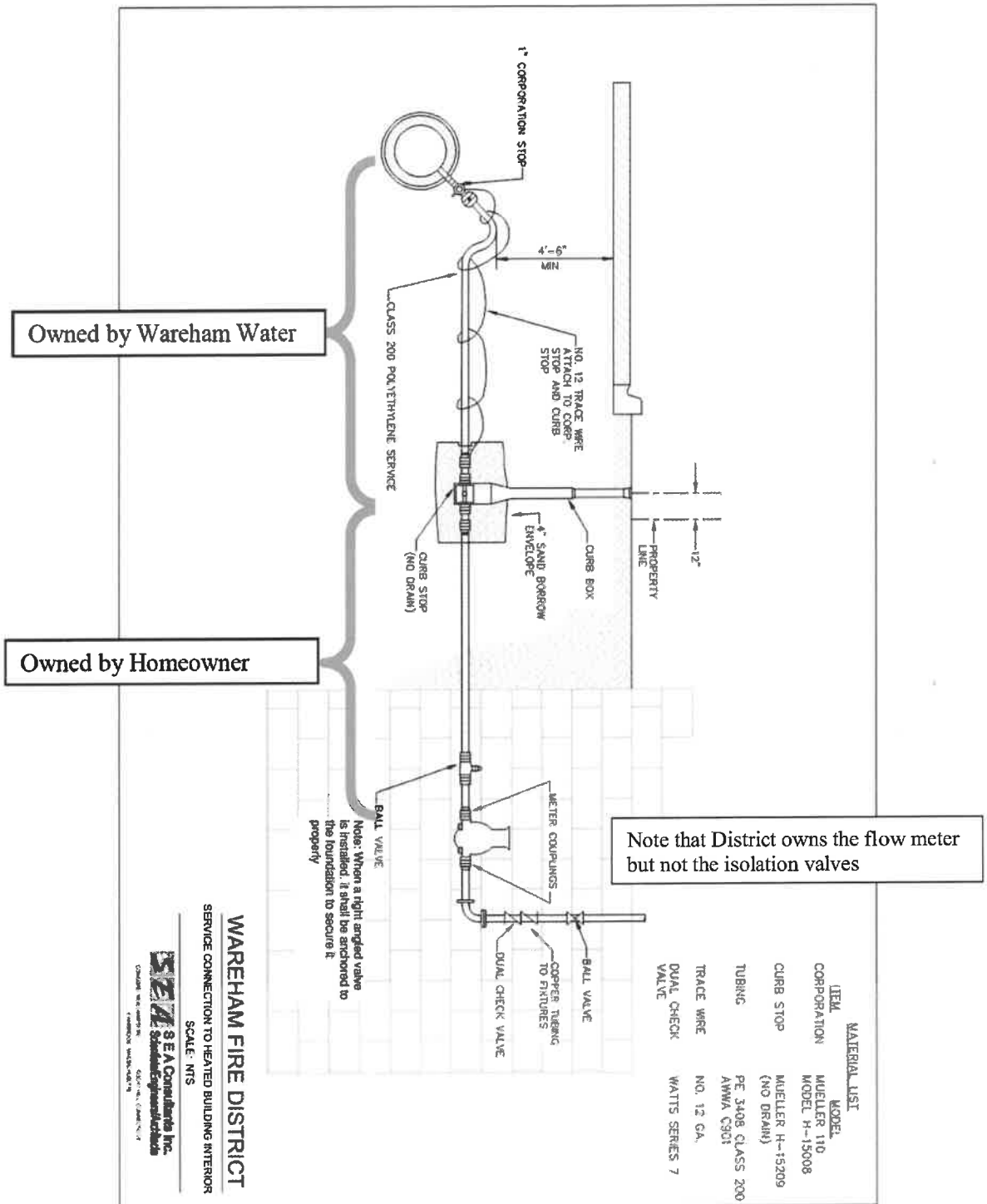
Appendix B: Commonly Asked Questions

1. Why do I receive a charge for our fire suppression system?
 - a. Fire lines typically are not metered. This charge is a readiness fee to provide the necessary water to the premises for fire suppression.
2. Why do I receive a charge for non-metered active lateral service fee?
 - a. Early in the history of the Wareham Fire District, it was not uncommon for buildings on the same grounds to have a lateral line run to another building which was not metered. This is a practice we no longer allow, but for those buildings which were grandfathered, this fee will show up on your bill as a flat fee for water consumed.
3. What does the new service connection development fee cover?
 - a. The purpose of this fee is to cover the cost of the infrastructure that has already been built to provide you water.
4. How do I find out where my water service line is located?
 - a. You can call the Water Department and we will come out to mark out the approximate location(s) of your water service line.
5. Who owns the water service line?
 - a. The WFD owns to the curb stop isolation valve. The homeowner owns from the curb stop to the water meter. See Figure in Appendix C.
6. Why do I need to use a WFD approved contractor to repair or update my water service line?
 - a. Since the WFD does not own the service line between the curb stop and water meter, the WFD wishes to ensure that contractor performing the work is qualified and installs the service line within the guidelines and rules and regulations of the WFD. Service lines installed incorrectly have a greater propensity to leak which is lost water. Lost water increases the cost of the water to you.
7. I do not understand how my water bill is calculated.
 - a. Your bill can be broken down into five main categories of charges:
 - i. Flat fee charged for up to 2000 cubic feet of usage. See Table 1.
 - ii. There are three bins set up for water consumption over 2,000 cubic feet at an increasing rate. The purpose of these bins is to encourage water conservation. See Table 1.
 - iii. Capital Improvement Project or CIP fees used to recover the cost from rehabilitating projects or projects improving the water system. See Table 1
 - iv. Late charge fees.
 - v. Service fees or miscellaneous fees as noted.
 - b. An example bill that has been marked-up is provided below. An individual account uses 4,000 cubic feet (cf) of water over a 6-month period. The consumption is broken down as 1.) 2,000 cf flat fee of \$120 and 2.) 2,000 cubic feet (i.e. 4,000 minus 2,000 cf) at the step one usage of \$0.85/100 cf or \$17.00. The total consumption portion of \$137.00. The CIP fee (FY19) is \$2.2078/100 cf. For 4,000 cubic feet of usage yields a CIP bill of \$88.31. The total water bill would then be $\$137.00 + \$88.31 = \$225.31$.
8. How many gallons are in 1 cubic foot?
 - a. There are approximately 7.48 gallons in 1 cubic foot of water.
9. Why do I pay for a backflow testing fee or for installing a cross connection device?
 - a. A cross connection is defined as a physical connection between water that is potable with water that is not potable. Under 301 CMR 22.22 - Cross Connection Distribution System Protection, the state requires the WFD to test the cross-connection systems. As such, the WFD charges for these cross-connection tests to recoup the cost to have staff to maintain these systems per State Law.

10. Why do I pay a meter maintenance fee?
 - a. The purpose of this fee is two-fold. The first is to encourage users to obtain the smallest water meter. Generally, the smaller water meters are more accurate at metering smaller flows. The second reason is to recoup the cost of the meter replacement when the meter is replaced. The District does not charge for replacement meters at the time of installation and as a goal replaces meters at an age of 10 to 12 years old. The water meters and associated components cost (2019 dollars) the following:
 - i. $\frac{3}{4}$ inch meter: \$360
 - ii. 1-inch meter: \$382
 - iii. 1.5-inch meter: \$729
 - iv. 2.0-inch meter: \$903

Appendix C: Profile of Service Line and Demarcation of Ownership

Note Water Meter Owned by WFD.



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