

SECTION G

SPECIAL PROVISIONS TO THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD AND SUPPLEMENTAL SPECIFICATIONS

DIVISION I

SCOPE OF WORK

All work done under this Contract shall be in conformance with the City of Framingham's *Construction Standards* dated June, 2021 (www.framinghamma.gov/index.aspx?NID=1116); the Massachusetts Department of Transportation (MassDOT)) *Standard Specifications for Highways and Bridges* dated 2024 including supplements, the 2017 MassDOT *Construction Standard Details*, the MassDOT 2015 Overhead Signal Structure and Foundation Design Drawings, the 1990 MassDOT *Standard Drawings for Signs and Supports*; the 2009 Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)* with MassDOT *Massachusetts Amendments dated November 2022*, and the *Standard Municipal Traffic Code*; the 1968 MassDOT *Standard Drawings for Traffic Signals and Highway Lighting*; the latest edition of *American Standard for Nursery Stock*; the Plans and these Special Provisions.

DEFINITIONS

"Municipality" and the "City" and "Owner" shall mean the City of Framingham, the municipality in which the Contract work is to be performed.

"MassDOT" shall mean the Massachusetts Department of Transportation – Highway Division.

SCHEDULE OF OPERATIONS

The Contractor shall provide a construction schedule as a Gantt chart in MS Project format both electronically and hard copy before beginning any construction. The schedule shall include all components of construction. The schedule shall provide sufficient detail as approved by the Engineer and/or Owner. The schedule shall include time periods when the Contractor will be performing construction. Contractor shall provide an updated schedule at each construction meeting and when the schedule is modified. The Schedule shall be provided in hard copy and electronic (MS Project) format. All costs associated with developing and maintaining the Gantt chart shall be considered incidental to the Contract.

COOPERATION OF THE CONTRACTOR

(Supplementing Subsection 5.05 of the Standard Specifications)

Agents of various public service, municipal and state agencies may be entering on the work site to alter or remove existing facilities, and/or to construct or place new facilities. The Contractor shall perform the work in accordance with Article 7 of the General Conditions.

ROADWAY FLAGGER

Certified Roadway Flaggers who are City of Framingham Fire Department employees may be used at the discretion of the City.

CONCURRENT WORK BY OTHERS WITHIN PROJECT LIMITS

(Supplementing Subsection 5.06 of the Standard Specifications)

Concurrent work may be in progress in the project area by the municipality, utility companies, another Contractor hired by the City, or other Contractors hired by private parties. The Contractor is required to coordinate his activities with these parties.

The Contractor is required to coordinate work shown on the plans as “By Others” or “B.O.” with the respective utility owners. Relocation and/or resetting of all such utilities to new grades made necessary by the construction of this project will be accomplished by the respective utility owners.

CONSTRUCTION STAKING

(Supplementing Subsection 5.07 of the Standard Specifications)

The Contractor shall be responsible for all horizontal and vertical control necessary for the work. Prior to construction, the Contractor shall retain a qualified surveyor to establish horizontal and vertical control from the information given by the Engineer on the Plans and from record survey available from the Engineer and the City. The elevation of existing structures to be tied into shall be confirmed or established. The Contractor shall perform all survey required for the work, and said work shall be considered incidental to the Contract.

The Contractor shall also be responsible for retaining a Professional Land Surveyor (PLS) for all survey required for the placement of new bounds, the removal and resetting of existing bounds, and any existing bounds to remain that have been displaced by the Contractor’s operations. The cost of said work by the PLS shall be considered incidental to the various items of work.

PUBLIC SAFETY AND CONVENIENCE

(Supplementing Subsection 7.09 of the Standard Specifications)

The Contractor shall provide necessary access for fire apparatus and other emergency vehicles to all adjacent streets and abutting properties at all times beyond the Limits of Work. The Contractor shall at all times provide access to public and private lots and outside of the Limits of Work or arrange 24 hours in advance for disruption in access.

Before the start of work, the Contractor shall post all locations in compliance with the Manual of Uniform Traffic Control Devices (MUTCD) and the Temporary Traffic Control Plans in the Contract documents.

The Contractor shall familiarize himself with the provisions of the Manual of Uniform Traffic Control Devices Part VI Construction and Maintenance. During construction, the Contractor shall provide traffic warning devices that conform to the MUTCD and City of Framingham Traffic Regulations in order to properly protect traffic and pedestrians from the Work. The Contractor shall be responsible for providing, positioning, repositioning, maintaining and removing signs through the course of the project as deemed necessary by the City or the Engineer.

The Contractor shall be responsible for requesting all Police Officers and/or Roadway Flaggers (“Details”) needed at least one day and preferably one week in advance of Work. The City shall reimburse the Contractor without mark-up for the cost of Details upon presentation of the cancelled check. An allowance for Details has been provided for in the Contract. It is the Contractor’s responsibility to cancel a Detail(s) at a minimum of four hours in advance of the start of the shift if conditions so warrant. The Contractor shall not be reimbursed for Details if the Contractor fails to show for the job or if the Contractor fails to cancel the Details with adequate advance notice.

This provision of Details shall not relieve the Contractor of the responsibility of providing proper traffic control devices when operating adjacent to the roadway while it is open to the public. Any costs associated with these devices are the responsibility of the Contractor and shall be accounted for in the unit costs unless otherwise provided for.

The Contractor shall provide sufficient fencing, barricades and signing and otherwise provide for security around all excavations and stockpiles. Cost for these items shall be included in the unit costs for the items of work.

The above provisions represent minimal requirements for maintenance of traffic and safety.

To provide for the convenience of the traveling motorist, no street surface shall remain in a milled condition for more than 10 working days without surface course paving.

The Contractor's attention is directed to his responsibility to maintain safe conditions for pedestrians and Contractor's personnel, as well as vehicular traffic. The Contractor's attention is directed to the fact that the work on this project is to be performed on streets that are used by pedestrians as well as vehicles. He shall furnish, install, maintain, and move all warning devices, barricades, signs, slow moving vehicle emblems, bridging materials, special apparel, and other safety measures and controls deemed necessary by the Engineer for the protection of motorists, pedestrians, and his own personnel.

If, at any time, in the judgment of the Owner or Engineer, the Work is not properly made safe in regard to public travel, persons on or about the Work, or public or private property, the City shall have the right to order such safeguards to be erected and such precautions to be taken as he deems advisable, and the Contractor shall comply promptly with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the work and the safeguard 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, the City may put the work into such condition that it shall be in its opinion, in all respects, safe.

The Contractor shall pay all costs and expenses incurred by the City in so doing. Such action of the City (or its failure to take such action), shall in no way relieve or diminish the responsibility of the Contractor for any and all costs, expenses, losses, liability, claims, suits, proceedings, judgments, awards, or damages resulting from by reason of, or in connection with the failure to take precautions or the insufficiency of the safety precautions taken by him or by the City acting under authority of this section.

Any automotive equipment, not protected by traffic cones or plastic drums, that is working on a public way under this project shall have one amber flashing warning light mounted on the cab roof or on the highest practical point of the machinery visible to both oncoming and overtaking vehicles, at least 32 candlepower and 50 - 60 flashes per minute. This light shall be in operation while the equipment is working or traveling in the work area at a speed of less than 25 mph, and a slow moving vehicle emblem shall also be displayed.

Construction equipment shall not be parked within any traveled way unless said equipment is adequately lighted and protected by safety devices and vehicular traffic is appropriately detoured. Appropriate MUTCD requirements shall apply.

NIGHT WORK

Night work shall be performed in accordance with the National Cooperative Highway Highway Research Program (NCHRP) Report 476 – “Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance and Construction”. A copy of this guideline specification may be downloaded from the following website: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_476.pdf.

No extra compensation will be made for night work and all costs associated with performing night work shall be included in the contract items.

STEEL PLATES IN CONSTRUCTION ZONES

(Supplementing Section 7.09 of the Standard Specifications)

At the end of each working day when trenches in areas of public travel are covered with steel plates, each edge of such plates shall be secured to base and beveled to grade as shown on the City of Framingham’s Construction Standards. Steel plates are only permitted with advanced written approval by the City.

PROTECTION OF UTILITIES AND PROPERTY

(Supplementing Subsection 7.13 of the Standard Specifications)

Written notice shall be given by the Contractor to all public service corporations or municipal and State officials owning or having charge of publicly or privately owned utilities of his intention to commence operations affecting such utilities at least one week in advance of the commencement of such operations. The Contractor shall, at the same time, file a copy of such notice with the Engineer. It is the Contractor's responsibility to provide adequate notice to all public and private utilities that may be affected by the construction of the project.

The following are the names of owners of the principal utilities affected as well as other major contacts, but completeness of this list is not guaranteed:

City of Framingham

Framingham Department of Public Works
110 Western Avenue
Framingham, MA 01702
Telephone: (508) 782-0213
Matthew Hayes, Project Engineer

Framingham Police Department

1 William H. Welch Way
Framingham, MA 01702
Telephone: (508) 872-1212
Attn: Lester Baker, Chief

Water and Sewer

Framingham Department of Public Works
100 Western Avenue
Framingham, MA 01702
Tel: (508) 532-6060
Attn: Stephen Leone, Water and Wastewater Director

Water

MWRA (Water Division)
1 Griffin Way
Chelsea, MA 02150
Tel: (617) 305-5827
Attn: Ralph Francesconi

Electric

Eversource
247 Station Drive
Westwood, MA 02090
Telephone: (781) 441-3851
Attn: Kim Khounesombat

Cable

Comcast
241 West Central Street
Natick, MA 01760
Telephone: (508) 647-1435
Attn: Louis Cormier

Design Engineer

Green International Affiliates, Inc.
239 Littleton Road
Westford, MA, 01886
Telephone: (978) 923-0400
Attn: Herman Peralta, PE

Framingham Fire Department

10 Loring Drive
Framingham, MA 01702
Telephone: (508) 532-5930
Attn: Michael D. Dutcher, Chief

Sewer

MWRA (Sewer Division)
2 Griffin Way
Chelsea, MA 02150
Tel: (617) 305-5956
Attn: Kevin McKenna

Fire Alarm

Framingham Dept. of Public Works
100 Western Avenue
Framingham, MA 01702
Telephone: (508) 532-6008
Attn: Patrick Keefe

Telephone

Verizon
15 Chestnut Street, 6th Floor
Worcester, MA 01609
Telephone: (508) 782-8417
Attn: John Bowler

Cable

RCN/NStar Communications
173 Bedford Street
Lexington, MA 02040
Telephone: (781) 441-3492
Attn: Andy Balta

Cable

AT&T/TCG c/o Siena Engineering
50 Mall Road, Suite 203
Burlington, MA 01803
Telephone: (781) 221-8400
Attn: John Kennedy

Gas

Eversource
247 Station Drive
Westwood, MA 01760
Telephone: (866) 633-3797
Attn: Pamela Pandolfi

The Contractor shall provide to the Engineer and to the police and fire departments a contact list of Contractor personnel who can be notified in the event of an emergency. The list shall have the names and telephone numbers of personnel available 24 hours a day, 7 days a week for the duration of the field work. The list shall be kept current and shall include secondary contacts as needed to ensure that an authorized person is available at all times to mobilize crews as required to respond to emergencies. If contacted directly by emergency response personnel, the Contractor shall immediately notify the Engineer.

The Contractor's attention is directed to the necessity of making his own investigation in order to assure that no damage to existing structures, drainage lines, traffic signal conduits, etcetera, will occur. Whatever measures are necessary to protect these lines during work shall be included in the Contract unit price for the items involved.

The locations of existing underground utilities are shown in an approximate way only and have not been independently verified by the owners or representatives. The Contractor shall notify Massachusetts DIG SAFE and procure a Dig Safe Number for each location prior to disturbing existing ground in any way. The Dig Safe Call Center telephone number is 1-888-344-7233.

Record drawings of the sewer and water systems within the project area will be made available to the Contractor prior to construction. These as-built drawings detail the probable locations of sewer and water connections into the individual homes and businesses in the area.

The Contractor, in constructing or installing facilities alongside or near sanitary sewers, storm drains, water or gas pipes, electric or telephone conduits, poles, sidewalks, walls, vaults or other structures, trees, shrubs, grass and landscaping shall, at his expense, sustain them securely in place, cooperating with the officers and agents of the various utility companies and municipal departments which control them, so that the services of these structures shall be maintained. The Contractor shall also be responsible for the repair or replacement, at his own expense, of any damage to such structures caused by his acts or neglect, and shall leave them in the same condition as they existed prior to commencement of the work.

In case of damage to utilities, the Contractor shall promptly notify the utility owner and shall, if requested by the Engineer, furnish labor and equipment to work temporarily under the utility owner's direction in providing access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the City or by the utility owner that suffers the loss. The cost of such repairs shall be borne by the Contractor, without compensation therefore.

If, as the work progresses, it is found that any of the utility structures are so placed as to render it impracticable, in the judgment of the Engineer, to do the work called for under this Contract, the Contractor shall protect and maintain the services in such utilities and structures and the Engineer will, as soon thereafter as reasonable, cause the position of the utilities to be changed or take such other actions deemed suitable and proper.

If live service connections are to be interrupted by excavations of any kind, the Contractor shall not break the service until new services are provided.

Relocation and/or resetting to new grades of all private utilities, including utility poles, will be accomplished by the respective utility.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in protecting or repairing property as specified in this section, shall be considered included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

The Contractor shall set all sewer and drain manhole covers to grade so that all manholes are accessible within 48 hours after placement of binder pavement. All water gates and gas gates, and all sewerage and drainage frames and covers shall be accurately tied to existing aboveground features prior to lowering of all castings. This information shall be provided to the Engineer and Framingham DPW on the same day that the castings are lowered below the surface. The Contractor shall be available to access any buried manhole 24 hours a day with minimum 2-hour response time. If the roadway is to be left at the HMA Binder Course for a duration greater than two weeks, those additional structures identified by the Engineer shall be adjusted to Binder Course grade.

When removing a frame and grate or cover that is to remain, the Contractor must have a process in place to ensure that the same frame and grate or cover are reinstalled on the same structure from which it was removed.

Utility structures not correctly adjusted to proper grade prior to paving or sidewalk installation or buried during construction shall be uncovered, repaired if necessary and reset to grade at Contractor's expense.

PROSECUTION OF WORK

(Supplementing Subsection 8.03 of the Standard Specifications)

Before starting any work under this Contract, the Contractor shall prepare and submit to the Engineer for approval, a plan (based on the Contract Temporary Traffic Control Plans) that indicates the traffic and pedestrian routing proposed by the Contractor during the various stages and time periods of the work and the temporary barricades, signs, drums and other traffic control devices to be employed during each stage and time period of the work to maintain traffic and access to abutting properties.

Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. Traffic control devices required only during working hour operations shall be removed at the end of each working day. Signs having messages that are irrelevant to the proposed traffic conditions during each phase of operations shall be removed or properly covered at the end of each work period. Signs shall be kept clean at all times and legends shall be distinctive and unmarred.

The length of full depth construction and paving operations shall be determined by the Contractor's ability to perform each operation across the entire roadway, maintaining one lane of traffic in each direction, within a day's time.

Where adjacent pavement surfaces are not level, a hot mix asphalt wedge shall be placed between the two surfaces as shown by the Temporary Ramp detail shown on the Temporary Traffic Management Plans. This HMA wedge shall be placed on the same day as work is performed at the transition.

Trenches and all other excavation performed in the public right of way, whether street or sidewalk surfaces, shall be temporarily patched at the end of each day. The temporary patch shall be in accordance with the City of Framingham Standard Detail R-5.1.7 and as shown on the Contract drawings.

When in the opinion of the Engineer, construction operations constitute a hazard to the safety of the travelling public in the area, the Contractor may be required to restrict or suspend operations and remove equipment from the roadway. The Contractor may also be required to suspend operations during certain hours and to remove the Contractor's equipment from the roadway.

Areas outside the limits of proposed work disturbed by the Contractor's operations shall be restored by the Contractor to their original condition at the Contractor's expense.

The work of adjusting existing structures to the HMA Intermediate Course shall be paid for under the appropriate Section 220 Items. Adjustments of these structures to final grade shall be paid for under the appropriate Section 220 Items as well, unless payment is included in the cost of new frames and grates or covers. Concrete collars are not required for these intermediate adjustments.

The castings of all structures which are required to be set or reset under this project shall not be set complete in place to the final grade until after the HMA Intermediate Course has been completed and the HMA Surface Course is scheduled to be completed within two weeks. Raised castings in the travel lanes shall be fitted with hard rubber ramps to protect raised castings, and shall be incidental to the Contract.

PRESERVATION OF ROADSIDE GROWTH

(Amending Subsection 8.08 of the Standard Specifications)

The Contractor shall take all necessary care when excavating or working in the vicinity of existing trees so that the root systems, trunks, and branches are not damaged. All precautions shall be taken to ensure that heavy equipment does not damage any roots, including those that lie below the limits of excavation.

Do not store equipment or stockpile materials within drip line of trees or in areas enclosed by tree protection fencing.

Avoid any direct soil contamination in root zone area by petroleum, petroleum products or solvents, salts or any other pollutant during construction.

All cutting or trimming of trees to be preserved shall be executed by a Massachusetts Certified Arborist. The Contractor shall provide the Engineer with a copy of the certification prior to any work on trees.

Trees that, in the judgment of the Engineer, have been irreparably damaged by the Contractor shall be replaced in kind and in size, or with a quantity of 2-inch caliper replacement trees (the quantity of which shall be determined by the Engineer) such that the cumulative caliper of the replacement trees will be up to the equivalent of diameter of the lost tree at breast height. The plants shall have a guarantee for a minimum of two (2) years after planting. Cost of removal of a destroyed tree, including roots and stump, as well as the cost of replacement trees, shall be paid for by the Contractor.

The Contractor shall refer to Section 1.5 Tree Planting and Protection of the City of Framingham Department of Public Works' Construction Standards for additional information.

SAFETY CONTROLS FOR CONSTRUCTION OPERATION

(Supplementing Subsections 850.21 and 850.61 of the Standard Specifications)

Safety controls for construction operations shall be done in accordance with the relevant provisions of Section 850 of the Standard Specifications, the Manual on Uniform Traffic Control Devices, the Temporary Traffic Control Plans and the following:

The providing of safety controls for construction operations shall be considered incidental to this Contract and the costs for safety controls shall be included in the unit bid price for those Contract items requiring such controls.

Positioning, adjusting and re-positioning of all devices such as traffic cones, high level warning devices, etc., not otherwise classified and paid for under other items in this Contract, is considered incidental and no separate payment will be made.

DISPOSAL OF SURPLUS MATERIALS

All materials not required or needed for use on the project, and not subject to the provisions of Item 180.4, or covered under other Contract Items, shall become the property of the Contractor and shall be removed from the site during the construction period and disposed of legally. All disposal facilities shall be approved by the City. No separate payment will be made for this work, but all costs in connection therewith shall be included in the prices bid for various Contract items.

ENVIRONMENTAL PROTECTION

This project is subject to Massachusetts General Laws, Chapter 131, Section 40 as amended. Signs shall be in accordance with the latest MassDOT Construction Standards. All costs for the manufacture, erection, maintenance, moving, and removal of the signs shall be absorbed by the Contractor with no additional compensation other than the Contract unit prices.

For this project, the Massachusetts Department of Environmental Protection File Number is XXXXX.

The Contractor shall operate only in those areas approved by the Engineer and shall provide protective measures called for in various Contract Items or at the direction of the Engineer. All protective measures shall be maintained by the Contractor until removal is approved by the Engineer or at the end of the Project.

The Contractor shall be responsible for restoration of disturbed areas as provided for in the various Items. Any damage to areas not approved by the Engineer shall be restored at the Contractor's expense. Should the Contractor fail to make the necessary repairs, the City may make such repairs and charge them against the Contractor.

Daily maintenance and fueling of equipment shall be conducted away from all wetland areas. The Contractor shall have sufficient materials on hand to control and clean up any spillage. In the event of an accidental spillage within any wetland area, the Contractor shall take immediate action to prevent contamination of wetland areas, and he shall cease operations and notify the Engineer. The cost of clean-up of any contamination shall be the responsibility of the Contractor.

Maintenance and repair other than daily requirement shall be done off-site at the Contractor's own facility or service yard.

From time to time the site may be visited or inspected by Local, State or Federal agencies responsible for protection of the environment. The Contractor shall cooperate with the representatives and shall not hinder or impede their work.

All protective measures shall be paid for in the costs of the various Items.

The Contractor shall provide for removal of dirt spilled from his trucks on existing pavement over which it is hauled or otherwise deposited whenever in the judgment of the Engineer the accumulation is sufficient to cause the formation of mud or dust or interfere with drainage.

Dust Control: Provide positive methods and apply dust control materials to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

The Contractor shall provide sanitary facilities for the use of workers at the site and shall ensure that they are maintained in a clean condition. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The sanitary conveniences shall be the obligation and responsibility of the Contractor.

PRECONSTRUCTION SURFACE VIDEO

The Contractor shall furnish the Engineer an original and one copy of a continuous color audio-video digital recording. The recording shall be taken prior to any construction activity. The recording shall be performed by a qualified, established audio-video recording firm knowledgeable in construction practices and experienced in the implementation of established inspection procedures.

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. 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.

Digital information shall be as follows:

1. Upper left corner: Name of Contractor, Day, Date, Time and Name of Project.
2. Lower left corner: Route of travel, viewing side, direction of travel and stationing.

The video system shall have the capability to transfer electronically individual frames of video into hard copy prints or photographic negatives.

Audio shall be recorded at the same time as the video recording and shall have the same information as on the viewing screen. Special commentary will be given for unusual conditions of buildings, sidewalks and curbing, foundations, trees and shrubbery, etc.

All recordings and boxes shall bare labels with the following information: Recording number, Owner's name, Date of recording, Project name and number and Location.

The recordings shall be of sufficient detail to accurately and clearly show the existing, pre-construction conditions of the entire project area. Each recording shall be accompanied by an audio description of the area being video-recorded with special attention given to areas which could be involved in disputes after completion of construction.

Coverage shall include, but not be limited to, all existing roadways, sidewalks, curbs, driveways, buildings and structures, stonewalls, above ground utilities, landscaping, trees, signage and other physical features located within the zone of influence of the construction. The coverage may be expanded if directed by the Engineer. All recording will be done during daylight hours. No recording shall be performed if weather is not acceptable, such as rain or fog, etc.

The Engineer reserves the right to reject the audio-video recording because of poor quality, unintelligible audio or uncontrolled pan or zoom. Any recording rejected by the Engineer shall be re-recorded at no additional cost. Under no circumstances shall construction begin until the Engineer has received and accepted the audio-video record(s).

The cost to perform the Preconstruction Surface Video shall be included under the various items of bid and no separate payment shall be made.

MONUMENTATION

The Contractor shall exercise due care when working around all property and street layout bounds which are to remain. This shall include, but not necessarily be limited to, concrete and granite bounds, iron rods, rebars, stakes, pipes, nails, or any other property or layout markers whether existing or proposed under this project. Should any damage to a property marker result from the actions of the Contractor, the marker shall be replaced, realigned, and/or reset to its intended position and certified as to the correct location by a Massachusetts registered professional land surveyor as directed by the Owner or Engineer. No further compensation will be due to the Contractor for the materials and labor required to re-establish the property marker as described above.

OPEN EXCAVATIONS

All open excavations shall be adequately safe guarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the City. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, special construction procedures shall be taken, such as limiting the length of open trench or requiring that the trench shall not remain open overnight.

SHEETING AND BRACING

The Contractor shall furnish, place and remove all sheeting and bracing required to support the sides of the trenches or other excavations for this project. The Contractor is responsible for all City permits required for trenches and excavations include Street Opening and Trench Opening Permits.

The Contractor shall be solely responsible for the safety of the workmen and the adjacent facilities from danger of caving and sliding and all work to be done shall be in strict accordance with the Department of Labor, Occupational Safety and Health Administration regulations and suggested practices for construction excavation and/or other applicable codes and regulations.

Special precautions shall be taken to guard against any damage to or settlement of pavements, buildings, walls, pipes, ducts, or other structures and facilities that are adjacent to the work.

The cost of providing and removing sheeting, shoring and bracing shall be included in the cost of various items of work under this Contract and no additional compensation will be allowed therefore.

WORK DURING INCLEMENT WEATHER

No work shall be done under this Contract except by permission of the Engineer when the weather is unfit for good and careful work to be performed. Should the severity of the weather continue, the Contractor, upon the direction of the City, shall suspend all work until instructed to resume operations by the City. Time shall be extended to cover the duration of the order. Work damaged during periods of suspension due to inclement weather shall be repaired and/or replaced by the Contractor. No earth fill or embankment shall be placed upon frozen material. If there is a delay in the Work due to the weather conditions, the necessary precautions must be taken to bond new work to old.

SWEEPING OF STREETS AND SIDEWALKS

All work areas shall be kept clean by the Contractor. The Contractor shall provide weekly sweeping of streets and gutters and daily sweeping of sidewalks within the Limits of Work, subject to approval of the Engineer.

The Contractor shall also be responsible for sweeping and cleaning of surfaces beyond the limits of the project to clean up material caused by spillage or vehicular tracking during the various phases of the work. Sweeping of sidewalks and streets shall be included in the various items and no additional compensation will be allowed therefore.

The Contractor shall be responsible for ensuring that the work area is cleaned at the end of each day, and that no debris remains within the public right-of-way or on any private lands not being legally used by the Contractor for storage.

SHOP DRAWINGS SUBMITTALS

The Contractor shall in accordance with Paragraph 2.03 of the General Conditions, submit a submittals schedule for all materials and equipment required for this Project. Submittals schedule shall indicate required dates for submitting Shop Drawings, samples, and product data for materials in order to meet project schedule.

The approval of Shop Drawings shall be general and shall not relieve the Contractor of his responsibility for adherence to the Contract or for any error in the drawing.

The Contractor shall not receive payment for, nor will he be allowed to install any item or material, which requires Shop Drawing approval unless and until he has received Shop Drawing approval for that item from the Design Engineer with an approval stamp placed thereon.

Within 15 days after receipt of an approved Shop Drawing for any item, the Contractor shall provide the City written proof that he has ordered such approved materials required on the subject Contract and a written confirmation of such order and delivery schedule from the manufacturer of the item. This delivery schedule shall be appropriate for timely completion of this Project.

USE OF CITY HYDRANTS

In accordance with rules and regulations of the Massachusetts Department of Environmental Protection and the City of Framingham Water Department, a backflow preventer is required on hydrant connections. The Owner shall provide the backflow preventer to the Contractor for use during the Project. The Contractor shall obtain a permit from the Department of Public Works before tapping into any hydrant within the City. **The Contractor shall not make connections to City hydrants unless there is a representative of the Framingham Water Department present. Only Framingham Water Department representatives are allowed to operate hydrants.**

The City will suspend the work for any violation of this provision.

It shall be the Contractor's responsibility to ensure that all subcontractors likewise understand and comply with this provision.

PERSONAL PROTECTIVE SAFETY EQUIPMENT FOR CONTRACTOR PERSONNEL

The Contractor is responsible to ensure that all personnel, including all subcontractors, working on the project are issued and are wearing all necessary personal protective safety equipment while working within the project limits. This equipment shall include, as a minimum, a hardhat and a safety vest, regardless of the type of work being performed. Other safety equipment shall be added as required to perform the work in which they are engaged and in accordance with all local, state and federal requirements in effect. Safety equipment shall be provided at no additional cost to the City.

PAVEMENT MARKINGS

All permanent pavement markings must be applied within two weeks of paving the surface course. The Contractor shall not wait until all paving has been completed prior to applying the permanent pavement markings. Pavement markings shall be epoxy paint and conform to the Special Provisions.

PAVEMENT JOINTS

All joints between proposed pavement and existing pavement to remain shall be coated with a hot poured rubberized asphalt sealant. The cost to provide the rubberized asphalt sealant shall be included under Item 460.

HAZARDOUS MATERIALS

In the event it is determined during excavation or construction that an asbestos condition exists, a Licensed Asbestos Specialist shall be employed by the Contractor to perform the asbestos containment and abatement work. Prior to asbestos containment and abatement work, the Contractor shall, through the Licensed Asbestos Specialists, obtain insurance in amounts and types specified by the Authority, naming the City of Framingham. The contract prices for the various items shall include full compensation for the services noted above.

MATERIAL TESTING REQUIREMENTS

All material testing requirements shall be in conformance with MassDOT standard specifications. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, test, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, test, or approvals shall be performed by organizations acceptable to Owner and Engineer.

OIL AND HAZARDOUS MATERIAL SPILLS PREVENTION

Measures must be taken by the Contractor to prevent spills and leaks of oils or other hazardous materials to the environment. Such measures include but are not limited to:

- Proper maintenance of construction equipment.
- Design fuel and hazardous material handling areas so as to prevent releases to the environment (include containment structures if needed).
- Instruct personnel in proper waste handling procedures and strictly prohibit disposal into drains, waterways or receptacles designed for non-hazardous waste only (e.g. trash dumpsters).

The Department of Environmental Protection (DEP) regulations 310 CMR 30.00 and 40.00 address proper management procedures for oil and hazardous waste. Releases or threats of releases of oil or hazardous materials must be reported to the DEP if the amounts equal or exceed reportable quantities. Reportable quantities are listed by DEP in 310 CMR 40.900. Notification to DEP must be made as soon as possible but not more than two hours after obtaining knowledge of a release or threat of release.

PRECAUTIONS UNDER POWER LINES

The Contractor's attention is directed to the AASHTO Guide on Occupational Safety on Highway Construction Projects, Subpart N, 1926.550, relating to construction equipment clearances at overhead electric lines, which states in part "...the minimum clearance between the lines and any part of the crane or load must be at least ten feet from lines rated 50 KV or below, and greater distances for higher voltage...".

For the protection of personnel and equipment, the Contractor shall be aware of this regulation especially during paving operations using large semi-trailer vehicles.

ARCHITECTURAL ACCESS BOARD TOLERANCES

The Contractor is hereby notified that they are ultimately responsible for constructing all project elements in strict compliance with the current AAB/ADA rules, regulations, and standards.

All construction elements in this project associated with sidewalks, walkways, wheelchair ramps and curb cuts are controlled by 521CMR - Rules and Regulations of the Architectural Access Board (AAB). The AAB Rules and Regulations specify maximum slopes and minimum, dimensions required for construction acceptance. There is no tolerance allowed for slopes greater than the maximum slope or for dimensions less than the minimum dimensions.

Contractors shall establish grade elevations at all wheelchair ramp locations and shall set transition lengths according to the appropriate table in the Construction Standards (or to the details shown on the plans).

MATERIALS REMOVED AND STACKED

Materials directed to be removed and stacked which are City of Framingham property, shall be removed, transported to and stacked at the City DPW located at #100 Western Avenue. All materials shall be neatly stacked as directed by the City. In addition, all materials stacked shall be signed for by the City. When directed by the Engineer to remove and stack materials which are privately owned, said materials shall be removed, transported to, and stacked on the property, from which the materials have been removed.

The contract prices for the various items shall include full compensation for the services noted above.

If the City and the Engineer determines that any part of the stacked materials is unsuitable for re-use by the City, or if other owners decide to abandon part or all of their materials, such materials shall become the property of the Contractor and he shall dispose of them away from the site.

The contract prices for the various items shall include full compensation for the services noted above.

PROTECTION OF UNDERGROUND FACILITIES

The Contractor's attention is directed to the necessity of making his own investigation in order to assure that no damage to existing structures, drainage lines, traffic signal conduits, etc., will occur. The location and disposition of utilities shown or not shown on the plans shall be considered approximate. The Contractor shall notify the City and Mass. DIG SAFE and procure a DIG SAFE number for each location prior to disturbing the existing ground in any way.

DIG SAFE Call Center 1-888-344-7233

The Contractor shall notify the City and Dig Safe seventy-two (72) hours prior to start of construction.

The Contractor, in constructing or installing facilities alongside or near sanitary sewers, storm drains, water or gas pipes, electric or telephone conduits, poles, railroad, sidewalks, walls or other structures, shall, at his expense, sustain them securely in place, cooperating with the officers and agents of the various utility companies and municipal departments which control them, so that the services of these structures shall be maintained.

The Contractor shall also be responsible for the repair or replacement, at his own expense, of any damage to such structures caused by his acts or neglect and shall leave them in the same condition as they existed prior to the commencement of work. In case of damage to utilities, the Contractor shall promptly notify the owner and shall, if requested by the Engineer, furnish laborers to work temporarily under the owner's direction in providing access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the City or by the utility company

which suffers the loss. The cost of such repairs shall be borne by the Contractor, without compensation therefore.

If, as the work progresses, it is found that any of the utility structures are so placed as to render it impracticable, in the judgment of the Engineer, to do the work called for under this Contract, the Contractor shall protect and maintain the services in such utilities and structures and the City will, as soon thereafter as it reasonably can, cause the position of the utilities to be changed or take such other action as it deems suitable and proper.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in protecting or repairing property as specified in this section shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefore.

The Contractor will cooperate fully with all utility companies private or public and will notify all such companies at least twenty-four hours prior to excavating in the vicinity of any utility. It is understood that the Contractor has considered in his bid the existence of the various utilities and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference by said utilities.

The Contractor shall pay the serving utility for their services rendered for the connection of underground service connection.

SAWCUTTING

No separate compensation will be made for sawcutting. Sawcutting shall be required, as shown on the plans or as specified herein and shall be considered as included in the payment made for the various items of this contract, regardless of the depth of saw cutting required.

PRECAST CONCRETE STRUCTURES

All precast concrete structures provided for this project shall be from a manufacturer on MassDOT's Qualified Construction Materials List. The Contractor shall submit clock diagrams of all structures to the Engineer for approval prior to ordering them.

END DIVISION I

DIVISION II

ITEM 102.511 TREE PROTECTION – ARMORING & PRUNING EACH

The work under this item shall conform to the relevant provisions of Sections 771 and shall be for furnishing and installing temporary tree trunk protection and for limb pruning to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as directed by the Engineer.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the latest edition of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance: Part 1-Pruning and Part 5-Construction Management Standard. Provision of reference shall be incidental to this item.

MATERIALS

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk.

Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree (including root flare) to the bottom of the first branch or as recommended by the Arborist. Material and methods shall be approved by the Engineer.

Other materials or methods may be acceptable if approved by the Engineer.

METHODS OF WORK

Prior to construction activities, the Engineer, the Contractor, the City Tree Warden, and the Arborist, if specified, shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the Engineer.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

DAMAGES & PENALTIES

In the event that trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by the Engineer.

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of \$500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include clean up of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.511 will be measured and paid at the contract unit price per each. This will include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

In the event of tree damage, cost of Arborist services, of remediation measures, and/or tree removal will be borne by the Contractor.

Payment under this item will be scheduled throughout the length of contract:

40% of value shall be paid upon installation of trunk armoring and completion of pruning work, if required.

60% shall be paid at the end of construction operations that would damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures.

In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the \$500.00 per diameter inch penalty.

ITEM 153. CONTROLLED DENSITY FILL - EXCAVATABLE CUBIC YARD

Controlled density fill (CDF) shall be used to backfill conduits constructed in existing pavement areas that are to remain or be milled and overlaid. Controlled density fill shall not be used to backfill utility excavations or trenches in areas of full depth pavement construction.

Controlled density fill shall conform to the requirements of Section M4.08.0 Type 1E.

Measurement and Payment

Controlled density fill - excavatable will be measured per cubic yard, complete in place.

Controlled density fill - excavatable will be paid for at the Contract unit price per cubic yard, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 180.01 HEALTH AND SAFETY PLAN LUMP SUM

DESCRIPTION

It is the Contractor's ultimate responsibility to ensure the health and safety of all the Contractor's employees and subcontracting personnel, the Engineer and his/her representatives, and the public from any on-site chemical contamination.

The Health & Safety Plan (HASP) shall be prepared by a Licensed Site Professional (LSP) and signed by a Certified Industrial Hygienist (CIH). The HASP shall include the components required by OSHA 29 CFR 1910.120(b); be designed to identify, evaluate, and control health and safety hazards and provide for emergency response if needed; and be a dynamic document with provision for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public.

Health and safety procedures provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions (e.g. OSHA, RCRA, CERCLA). In addition, guidelines of NIOSH, OSHA, USCG, EPA, etcetera, shall be followed. Equipment used for the purpose of health and safety shall be approved and meet pertinent standards and specifications of the appropriate regulatory agencies.

The HASP shall be submitted to the Engineer for acceptance at least four weeks prior to commencement of work. The review and acceptance of the HASP by the City does not relieve the Contractor of the responsibility for attaining the required degree of protection and training, or to comply with all laws, rules, regulations, standards or guidelines in effect during the execution of the contract.

A copy of the Health and Safety Plan shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of the City,

Contractor and sub-Contractors. The employee's signature on the Health and Safety Plan shall be deemed prima facie evidence that the employee has read and understands the plan. A copy of the plan with signatures shall be submitted to the Engineer at the conclusion of the contract, or at the Engineer's request. Signature sheets shall be submitted monthly, or at the request of the Engineer.

COMPENSATION

Method of Measurement

Health and safety plan shall be measured by the lump sum, in accordance with the Contract Drawings, as specified herein and as directed by the Engineer.

Basis for Payment

Health and safety plan shall be paid for at the contract unit price per lump sum which shall be full compensation for all labor, and incidentals necessary for the development and preparation of the HASP by a qualified individual, as specified herein, and as directed by the Engineer. Payment shall be made in full upon acceptance of the HASP by the City.

<u>ITEM 180.4</u>	<u>MONITORING/HANDLING AND STOCKPILING OF CONTAMINATED SOILS</u>	<u>CUBIC YARD</u>
<u>ITEM 183.5</u>	<u>SOIL AND WASTE MANAGEMENT</u>	<u>CUBIC YARD</u>

GENERAL

QUALIFICATIONS

The Contractor shall demonstrate the necessary skills, experience, training, and qualifications to conduct the work as specified herein.

The Contractor shall possess all required licenses, insurance, permits and trained employees to properly execute the work as specified herein.

All personnel involved in the transportation of waste from the site shall have the required skills, experience, training, and qualifications including, but not limited to, Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) training.

EXISTING CONDITIONS

The following documents are available for review and appended to these Technical Specifications.

None.

The Contractor is obligated to review existing environmental assessment reports and manage the soil and groundwater in accordance with applicable state and federal regulations.

DEFINITIONS

- A. Asphalt, Brick and Concrete (ABC): Asphalt, Brick and Concrete material that is waste from construction or found in fill material during excavation. ABC material found in clean, reusable fill may be reused onsite to the greatest extent possible. All excess ABC generated during construction shall be disposed of offsite at an appropriate, licensed facility that will accept ABC waste.
- B. Area of Excavation: For the purposes of reusing soil on-site, the area of excavation is considered to be the approximate area in which the soil was removed provided that area is consistent in soil strata, color, texture, geotechnical properties and has substantially similar visual and olfactory characteristics. Soil returned to the area of excavation shall be returned to approximately the same horizontal and vertical location from which it originated provided that it is not placed in an area that differs substantially in physical or chemical characteristics as can be observed and measured during excavation. Soil returned to the area of excavation shall be placed and compacted as specified in the Contract Specifications.
- C. Authorized Excavation: Earth Excavation or "Excavation" consists of removal of materials encountered to the elevations and widths indicated in the Contract Drawings, Specifications, or as directed by the Engineer.
- D. Background: (see Section 1.3.W.1)
- E. Bill of Lading (BOL): A document signed by a waste transporter or the transporter's representative and issued to a waste generator that evidences the receipt of waste to a specified disposal facility or location. BOL is typically utilized as accompanying documentation during transport of Regulated soils. Soils subject to management under 310 CMR 40.0035.
- F. Competent Person: for purposes of this Specification, the term shall mean one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them [29 CFR 1926.32(f)].
- G. Containerized Waste (as defined in 310 CMR 40.0000) means discarded oil and/or hazardous material at a site in drums, tanks, engineered impoundments, or other fabricated containers, including, without limitation:
 - 1. discarded oil and/or hazardous material that was generated at a site as a results of manufacturing industrial, commercial or other process-related activities, and
 - 2. discarded oil and/or hazardous material discovered, managed, generated, or accumulated as part of a response action.

H. Contaminated Media:

1. Contaminated Debris (as defined in 310 CMR 40.0000) means any debris that contains oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.
 2. Contaminated Groundwater (as defined in 310 CMR 40.0000) means groundwater containing oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600.
 3. Contaminated Sediments (as defined in 310 CMR 40.0000) means sediments containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.
 4. Contaminated Soil (as defined in 310 CMR 40.0000) means soil containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.
 5. Contaminated Surface Water (as defined in 310 CMR 40.0000) means surface water containing oil and/or hazardous material associated with a release for which notification is required under 310 CMR 40.0300 and 40.1600.
- I. Debris (as defined in 310 CMR 40.0000) means solid material that is a manufactured object, plant or animal matter that is intended for disposal or is otherwise no longer serving its intended use. The term shall include demolition and construction waste, hay, vegetation, and other organic and inorganic absorbent materials used to contain or absorb releases of oil and/or hazardous material. The term shall not include:
1. any material for which a specific treatment standard is provided in 40 CFR Part 268, Subpart D; or
 2. process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges or air emission residues.
- J. Demolition and Construction Waste (as defined in 310 CMR 40.0000) means any waste materials and rubble resulting from the construction, remodeling, repair or demolition of buildings, pavement, roads or other structures. Demolition and construction waste includes, but is not limited to, concrete, bricks, lumber, masonry, road paving materials, rebar and plaster.
- K. Disposal shall mean safe and legal reuse, recycling, or disposal off the site in a manner as required to comply with all applicable statutes and regulations.
- L. Hazardous Material as defined 310 CMR 40.0006.
- M. Hazardous Waste:
1. Hazardous waste as defined 310 CMR 40.0006; or

2. Hazardous waste as defined in 40 CFR 261.3.
 3. A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:
 - a. Cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or
 - b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.
- N. Licensed Site Professional and LSP (as defined in 310 CMR 40.0006) each means a hazardous waste site cleanup professional, as defined in M.G.L. c.21A, §19, holding a valid license issued by the Board of Registration of Hazardous Waste Site Cleanup Professionals pursuant to M.G.L. c.21A, §§19 through 19J.
- O. Liquid Waste: materials generated onsite due to work performed and are waste or excess including but not limited to collected groundwater, collected stormwater, non-aqueous phase liquids, Contractor-supplied fuels and fluids, and drummed liquids.
- P. Material Shipping Record (MSR): A document signed by a waste transporter or the transporter's representative and issued to an acceptance facility that evidences that receipt of unregulated soils or waste to a specified disposal facility or location. For the shipment of contaminated soil, urban fill, and dredge materials not subject to management under 310 CMR 40.0035.
- Q. Massachusetts Contingency Plan or MCP: 310 CMR 40.0000
- R. Natural Soils: Natural soil is defined for the purposes of the Contract as unconsolidated sand, gravel, silt and clay, and the organic material which has become part of the unconsolidated soil matrix. For this section only, soil may include broken and fragmented rock.
- S. Peat: A substance of vegetable origin, consisting of roots and fibers, moss, etc., in various stages of decomposition, and found, as a kind of turf or bog. Peat shall be considered natural soil when it is encountered in small amounts (layers 1-foot (304.8 mm) or less in thickness) and when it is impractical to separate the peat from the natural soil or urban fill strata. Otherwise, peat shall be considered a distinctive stratum.
- T. Regulated Soil: Soils requiring management in accordance with 310 CMR 40.0000, and require BOL to document transport. (see Section 1.3.W.3)
- U. Remediation Waste: as defined in 310 CMR 40.0006 means any Uncontainerized Waste, Contaminated Media, and/or Contaminated Debris that is managed pursuant to 10 CMR 40.0030. Remediation Waste does not include Containerized Waste.

- V. Solid Waste (Waste): materials generated on site due to work performed and are waste or excess, including but not limited to asphalt, brick and concrete (ABC) waste, demolition waste, decontamination waste, dredging spoils (dewatered), metal waste, plaster/drywall, plastic waste, rock, rubber waste, sediment, tar waste, trash, vegetation debris, wood waste.
- W. Soil Classification Categories: Unless specifically stated otherwise, terms used in this specification are as defined in the Massachusetts Contingency Plan (MCP), 310 CMR 40.0006. The following definitions and soil classifications apply to these specifications:
1. Background or Unregulated Soil: Any fill or natural soil material which meets the regulatory definition of "background" as defined in 310 CMR 40.0006 may be reused as common fill/ordinary borrow provided it also meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Suitable soil which does not have any evidence of contamination may be reused within the area of excavation without first performing laboratory analyses. For record keeping purposes soil/fill that meet the definition of background, shall be transported under a Material Shipping Record (MSR). Background means those levels of oil and hazardous material that would exist in the absence of an MCP Disposal Site, including both Natural Background and Anthropogenic Background.

Background soil may also be re-used off-site without restriction provided it is reused in an area where background concentrations are equal to or greater than the site-specific background determined at the off-site location in accordance with DEP Policy WSC#13-500 Similar Soils Provision Guidance (or most recent update). The Contractor is responsible for determining the background levels at the point of excavation. It is also the Contractor's responsibility to identify one or more disposal facilities/locations with background levels appropriate to receive the material to be disposed or reused. It is the Contractor's responsibility to determine these background levels in advance so as to comply with 310 CMR 40.0032(3)(b) and so as not to delay or adversely affect construction operations.
 2. Impacted: Any soil or fill material which contains oil or hazardous materials (OHM) at concentrations greater than background levels but less than release notification thresholds established by 310 CMR 40.0300 and 40.1600. Impacted soil may be reused in the area of excavation or as fill provided it is reused in an area of equal or greater contamination and meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Impacted soils requiring off-site transportation and disposal/reuse shall be transported using a Material Shipping Record (MSR).
 3. Contaminated or Regulated Soils: Any soil or fill material which contains oil or hazardous materials at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600, except

where the presence of the material is consistent with the regulatory definition of "background" as defined in 310 CMR 40.0006.

Any soils which contain either petroleum or chemical odor or visual indications of oil or hazardous materials shall be handled as potentially contaminated soils. Soil/fill that may be contaminated shall be set aside by the Contractor for assessment by the Contractor's environmental professional (LSP) in a secure manner to prevent exposure to humans and the environment and in accordance with 310 CMR 40.0036. Soil/fill that is staged and characterized can be reused within the area of excavation or elsewhere on site provided the material has been tested and has equal or less contamination than the point where it is to be reused and it is not reused beneath a permanent structure such as a building foundation. Any excavated soil/fill material not reused within the area of excavation must be characterized prior to off-site reuse/disposal. After analytical results are available, soil/fill shall be handled in accordance with the type and degree of contamination (if any) present in the soil/fill, and recommendations of the Contractor's LSP.

Contaminated soil that cannot be reused on site shall be reused off-site, recycled, or disposed as a solid waste at an appropriately permitted facility unless it also meets the regulatory definition of hazardous waste as defined in 40 CFR Part 261 or contains detectable asbestos. Contaminated soils requiring off-site transportation and reuse/disposal or recycling shall be transported using a Material Shipping Record (MSR) or Bill of Lading (BOL), as appropriate. Subcategories of Contaminated soil are defined as follows:

- a. Unlined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state unlined landfills. Note: per COMM 97-001, sediments may not be re-used as Unlined Landfill Material.
- b. Lined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state lined landfills.
- c. Asphalt Batch Plant Material: Soils that meet all applicable criteria for recycling at an asphalt batching plant and/or the specific licensing requirements for the proposed recycling facility. Soil that does not meet the applicable COMM 97-001 criteria for Unlined or Lined Landfill Material that is characterized by the following: TPH concentrations in excess of 5,000 milligrams per kilogram (mg/kg), or total SVOC concentrations in excess of 100 mg/kg, or total non-chlorinated VOC concentrations in excess of 10 mg/kg, and total lead concentrations below 3,000 mg/kg and TCLP metal concentrations below applicable hazardous levels. Material classified as Asphalt Batch Plant Material shall be excavated and transported to an asphalt batch plant for recycling. This material cannot be used as daily cover at or disposed of at a Massachusetts Unlined or Lined Landfill.

- d. Out-of-State Non-Hazardous: Soils that contain concentrations of contaminants that exceed in-state lined and unlined landfill reuse criteria as well as asphalt batch plant acceptance criteria, but meet the criteria for regional thermal treatment facilities or out-of-state recycling facilities, and are not classified as a Resource Conservation and Recovery Act (RCRA) Hazardous Waste.
- 4. Hazardous Waste: A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Also included within the definition of hazardous waste is hazardous waste as defined 310 CMR 40.0006 and 40.CFR 261.3. Hazardous waste as defined in 40 CFR 261.3 is a solid waste that exhibits any of the characteristics of hazardous waste in excess of regulation levels presented in 40 CFR 261, subpart C and/or that is listed in 40 CFR 261, subpart D; that is a mixture of solid and hazardous waste; or that is derived from a listed waste. Subcategories of Class C soils shall be as follows:
 - a. Post-treatment Non-Hazardous: Soils classified as hazardous waste that have been treated on-site to reduce the toxicity characteristic (e.g., for TCLP lead).
 - b. Hazardous: Material determined to contain "listed" or "characteristic" hazardous waste constituents which cannot be readily treated on-site. This material must be transported to an out-of-state approved RCRA Subtitle C hazardous waste disposal or treatment facility under a Uniform Hazardous Waste Manifest.
- X. Special Waste: Any waste that is determined not to be a hazardous waste pursuant to 310 CMR 30.000 and that exists in such quantity or in such chemical or physical state, or any combination thereof, so that particular management controls are required to prevent an adverse impact from the collection, transport, transfer, storage, processing, treatment or disposal of the waste. Asbestos and PCB-contaminated soils/fill are examples of special waste categories. Refer to Dewatering for additional requirements.
- Y. Transportation Documentation or Shipping documentation means the document used to identify and accompany soil or waste during transport such as a Material Shipping Record (MSR), Bill of Lading (BOL), or Uniform Hazardous Waste Manifest. Also referred to as a shipping record.
- Z. Unauthorized Over Excavation: Consists of removal of materials beyond indicated elevations and width limits indicated in the Contract Documents without direction of the Engineer. Over-excavation material handling, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Over-excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer

- AA. Unauthorized Excavation: Consists of removal of materials beyond indicated sub-grade elevations or Contract-defined limits as shown in the Contract documents without specific direction of the Engineer. Unauthorized excavation, handling material, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Unauthorized excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer.
- BB. Unknown Materials: Any material, that is not readily identifiable as nonhazardous waste, and which has not been previously characterized or encountered during site investigation activities. The Unknown Material classification is to be used in the event that an unexpected, unusual material is encountered for which special handling procedures shall be required in order to handle the material safely. Such wastes include but are not limited to:
1. Unlabelled drums or containers containing material which is not readily identifiable as a non-hazardous substance.
 2. Any material, which varies significantly from material previously observed on site and which cannot be readily identified as a nonhazardous.
 3. Waste material of unusual color or odor or material with indications of hazardous levels (e.g. exceeding OSHA permissible exposure limits) of contaminants as evidenced on an organic vapor monitor or other similar instrument.

The Owner reserves the right to apply generator knowledge to classify and profile the material as a previously encountered waste or as a known waste. In the event that a material is encountered which the Contractor is uncertain as to its nature, the Owner or their representative shall assess the material with the Contractor and inform the Contractor as to the nature of the material (known or unknown).

- CC. Unregulated Soil: (see Section 1.3.W.1)
- DD. Urban Fill: Fill, also known as urban, or miscellaneous fill, is defined as a mixture of soil and other materials which have been located in the area through man-made processes primarily for the purpose of grading, backfilling or filling in low areas. Material commonly associated with urban fill includes, but are not limited to; coal, glass, brick, ash, wood fragments and other similar granular materials. Urban fill shall not include boulders, ledge, consolidated rock, asphalt, concrete, railroad timbers, rail, cobblestones or any other abandoned building materials.
- EE. Waste Manifests: the hazardous waste shipping/transportation documentation required to ship all hazardous waste and subject to provisions in 49 CFR 172 Subpart C.

DESCRIPTION OF WORK

General

This Section includes furnishing all labor, equipment, materials, and incidentals required to perform all operations in connection with the handling and disposition, stockpiling, transport, in-project reuse and/or off-site reuse or disposal of excess excavated materials resulting from the construction operations as specified. In-project reuse shall be defined as material that is reused within the Project, such as approved use of excavated soils as backfill into the excavation trench after installation of new utilities.

This Section includes proper handling and management of waste materials, including, but not limited to, construction debris, building demolition, municipal waste, boulders, regulated and unregulated soils, ash, rubble, asphalt, brick and concrete (ABC), asbestos containing material, asbestos cement pipe (Section 02076), hazardous materials and empty or crushed drums and/or drum parts.

Coordinate work with that of all other trades or contracts affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

All work shall be conducted in compliance with Contractor-prepared plans as specified in Paragraph 1.7 Submittals of this Section.

Implementation of the submitted HASP and other applicable includes establishing work zones (e.g., support zone, contamination reduction zone, exclusion zone), preparing a decontamination pad(s) and staging area(s), performing the appropriate environmental monitoring, training and medical monitoring of personnel, coordinating waste disposal and waste characterization as needed, etc.

The Contractor shall develop, implement, maintain, supervise, and be responsible for all soil management practices during the course of this contract. An OSHA Competent Person, with demonstrated experience in clean and contaminated soil and hazardous waste handling (e.g. L.S.P.), shall be present during all excavation, backfilling, field screening, segregating, handling, and characterization of all soils excavated in the course of completing this contract to ensure that soil is managed in accordance with applicable laws, regulations, and this Section.

Demobilizing the site, including, but not limited to, removing and disposing of excess or waste soils, rock, solid waste, demolition waste, construction-related equipment and materials used for personnel and equipment decontamination and related waste such as personal protective equipment (PPE), decontamination water/solids, temporary covers, and wash-water storage tanks; disconnection of temporary utilities; and final clean-up to pre-construction conditions.

The Contractor is responsible for being aware of potential hazards at the site and reviewing all existing information which provides evidence of contamination within the limit of the work.

Soil and Waste Management

This Section describes the general parameters and requirements for testing (including field screening and laboratory chemical analysis), excavation, handling, storage, tracking, transport, and in-project reuse or off-site reuse/disposal of soils.

In the course of the work, it may be necessary to excavate and handle potentially contaminated soil or hazardous material. The soil or hazardous materials management practices specified herein apply to all soil and/or hazardous materials excavated during the course of this Contract. Contaminated soils and hazardous materials/hazardous waste shall be managed in accordance with 310 CMR 40.0000 and 310 CMR 30.000.

The Contractor shall segregate soils during excavation and stockpiling to avoid mixing soils (i.e. topsoil, fill and natural soils shall be segregated, in addition to regulated, unregulated soils, etc.).

Characterization of soil, and unknown material for disposal/off-site reuse purposes; field screening and soil management/segregation; temporary storage/staging; and characterization (as may be necessary for unknown materials and/or for compliance with receiving facility requirements); and disposal and/or off-site reuse of excavated soil and waste material. All laboratory chemical analyses conducted shall utilize currently accepted U.S. EPA and applicable state agency analytical protocols and procedures.

The Contractor shall characterize all excavated and stockpiled soil and fill material prior to off-site reuse or disposal. Characterization requirements may vary depending on the source/location of the excavated soil/fill, the site selected to receive soil suitable for off-site reuse, or the disposal facility permits and policies. The Contractor is responsible for final waste characterization and shall determine if any additional waste characterization is required at no additional cost to the Owner.

Providing and constructing a secure soil staging area sized to adequately segregate soils in accordance with the conditions specified without impeding construction-related activities. The Contractor is to use existing information and obtain additional information as may be needed to minimize the need for a staging area. If a staging area is required to characterize unknown or excess material for any reason, the Contractor is responsible for locating, selecting, preparing and securing the area.

Excavated soil/fill that is contaminated or may be suspected as contaminated or containing hazardous materials shall be stockpiled and covered prior to characterization and off-site reuse or disposal. Since individual disposal facilities will have different permit conditions and specific pre-characterization data requirements the Contractor is responsible for final soil characterization prior to transport and disposal. The Contractor is hereby made aware that for the purposes of disposal, final soil characterization is the responsibility of the Contractor and costs for securing a staging area and conducting waste characterization shall be incorporated into the Contractor's bid price for construction.

During construction activities, excavated soil/fill waste shall be field-screened by the Contractor and either loaded directly for off-site disposal (provided the excavated material is consistent with previously conducted investigations) or stockpiled in a soil/fill waste staging area located by the Contractor and approved by the Owner and Engineer. Stockpiles of soils shall be minimized to reduce the amount of waste material stored onsite. Stockpiled materials that are to be disposed of shall remain onsite for only as long as it would reasonably take to characterize (if not done in advance), load and transport offsite to an approved disposal facility. Soils that are to be re-used as fill material shall be stockpiled and maintained per Section 3.4 Staging Areas.

Soil suspected of having the characteristics of a hazardous waste or of containing a listed hazardous waste shall not be removed from the excavation except at the direction of the Engineer.

Soil/fill waste shall not be staged within 100 feet (30.5 meters) of a reservoir, wetland or Area of Critical Environmental Concern or in a 100-year floodplain. Soil/fill waste shall not be staged in the work area over night. Contaminated material requiring additional waste characterization due to waste disposal facility requirements or in order to assess unknown materials, shall be staged securely pending analytical sampling and characterization by the Contractor.

The Contractor shall reuse excavated soil at the point of origin to the maximum degree possible. Soil/fill which cannot be reused immediately at the point of origin shall either have been pre-characterized for off-site reuse or disposal by the Contractor and directly loaded for off-site transport (provided the excavated soil/fill is consistent in visual, olfactory and field screening characteristics with subsurface investigation conducted prior to construction pursuant to the MCP) or it shall be staged at a location determined and secured by the Contractor pending analytical characterization.

Excavating soil, fill and waste containing potential asbestos-containing material (e.g., transite board) shall conform to ITEM 183.3 ASBESTOS CEMENT PIPE REMOVAL. No off-site staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.

Removing characterized on-site materials for off-site re-use or disposal.

Placing and grading of certified clean fill (including fill from on-site which is determined to be suitable for re-use). The Contractor is to maximize the in-project reuse of on-site materials by using soil suitable for such reuse prior to importing material on site.

In the event that a previously uncharacterized, unknown material is encountered the Contractor shall manage the material separately and will temporarily stage the material pending characterization as specified herein.

All Investigation Derived Wastes are the property and responsibility of the Contractor and are to be disposed of by the Contractor under a Uniform Hazardous Waste Manifest, Material Shipping Record or by a Bill of Lading, as appropriate. The parties understand and agree that any consultant or sub-consultant (at any tier) is not, and has no responsibility as, a generator, treater, storer, transporter, or disposer of hazardous or toxic substances found or identified at the project site, and that the Contractor agrees to assume responsibility for and indemnify and hold any consultant or sub-consultant (at any tier) harmless from the foregoing.

Groundwater Management

Management of contaminated groundwater: If groundwater potentially impacted by oil and/or hazardous material (OHM), based on visual or olfactory evidence, is encountered in the course of the work, construction dewatering and discharge permits and groundwater treatment may be necessary depending upon the discharge method(s) and/or location(s) utilized by the Contractor. The Owner and Engineer shall be notified by the Contractor if groundwater potentially impacted by OHM is identified. REFER TO ITEM 183. DEWATERING.

REFERENCES

All work at the site must be performed in accordance with all applicable federal, state, and local regulations, permits and licenses. Comply with applicable requirements of the following standards and those referenced in this Section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

OSHA regulations (including, but not limited to, 29 CFR 1910.1000, 29 CFR 1926, and CFR 1910.120), 40-hour Occupational Safety and Health Administration (OSHA) training (plus 8-hour refresher training) and all other applicable state and federal regulations regarding health and safety requirements;

The applicable parts of the Code of Federal Regulation (CFR) Title 40: Protection of Environment, pertaining to the Comprehensive Environmental Response and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA), RCRA, and the National Emission Standards for Hazardous Air Pollutants (NESHAPS) as regulated by the U.S. Environmental Protection Agency (U.S. EPA);

Massachusetts Site Assignment Regulations for Solid Waste Facility Regulations 310 CMR 16.000.

Massachusetts Solid Waste Management Facility Regulations 310 CMR 19.00.

State regulations specified in the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000), and Massachusetts General Law 21E - Massachusetts Oil and Hazardous Materials Release Prevention and Response Act, and applicable Massachusetts Department of Environmental Protection (MassDEP) guidelines and policies;

1. Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup Policy No. WSC-94-400 entitled "Interim Remediation Waste Management Policy for Petroleum Contaminated Soils," dated April 21, 1994.
2. Massachusetts Department of Environmental Protection Bureau of Waste Prevention Policy No. COMM-97-001 entitled "Reuse and Disposal of Contaminated Soils at Massachusetts Landfills," dated August 15, 1997.
3. Massachusetts Department of Environmental Protection, Bureau of Waste Prevention Policy No. WSC#-13-500 "Similar Soils Provision Guidance," dated September 4, 2013.
4. Massachusetts Department of Environmental Protection, Policy #COMM-15-01 "Interim Policy on the Re-Use of Soil for Large Reclamation Projects," dated August 28, 2015.
5. MassDEP Technical Update. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil (2002);

Department of Transportation (DOT) regulations 49 CFR, and state transportation licenses and permits;

NIOSH/OSHA/USCG/EPA: "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" October 1985, DHHS (NIOSH). Publ. No. 85-1 15;

Department of Transportation training;

U.S. Army Corps of Engineers 404 permit;

General Contractor's license;

National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) to discharge and associated general permits;

Massachusetts Water Resources Authority pretreatment and construction dewatering requirements and permits;

Excavation and/or grading permits;

Special use permits;

Special waste haulers certificate;

Massachusetts Wetlands Protection Act and associated Order of Conditions;

City of Framingham wetland regulations and bylaws; and The Contractor's Soil and Waste Management Plan (SWMP) and Health and Safety Plan to protect the workers and the public.

SUBMITTALS

The Contractor shall prepare a Work Plan that generally describes the work to be performed under EXECUTION. The work plan shall include, but not be limited to detailing the submittal and implementation of the following:

1. Soil and Waste Management Plan;
 - a. Dust, Vapor and Odor Control Plan;
 - b. Air Monitoring Plan;
 - c. Equipment and Personnel Decontamination Plan
2. Site-Specific Health and Safety Plan);
3. Dewatering Plan (Item 183.);
4. Stormwater Handling Plan;
5. Spill and Discharge Control Plan;
6. Asbestos Management Plan (See Item 183.3); and

7. MCP required reports as necessary (RAM, URAM, status reports, closure reports).

The Soil and Waste Management Plan (S/WMP) shall be submitted at least three weeks prior to the beginning of any intrusive work at the site. All other required plans shall be submitted to the Owner or Engineer and/or their representative for review and approval at least two weeks prior to beginning any intrusive work at the site. Plans shall be consolidated provided the requirements of each plan are fully incorporated therein.

Soil and Waste Management Plan (S/WMP): The S/WMP shall outline measures for sampling, field screening, laboratory analysis, and disposal/ off-site reuse of soils and wastes generated at the Project site. At a minimum, this plan shall address the following:

Methods, procedures, and equipment used for excavating, characterizing, segregating, reusing/backfilling, loading, and transporting contaminated soil/solid waste materials encountered during excavation operations;

A list of all transporters and receiving facilities, complete with license numbers, permit numbers (as appropriate), contact person, and address and telephone number that the Contractor utilizes for soil management and waste disposal. In addition, a copy of a memorandum of understanding between the Contractor and each disposal facility shall be attached to the Soil and Waste Management Plan. The memorandum of understanding shall detail that the disposal facility agrees to accept a specified quantity of waste as characterized in the contract specifications and detail what if any restrictions may apply. The Contractor shall provide copies of the permits held by each disposal facility which the Contractor plans to use to dispose of non-hazardous solid waste, hazardous waste, PCB-impacted waste and asbestos-containing waste. The transporters shall have adequate financial insurance and liability insurance mechanisms to handle any accidents, and associated third-party compensation;

A summary of the history of compliance actions for each receiving facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. The Owner reserves the right to reject any facility on the basis of poor compliance history;

If hazardous wastes are to be transported, Contractor shall have or obtain a valid EPA identification number to transport hazardous materials and any other permits or licenses as required by federal, state and local laws, regulations, ordinances and procedures.

Procedures for securing the staging area, controlling dust and soil/solid waste migration, preventing damage to uncontaminated areas via contaminant migration and for decontaminating vehicles and personnel exiting the staging area;

The means and methods for decontaminating all equipment and personnel, including provisions for installing an equipment decontamination pad if required or specified.

Means, methods and equipment for locating and protecting stockpiles.

Methods and procedures for identifying stockpiled material (e.g., labeling, marking containers) and procedures for identification and tracking;

Methods, procedures, and equipment used for obtaining the necessary information needed to satisfy the off-site reuse/disposal facility requirements specified herein and/or by the facility;

Methods, procedures, and equipment proposed for assessing and handling Unknown Materials. The S/WMP shall indicate which laboratory(ies) the Contractor shall utilize for chemical analysis of soil, groundwater and unknown materials.

- a. An Unknown Materials information sheet shall be developed as part of the Contractor's S/WMP, upon which the Contractor shall record information such as container type, size, and condition; and, any identifying characteristics of the unknown material. The format of the information sheet shall be as accepted by the Owner and/or its representatives;
- b. The Contractor's plan for notifying the Owner and Engineer in the event that an unknown material as defined in this specification is encountered. The plan shall include the phone numbers and names of the Owner's representative(s) that the Contractor would contact in such an event.

Provisions for separation of incompatible materials and segregation of different class of soil;

Procedures for consolidating (i.e., bulking) compatible materials for disposal.

Procedures for dewatering as well as handling, characterization, storing, treating and disposing of groundwater due to dewatering. Refer to Item 183. – Dewatering.

Procedures for diverting and handling site stormwater. This would include handling, treatment and discharge of storm water.

Provisions, procedures and equipment used for control of dust, vapor and odor; including measures to control objectionable dust, vapors, and odors originating from the site (under Environmental Field Monitoring / Dust Control herein). This shall describe procedures to minimize the creation of dust, and the control of objectionable vapors and odors originating from the site.

Provisions, procedures and equipment used to monitor air at the site (under Equipment And Personnel Decontamination herein). This shall include site specific monitoring for potential hazards in the air; including the proposed instrument(s) to be used, the expected hazards (e.g., dust, VOCs), the monitoring frequency, the monitoring locations, and the reporting procedures.

Soil Management/Tracking Documentation:

Prior to off-site disposal or reuse, the Contractor shall provide to the Engineer a letter from the disposal facility indicating that the facility has reviewed the available data relative to the soil/solid waste to be delivered and agrees that the soil/solid waste meets their acceptance criteria. The letter shall be signed by a duly authorized representative of the receiving facility.

Within the time constraints established in state and/or Federal laws and regulations, the Contractor shall submit to appropriate authority(ies) and the Owner, as applicable, Uniform Hazardous Waste Manifests, Material Shipping Records, and/or Bills of Lading (collectively referred to as transportation documentation) for all soils, rock, ACB, asbestos pipe, asbestos containing materials (ACM), hazardous waste and waste disposed or reused of off-site utilizing such documents. Copies of all transportation documentation and all other documents used to track and/or permit off-site transportation of soils or wastes shall be submitted to the Owner and Engineer within ten (10) days of shipment. All transportation documentation shall be signed by the transporter and receiving/disposal facility. The Contractor is responsible for preparation of all transportation documentation, manifests, Bills of Lading, Material Shipping Records, and all other related documents completely and accurately prior to submitting them to the Owner and/or its representative for generator and LSP signatures. The Contractor shall be responsible for submitting to the Owner's LSP all information necessary for preparation of LSP opinion letters to disposal facilities and coordinating disposal documentation with all parties. The Owner's LSP and the Owner shall the sign any MassDEP Bill of Lading forms where required only after the Contractor has provided the information required for preparation of electronic MassDEP forms. The Contractor shall be responsible for paying for any and all fines associated with inaccurate, incorrect, or improperly completed transportation documentation and all other related documents, including fines resulting from late or untimely submittals.

Stormwater Handling Plan

The Stormwater handling plan shall provide provisions to ensure compliance with Section 3.10, other portions of the Contract Documents, and all applicable local, state and federal permits.

Quality Control Plan

The Contractor shall prepare a Quality Control plan for the development, implementation, and maintenance of a quality control system to ensure that the specified quality is achieved for all materials and work performed.

Spill and Discharge Control Plan (SDCP): The SDCP shall provide contingency measures and reporting responsibilities for potential uncontrolled spills and discharges of contaminated and/or hazardous materials, including, but not limited to: fuels, oils, contaminated groundwater, granular solid waste, leachate, decontamination water, sewage, and other on-site waste materials. In addition to the above listed items, the SDCP shall specifically contain: procedures for containing dry and liquid spills; absorbent material available on site; storage of spilled materials; governmental reporting (i.e., notification) procedures; decontamination procedures; discharges of sanitary or combined sewers into storm drains either by flow handling/bypassing or accidental or unintentional discharge; and procedures for protecting wetlands and surrounding public and private property.

The Spill and Discharge Plan shall indicate the location and quantity of the materials to be staged on site and the basis for the quantities (i.e. indicate the vessel which will be on site containing the greatest volume of oil or hazardous materials). No fuel or oil tanks or drums may be temporarily staged on site unless they are stored within a secondary containment system. Fuel deliveries shall be performed in a designated area which has either secondary spill containment or an impervious surface with absorbent berms located around the point of fuel delivery. The Spill and Discharge Plan shall indicate the location of the fueling area and the nature of secondary containment which the Contractor intends on utilizing.

Notification Procedures: The Contractor shall prepare in advance of work activities a notification list, complete with phone numbers, addresses, and contact names for all parties to be notified in the event of a spill. This list shall be posted on-site at all times and shall include:

- a. Owner's designated representatives;
- b. Owner;
- c. Fire Department;
- d. Engineer;
- e. Massachusetts Department of Environmental Protection (as required per 310 CMR 40.0000). The Owner shall be notified immediately of an uncontrolled spill or discharge. If human health or the environment are potentially threatened, the Contractor shall take immediate action to abate the conditions and notify emergency personnel;
- f. Appropriate emergency personnel.

Spill Incident Report(s): In the event of an uncontrolled spill or discharge, a written report detailing each uncontrolled spill or discharge shall include, at a minimum, the cause and resolution of incident, outside agencies involved, and date and time of occurrence. The report shall be submitted to the Owner within 48 hours of the incident. The Contractor shall document all spills on the as-built Drawings and submit the Drawings to the Owner at project completion. The Contractor shall

be responsible for remediating any spills or releases of oil or hazardous materials as a result of the Contractor's activities. The site shall be remediated to pre-release conditions at no additional cost to the Owner.

Medical surveillance records, OSHA 40-hour training forms, accident forms, and all other documentation requirements of the Contractor's safety and health program for personnel working on the site (who are subject to exposure to potentially contaminated soil) shall be up-to-date and kept on file at the site. The Contractor shall provide documentation of employee status upon request of the Engineer and/or their representative.

PRODUCTS

DUST CONTROL

Dust suppression may be achieved by applying controlled amounts of water or dust suppression chemicals to the project site, and through covering of soil stockpiles, etc. Dust suppression shall be carried out in accordance with the approved SWMP.

SPILL CONTROL

At a minimum, the Contractor shall maintain on-site absorbent pads, booms and absorbent materials in sufficient quantity to address a release of fuel oil, hydraulic oil or other OHM that the Contractor intends to use or store on site, including fuel oil and hydraulic oil that is used within earth moving equipment. The quantity of spill containment materials maintained on site shall be sufficient to respond to a catastrophic release from the vessel containing the greatest quantity of oil or hazardous material on-site.

SOIL MANAGEMENT/TRACKING DOCUMENTATION

Provide completed Bills of Lading (BOLs), Material Shipping Records (MSRs), manifests, certificates of disposal, weight slips and all other documentation relative to disposal, reuse, treatment, recycling or other means of off-site use of soil and waste materials.

Provide appropriate equipment and materials to protect and delineate stockpiles as necessary.

EXECUTION

GENERAL

All work in this section will be performed in accordance with the Contractor's Work Plan, S/WMP, Site-Specific HASP and any other site specific plans/reports that have been approved by the Owner and Engineer.

The primary concern of the Contractor in the excavating, handling, sampling, bulking, and on-site storage of soil/solid waste and/or drummed material (if encountered) will be to protect the health and safety of the site workers, the public, and the environment.

The Contractor shall keep a copy of the Health and Safety Plan (HASP) on site during all operations and shall conduct daily health and safety meetings. Failure to keep a copy of the HASP on-site, or any other breach of the Contractor's Plan, may be cause for stopping work at the cost of the Contractor. Delays caused by the Contractor's failure to comply with the health and safety regulations or any health and safety plan shall not entitle the Contractor to recover any additional costs or time lost. The Contractor shall not be allowed to resume activities until corrective measures are accepted by the Engineer and/or their representative and implemented.

The Contractor shall reuse geotechnically suitable excavated material prior to using imported backfill to reduce the volume of material to be reused/disposed off-site. Imported backfill shall be used only as accepted by the Engineer. Urban fill soils and roadway base/subbase shall be re-used to the maximum extent before reusing naturally occurring soils. If off-site disposal is required, natural soils shall be preferentially disposed or reused. Contamination shall not be exacerbated as a result work activities.

SOIL/FILL WASTE CHARACTERIZATION

Soil and fill material shall be classified based on the criteria established in the accepted SWMP.

Initial Characterization of Soil/Fill Waste Material: A summary of existing conditions and investigation findings performed by the Engineer during design, including a summary of analytical results, shall be available to the Contractor.

The Contractor shall review all the existing conditions information supplied by others. The Contractor shall use the information and shall either perform independent sampling and characterization of soil/fill waste strata to be encountered during construction in advance of excavation such that excavated soil or wastes can be segregated and directly transported to an appropriate facility or the Contractor shall make the necessary arrangements to secure a staging area(s) suitable for storing soil stockpiles or wastes pending analyses, at no additional cost to the Owner. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner. The Contractor shall identify known or suspected areas where hazardous materials may be encountered, including but not limited to asbestos, PCB, lead-based paint.

Soil shall be preliminarily segregated based on the Soil Classification Categories detailed in Section 1., except as indicated below.

1. Potential Asbestos Containing Material (PACM). If soil/fill waste suspected of containing asbestos is encountered during excavation, the Contractor shall immediately contact the Engineer to discuss the nature and extent of the PACM and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the PACM, MassDEP shall be contacted for approval. Discovery and management of PACM shall be documented in the S/WMP. Evidence of PACM includes but is not limited to the presence of suspect asbestos-containing building debris such as cementitious (transite) piping, vinyl floor

tiling, roofing paper or paper-like insulation materials or any other suspect asbestos containing material observed in the soil/fill waste. Following MassDEP approval, such soil/fill waste shall be segregated and stockpiled pending confirmatory analysis to determine appropriate disposal requirements.

2. Unknown Material. If unknown material is encountered during excavation, the Contractor shall immediately contact the Owner and Owner's representative to discuss the nature and extent of the unknown material and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the unknown material from the excavation area, the Contractor and Owner and/or its representatives, shall visually assess the material and its potential hazards. Drums shall be assessed to determine whether they are leaking, corroded, pitted, bulging (evidence of reactive waste), crushed, empty, filled-in-place. Crushed, empty, and/or skeletal parts of drums shall be handled as solid waste, as specified. Note any evidence of staining or olfactory indications of contamination. The Contractor shall record any identification or markings on the drummed material(s). Discovery and management of unknown materials shall be documented as required in the SWMP.

Final Waste Characterization: Final waste characterization shall be the responsibility of the Contractor. The Contractor shall be responsible for determining the characterization requirements of each disposal facility in advance to facilitate timely off-site removal and to adequately estimate the disposal costs. The Contractor shall perform additional segregation based on disposal requirements. Disposal or off-site reuse of the material shall depend on sampling and characterization analytical results. At the request of the Engineer or Owner, the Contractor shall provide a split sample. The Contractor shall perform or observe all sampling and shall provide notice in advance to the Engineer so that the Engineer may observe the sampling procedure.

Stockpiles within the staging area shall be sampled and characterized within a timely manner so as not to impede construction activities or preclude the reuse of soil/fill on site. If soil/fill cannot be reused on site due to the Contractor's delay in sampling material, the Contractor shall dispose of the soil/fill at no additional cost to the Owner including the additional cost of imported fill material used in its place to meet project requirements.

SOIL/SOLIDS WASTE MANAGEMENT

The Contractor shall reuse, recycle or dispose of all excess soil and wastes resulting from excavation activities in accordance with federal, state and local regulations and these specifications, as well as all other state laws through which the waste material is being transported.

The Contractor shall obtain receipts of disposal for disposed wastes as applicable.

The Contractor shall be responsible for preparing and keeping in proper order all waste manifests, BOLs, MSRs, and shall designate one person who shall be made available to sign all transportation documentation. The Contractor shall be responsible for obtaining the generator's signature and all other signatures required for the proper completion of the transportation documentation. The Contractor shall allow a minimum of five (5) working days from the date of the submittal for any documents requiring the signature of the Owner and/or the LSP. The transportation documentation

shall document the handling of the excess excavated soil or waste from the time it is generated until the time it is properly reused or disposed.

The Contractor shall be responsible for obtaining all federal, state, and local permits and variances to allow transport of materials and wastes on public roadways.

Transportation of wastes shall be in compliance with any relevant federal, state and local requirements, and such as to assure that waste material is not released during transit.

Soil and fill material that is managed under a Utility-Related Abatement Measure (URAM) Plan pursuant to the MCP, and which is staged off-site may be re-used within fourteen (14) calendar days of excavation. Any material which is suitable for re-use as ordinary borrow, based on analytical results and could have been placed on site, but was not, due to Contractor delay (i.e. analytical results were not available within 10 days following excavation) will be disposed in accordance with the applicable regulations by the Contractor at no cost to the Owner.

Soil and fill material that is managed under a URAM Plan pursuant to the MCP, which is staged off-site and which is determined at the staging area to be characteristically hazardous may be treated (stabilized) within the "Area of Contamination" only and must be reused within 14 days or disposed of within ninety (90) calendar days of excavation. No treatment may occur at the staging area. Pursuant to the MCP and RCRA, hazardous Remediation Waste (e.g., Hazardous soils) shall be removed from the site within 90 days. All other Remediation Waste (e.g., Contaminated soils) shall be removed within 120 days unless exceptions identified at 310 CMR 40.0031(7) apply.

Contaminated and Hazardous excavated soils shall be completely covered and secured in accordance with this. Soils exhibiting evidence of potential contamination including but not limited to odors and/or staining shall be covered prior to characterization and off-site reuse or disposal.

The Contractor shall be responsible to inform the Owner if hazardous waste disposal will not be performed within 90 days of hazardous waste characterization. This notification shall take place a minimum of 30 days prior to the 90-day deadline. No hazardous waste stockpiled at the site shall remain on site more than 90 days after it is characterized. In accordance with 310 CMR 40.0031, all other Remediation Waste shall not remain on site or temporary off-site storage location more than 120 days from initial date of generation.

Transporters of solid wastes that include, but are not limited to, contaminated soil/fill (including OHM-contaminated soil), construction and demolition debris non-hazardous laboratory wastes, bottles, tires, metal parts, tree stumps, brush, and grass cuttings will utilize trucks or dumpsters specifically designed to ensure that material, dust, or liquid is not released in transit. No truck shall be allowed to exit the site until all free liquids are drained from soil being transported off-site. Moisture content of the soil/waste shall be reduced by the Contractor, to or below the maximum acceptance limits required by the disposal facility. Material shall be covered at all times. The vehicle in which the waste is transported shall be driven directly to the intended destination without any stops or detours in between, except those necessary in response to road conditions, vehicle service needs, or emergencies. Discharge or release of material during transport shall be

immediately reported to the Owner. Transporters shall clean up any discharge that occurs in transit, at the Contractor's expense.

Manifesting of solid waste shall be required and shall include at a minimum: vehicle identification; date of loading and disposal; tonnage, as measured at the disposal site; and signature of the Owner and/or its representative, transporter, and disposal facility's representative. Transportation of the wastes shall be accompanied by the appropriate manifests such as a MassDEP Bill of Lading, as required in the Code of Massachusetts Regulations (CMR) 310 CMR 40.0030, a Material Shipping Record or by a Uniform Hazardous Waste Manifest. The original shall be returned to the Owner, and/or their representative, within ten (10) working days of disposal.

STAGING AREAS AND STOCKPILING

Prior to disposal, the Contractor shall maintain segregated excess excavated soil and waste stockpiles in conformance with all applicable federal, state and local waste disposal regulations. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.

The Contractor's staging area shall be large enough to store equipment, materials and all stockpiled soils. The Contractor shall protect the staging area from contamination due to excavating, handling, storing and disposing of hazardous materials.

Stockpiled soils determined to be Contaminated or Hazardous, as described herein, shall be securely covered at the close of each day and continuously when not being added to or otherwise being handled by the Contractor. Stockpiles shall also be covered at times as directed by the Engineer.

Stockpiles of soils that are known or suspected to be hazardous within the soil staging areas shall be placed on a 20-mil HDPE liner/filter fabric and bermed to minimize the potential for contamination release. Each soil category shall be staged in separate areas with barriers to keep different soil types from mixing. Waste characterized as RCRA hazardous waste or other Hazardous soils shall not be stored on site for a period greater than ninety (90) days. All other waste, including Unregulated or Contaminated soils, must be disposed of off-site within 120 days of excavation. At the end of each working day, contaminated soils will be covered with 10-mil polyethylene to minimize the potential for release of contaminants.

Covers on stockpiles of soils that are known or suspected to be hazardous shall be secured with tires, ropes, anchors or equivalent material. The cover system shall be capable of resisting actual wind gusts at the site, with a minimum wind capacity of 40 miles per hour. The stockpile covers shall be installed and secured at the end of each working day and at all times when earthwork is not taking place on site. Stockpile covers shall be immediately re-covered should wind forces expose any of the excavated materials. Failure to adequately protect the stockpiles may result in non-payment.

Stockpiles are to be segregated based on visual, olfactory, and field screening results. Similar material may be stockpiled together. Each stockpile must be clearly separated from adjacent stockpiles.

Stockpiles will be clearly designated by a sign post or marker which can be cross-referenced with samples collected from the pile for characterization purposes. The signs/markers are not to be moved, except by authorized personnel and not until the soil is ready to be either reused on site or loaded for off-site disposal.

Unknown, potentially hazardous soils/debris and drummed materials encountered during the project shall be located in a separate bermed location. The Contractor's Soil and Waste Management Plan shall provide construction details of the dimensions and protective measures proposed for the staging area(s). The construction details and protective measures are subject to the approval of the Owner and/or its representatives. The Contractor shall select the area to facilitate handling of the material and to minimize interference with other ongoing construction activities. The Owner or Engineer must agree with the location prior to construction. In the event that excavation is conducted near storm water drainage basins or inlet manholes, the Contractor must protect the drainage structures with filter fabric or provide similar protection to prevent sediment loading and migration of contaminated soils and sediments.

If the soil storage area consists of an unimproved or otherwise pervious surface, and soil to be stockpiled is known or suspected to be contaminated, the Contractor shall install a lining of 6-mil (or greater) polyethylene, to protect the soil from the potential of intermixing with existing subsurface soils.

Stockpiles shall be no greater than 250 cubic yards in volume. If space constraints, etc. make it infeasible to maintain separate stockpiles of soils to 250 cubic yards, the Waste Management Plan shall include a map with the locations of the composite samples for each stockpile shall be provided to the Resident Engineer prior to the submittal of the samples to the off-site analytical laboratory. This will allow any portion of the stockpile, which came back as contaminated soil to be properly segregated and managed separately

Stockpiles shall be established and maintained as per EPA requirements under the Construction General Permit Section 2.1.2.4. Requirements include the following.

- a. Locate the piles outside of any natural buffers and physically separated from other storm water controls;
- b. Protect from contact with storm water (including run-on) using a temporary perimeter sediment barrier;
- c. For all soils, provide cover or appropriate temporary stabilization to minimize sediment discharge and to contain and securely protect from wind; nevertheless, the Contractor shall provide cover for any stockpiles containing contaminated soils as specified herein;
- d. Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any storm water conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water; and

- e. Unless infeasible, contain and securely protect from wind.

HAZARDOUS WASTES

Transporters of hazardous wastes shall be in conformance with Code of Federal Regulations (CFR) 40 CFR, Part 171, all other federal laws and regulations and 310 CMR 30.400, and all other state laws through whose boundaries the waste material is being transported. The transporter shall provide copies of its EPA identification number, Massachusetts transporter's license, and proof of driver training in transporting hazardous waste.

The disposal site shall be in conformance with 40 CFR, Part 264 and relevant laws of the state in which the facility is located. The Contractor shall provide copies of the disposal facility's EPA and state treatment and disposal permit.

Manifesting of hazardous wastes shall be in conformance with 40 CFR, Part 264, Subpart E, 310 CMR 30.310 and 310 CMR 30.405.

Actual quantities which are subject to unit rates shall be tabulated by the Contractor and verified by the Engineer on a daily basis. The Contractor shall not be reimbursed for unit rate work performed without the prior approval of quantities by the Engineer.

EQUIPMENT AND PERSONNEL DECONTAMINATION

Equipment and personnel decontamination facilities shall be provided by the Contractor when hazardous materials are expected to be encountered and handled onsite. Equipment and personnel decontamination area(s), conforming with the Contractor's HASP and these Specifications, will be constructed in such a manner to protect existing site surfaces, materials, and structures from contamination. The equipment decontamination area(s) will be sized adequately to provide for the decontamination of the largest piece of equipment to be decontaminated. Filter fabric will be placed over an impermeable liner to protect the liner from rips, punctures, or tears from traffic and heavy equipment.

The Contractor shall establish a site-specific decontamination protocol and decontamination areas for personnel and equipment utilized at the subject site. Personnel and equipment decontamination shall be conducted in compliance with the HASP.

The decontamination protocol shall include (i) the means, methods, and materials for the proposed decontamination procedures; (ii) the procedures employed to contain and store the wash or rinse liquids/sludges; (iii) procedures used to sample, analyze, and characterize the contaminated wash or rinse liquids/sludges; (iv) procedures to contain or clean contaminated equipment and PPE; and (v) the procedures for handling and disposing of solid wastes generated from site decontamination activities. All sample analysis shall be completed by a certified laboratory. The Contractor shall be responsible for the cost of this analytical work. The Contractor shall submit a copy of the analytical results and laboratory certifications to the Owner for review prior to proceeding with disposal. The Contractor shall be responsible to properly manifest and dispose of all residual wastes generated from on-site activities in conformance with federal, state, and local

environmental and transportation regulations. The Contractor shall be responsible for the manifests and procedures to be used to package and dispose of contaminated solid wastes, wash, or rinse liquids at an EPA or state-approved treatment or disposal facility. The Contractor shall be responsible for any releases from site or decontamination activities due to its work, and will remediate any release for which the Contractor is responsible to pre-existing conditions at the Contractor's expense.

Provisions for collecting decontamination water will be incorporated into the maintenance of the decontamination pad and will include placing an impermeable liner over a sloped surface such that water is directed, if necessary, into an area for subsequent pumping to 55-gallon drums or other appropriate tankage. Following completion of the work, the wash water shall be characterized by the Contractor and disposed off-site, in accordance with federal, state, and local regulations.

ENVIRONMENTAL FIELD MONITORING / DUST CONTROL

The air monitoring program is to be designed to protect public health and the environment from the potential generation of dust and contaminant release during work. All personnel shall be made aware of the potential hazards and be informed of air monitoring information by the Contractor.

Dust control measures shall be implemented by the Contractor during all soil handling operations, loading and transport of waste material from the site in accordance with the Contractor's Dust Control Plan.

Air monitoring shall occur when excavating or handling soils that are known or suspected to be hazardous or contain OHM. The Contractor shall keep accurate documentation of all air monitoring, which will be made available to the Engineer or Owner upon request.

At a minimum, the air monitoring shall include daily monitoring and documentation of one upwind, and two downwind conditions during periods of activity on the site and when there is a potential for dust being generated on the site. The air monitoring information including air monitoring in the vicinity of all site activities shall also be utilized for establishing levels of personal protection measures in the Contractor's Site Specific Health and Safety Plan. The Contractor shall submit his/her air quality monitoring program for review and approval prior to commencement of site activities.

Air monitoring shall include headspace analyses in a jar or plastic bag performed using a portable photoionization detector or other appropriate instrument for the anticipated conditions. The Contractor shall be responsible for properly calibrating the instrument each day and recording the calibration in a daily log which shall include the following information:

- a. Name of device or instrument calibrated.
- b. Date of calibration.
- c. Results of calibration.
- d. Name of person performing the calibration.
- e. Identification of the calibration gas.

The Contractor is responsible for providing fully charged instrument(s) at the start of each work day.

When applicable, field screening samples shall be taken from numerous locations within the excavation. Samples shall be taken from any area that appears to be visibly contaminated or where an odor is noted.

If there are indications of contamination, the frequency of air monitoring will be determined by an Industrial Hygienist or competent environmental health professional. The Contractor's Site Health and Safety Officer and Superintendent will be responsible for assuring that monitoring is conducted in an appropriate manner, and that work practices, engineering controls and/or Personal Protective Equipment are proper for the conditions.

Dust shall be controlled during excavation of soil/fill waste material to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.

During construction, real-time dust monitoring shall be conducted under windy and/or excessively dry working conditions or when directed by the Engineer. The monitoring shall consist of total dust testing using MIE, INC. MINIRAM PDM-3 DUST MONITORS, or like instruments. The total dust criteria at the site shall conform to the requirements of the HASP. Should fugitive dust quantities exceed 20 percent of the ambient level or action levels indicated within the HASP, the Contractor shall perform additional measures to reduce the total dust concentrations.

Nuisance dust levels shall be reduced by pre-wetting the surface soils and by establishing and maintaining clean access roads. The Contractor's Dust, Vapor, and Odor Control Plan shall describe the procedures and materials to minimize dust. At a minimum, the Contractor shall provide clean water, free from salt, oil, and other deleterious materials.

Areas of exposed earth to be excavated shall be lightly sprayed with water before excavation if there is potential for nuisance dust generation. Additional water spray may be utilized only when any indication of excessive dust is observed. To the extent feasible, the Contractor shall minimize the use of water within the limits of excavation.

Unimproved access roads shall be sprayed with water on a regular basis to minimize the generation of dust.

All containers temporarily storing waste material shall be covered at all times except as necessary to place waste material into the container. The Contractor shall monitor the covers daily to ensure the covers are in place and effectively eliminating the generation of dust and make appropriate notes in the site log.

VAPOR AND ODOR CONTROL

The Contractor shall provide the materials and labor to control objectionable vapors and odor in accordance with the Contractor's SWMP. The Contractor shall limit the exposure area and shall cover the exposure area with synthetic reusable covers, lime, foam suppressants, or other methods to reduce off-site odors to acceptable levels. The Contractor shall not use soil suitable for on-site reuse as cover to control vapor and odors.

BULKING

Following characterization and compatibility testing of waste material, the Contractor shall place compatible materials into common containers to reduce transport and disposal costs, when practicable and with the approval of the Engineer. In addition, materials that are improperly contained shall be transferred into the appropriate containers. Drums and containers used during this project shall meet the appropriate DOT, OSHA, and U.S. EPA regulations for the materials contained. The Contractor shall describe the bulking procedures in the Soil and Waste Management Plan.

CONTAMINATED LIQUIDS

The Contractor shall collect and properly dispose of contaminated liquids and other liquids generated or encountered on site during construction. Contaminated liquid sources include decontamination water, and drummed liquids encountered during excavation. The Contractor shall be responsible for treating and disposing of contaminated groundwater as required by applicable regulations and SECTION 02140 DEWATERING (Item 183.).

STORMWATER CONTROL

The Contractor shall protect all work from erosion while onsite. The Contractor shall divert all stormwater from work areas that may contain oil or hazardous materials (OHM). Stormwater that may contact OHM, polychlorinated biphenyls (PCBs), lead, asbestos or other types of impacted soil shall be collected within the immediate area of the contact, treated (as determined by sampling and testing) and disposed of in accordance with all local, state and federal regulations. Stormwater that is collected, stored onsite and sampled shall be tested and characterized for determining proper transportation, disposal and/or discharge in accordance with SECTION 02140 DEWATERING.

BACKFILLING AND COMPACTION

Excavated areas shall be backfilled with appropriate backfill material (including excavated material suitable for reuse and, when necessary, imported off-site material) as specified in EARTH EXCAVATION.

CLEANUP

During the course of the work, the Contractor shall keep the Site and his operations clean and neat at all times. He shall dispose of all residue resulting from the site clearing operations; and at the conclusion for the day's Work, he shall remove and haul away any surplus materials, lumber, equipment, temporary structures, and any other refuse remaining from the site clearing operations and shall leave the entire site in a neat and orderly condition.

Sample Waste Stream Disposal Summary Table

Material Type	Pre-Approval by Receiving Facility	Testing/ Analysis	Transportation Documentation	Proposed Receiving Facility/Facilities
Asbestos Containing Material (ACM)	Required	Not required	WSR	
Asbestos Cement Pipe (ACP)	Required	Not required	WSR	
Unregulated Soils	Required	Required	MSR	
Impacted/Regulated Soils	Required	Required	BOL	
Hazardous materials	Required	Required	HWSM	
Catch basin cleanings	Required	Required	WSR	
Street Sweepings	Required	Not required	WSR	
Contaminated Dewatering liquids	Required	Required	BOL	
Uncontaminated dewatering liquids	Required	Not required	Not required	
Sanitary Sewerage	Not required	Not required	Not required	
Asphalt, Brick and Concrete Material (ABC)	Not required	Not required	MSR, MassDEP notification form if crushed	
Construction Debris	Not required	Not required	Not required	
Vegetation	Not required	Not required	Not required	
Municipal Solid Waste	Not required	Not required	Not required	
Recyclable Materials	Not required	Not required	Not required	

COMPENSATION

Soil and Waste Management shall be paid for at the Contract bid price per cubic yard of material excavated and stockpiled for testing prior to disposal. The work shall include furnishing all labor, equipment, and materials, and performing all operations in connection with handling, stockpiling, texting, and classification prior to offsite disposal. The work shall also include providing all Contractor prepared plans unless otherwise noted, managing of excavated soil and fill material, characterization of soil, fill and unknown material for disposal/reuse purposes; field screening and soil management/segregation; temporary storage/staging; and characterization (as may be necessary for unknown materials and/or for compliance with receiving facility requirements).

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

RELATED DOCUMENTS

Dewatering consists of the removal of surface water and/or groundwater as necessary to perform the construction required by the Contract in accordance with the drawings and specifications.

Furnish all labor, materials, equipment, and incidentals required to:

Design, furnish, operate, maintain, and remove temporary dewatering systems of sufficient scope, size and capacity to control hydrostatic pressures and to lower, control, remove and dispose of groundwater and surface water to maintain stable, undisturbed subgrades, and allow work to be performed under dry and stable conditions, and comply with all applicable permit and other regulatory requirements.

Work to be done as part of dewatering includes, but is not limited to:

Dewatering activities are not anticipated to be needed as a part of this project; however, should the Contractor need to dewater the project site or a portion thereof, these requirements shall govern. No dewatering shall be performed without prior approval from the Engineer.

Control hydrostatic pressure.

Prevent surface water from entering the excavation during construction.

Implement erosion and sedimentation control measures. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.

Prevent surface water from entering excavations by grading, dikes, or other means.

Provide system to treat/settle all water removed from excavations, except water that is infiltrated into the ground on-site in a manner that does not result in negative on- or off-site impacts.

Provide an Environmental Site Professional/Dewatering Specialist/Field Representative (hereinafter referred to as the Dewatering Professional) who will be responsible for dewatering, infiltration, treatment and discharge of dewatering flows as specified and in compliance with all applicable permits and regulations.

Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.

Remove dewatering system when no longer required for work activities.

Uncontaminated groundwater or accumulated surface runoff removed from excavations shall be infiltrated to the ground if feasible, by means of a temporary infiltration trench or basin. The temporary infiltration trench or basin must be: 1) open to the surface or “open-air”; and 2) wider than it is deep. Otherwise, the Contractor must obtain an Underground Injection Control (UIC) permit from the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Resource Protection (BRP) in accordance with 310 CMR 27.00.

Surface flow that could lead to off-site discharge is not permitted. If ground infiltration is not feasible, treated water shall be directly or indirectly discharged to a surface water in accordance with a National Pollutant Discharge Elimination System (NPDES) permit issued by the U.S. Environmental Protection Agency (EPA). If neither ground infiltration nor surface water discharge is feasible, treated water shall be discharged to the local sewer system in accordance with the appropriate permits and regulations or transported off-site to an approved facility. In no case shall dewatering flows be directly or indirectly released to surface waters or storm drains prior to settling and, if appropriate, any additional treatment. The Contractor is responsible for acquiring all proper permitting required for the chosen method of discharge.

If work is expected to be conducted within soil or groundwater affected by oil or hazardous materials, or if the groundwater appears to be impacted, prior to any discharge, the groundwater or accumulated surface runoff shall be sampled and tested to meet the requirements of the NPDES Remediation General Permit, or other permit requirements if an alternative discharge/disposal method (e.g., discharge to sanitary sewer, off-site disposal) is selected by the Contractor. The Contractor is responsible for coordinating the selected method of permitting and discharge or disposal with the Owner’s Licensed Site Professional (LSP) to meet the applicable requirements of the Massachusetts Contingency Plan (310 CMR 40.0000).

Upon sampling, testing and characterization of groundwater or accumulated surface runoff, proper treatment or disposal of ground water or accumulated surface runoff shall be determined. Treatment, discharge or disposal of groundwater shall be in accordance with all applicable regulations and shall be approved by the Engineer and Owner prior to final discharge or disposal.

PERFORMANCE REQUIREMENTS

Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer registered in the Commonwealth of Massachusetts, using performance requirements and design criteria indicated. All costs for delegated design shall be included in the bid price for the Work of this Section.

Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Designer, at no additional cost to the Owner. The Contractor’s pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from operations. Precautions shall be taken to protect new work from flooding during

storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and storm water management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

The presence of groundwater in soil will not constitute a condition for which an increase in the Contract price may be made. Under no circumstances place concrete, fill lay piping or install appurtenances in excavations containing free water.

The Contractor shall furnish and operate pumps and related equipment, including standby equipment, and all necessary piping to keep all excavations clear of surface, rain or groundwater during the operations, the water at all times and shall be responsible for any damage to the subgrade, completed work or adjacent properties from such water. All piping exposed above surface for this use shall be properly covered to allow traffic to pass without obstruction. Prevent erosion and siltation of surrounding area.

The Contractor is responsible for correcting any disturbance of natural bearing soils, compacted fills or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the dewatering system as specified.

SUBMITTALS

Shop Drawing: For dewatering system. Show arrangement, locations, and details of filters, pumps, power units and discharge lines; means of discharge; control of sediment and disposal of water.

Qualifications of the both the Contractor's dewatering specialist or firm (design) and the Dewatering Professional (all other responsibilities) shall be submitted for approval prior to execution of any dewatering. The submittal shall include, but is not limited to:

Qualifications of firm's Registered Professional Engineer as specified in Section 1.5, B.

Qualifications of the Dewatering Professional who shall oversee the installation, operation and maintenance of the dewatering system.

Submit a Dewatering Plan including design calculations prior to start of any dewatering operation. The submittal will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy,

regulatory compliance, and safety of the means, methods and sequencing of construction activities related to dewatering. The plan shall include the following items as a minimum:

Dewatering Plan and details stamped and signed by a Massachusetts Registered Professional Engineer that conforms to the requirements of the dewatering permit(s), the Wetlands Protection Act Order of Conditions, and all other applicable regulations and permits including, but not limited to, requirements for equipment, monitoring, sampling and reporting.

A list of equipment including, but not limited to, pumps, prime movers, and standby equipment.

A description of the proposed method of dewatering, water infiltration, containment, treatment discharge and disposal; and installation, maintenance, and system removal procedures.

A description of erosion/sedimentation control measures and best management practices to eliminate or minimize impacts from potential pollutants.

Contractor shall submit a modified Dewatering Plan within 24 hours, if open pumping from sumps and ditches results in boils, loss of fines, softening of the ground or other adverse impacts on or off-site.

Field quality control reports. Data for the required discharge reports, as applicable, shall be collected and maintained by the Contractor's Dewatering Professional. It shall consist of periodic sampling and analysis of system influents, midfluents and/or effluents and discharge quantities and other requirements of the relevant permits. The Contractor's Dewatering Professional shall also coordinate analysis of samples at an appropriately certified analytical laboratory and shall comply with all permit reporting requirements.

Other Informational Submittals: Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

QUALITY ASSURANCE

Employ the services of a Dewatering Professional and a Massachusetts Registered Professional Engineer having the following qualifications:

The Massachusetts Registered Professional Civil Engineer shall have completed the design of at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years consisting of deep wells, well points, vacuum well points, and sump pumping for heavy Civil projects of similar size, type, and complexity in developed areas with trench box or steel/timber sheeting support of excavation systems.

The dewatering system installer's Supervisor shall have a minimum of five (5) years of experience in installation of well points, deep wells, recharge systems, or equal systems.

The Dewatering Professional responsible for day to day operation of the system shall have the following minimum qualifications:

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Completion of at least five (5) successful dewatering projects of equal size and complexity with equal systems within the last five (5) years consisting of: system operation and troubleshooting, collection of readings, maintenance of logs and other required documents, collection of samples, coordination of analysis of samples, and compliance with reporting requirements during pumping for heavy Civil projects of similar size, type, and complexity in developed areas.

Current certification from MassDEP to operate the proposed treatment system, as applicable.

If subgrade soils are disturbed or become unstable due to dewatering operation or an inadequate dewatering system, notify the Engineer, stabilize the subgrade, and modify system to perform as specified at no additional cost to the Owner.

If oil and/or other hazardous materials are encountered after dewatering begins, immediately notify the Engineer.

PRODUCTS

MATERIALS

Site specific dewatering equipment may include, but is not limited to, pumps, hoses and dewatering filter bags. The exact equipment used shall be determined by the Contractor and in accordance with the Order of Conditions and all applicable Federal, State and Local regulations.

Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown, at least one (1) pump for every five (5) used.

Provide dewatering equipment, including an appropriately sized settling tank, and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the Dewatering Plan.

Provide temporary pipes, hoses, flumes, channels, crushed stone, geotextile fabric, sedimentation barriers, or any combination of equipment for the transport of discharge water over-ground to the discharge location.

Provide sampling and analysis equipment to test for turbidity.

EXECUTION

GENERAL

Execution of any earth excavation, installation of earth retention systems, and dewatering shall not commence until the related submittals have been submitted, approved by the Owner and Engineer, and the Dewatering Professional is on site and has begun the duties specified herein.

Furnish, install, operate, and maintain dewatering, ground infiltration, treatment and discharge systems as indicated or specified and in accordance with the Dewatering Plan. Delays due to insufficient storage capacity, inadequate Contractor Dewatering Plan, or permitting delays will be at no additional cost to the Owner. The Contractor is responsible to evaluate available data and determine the necessary dewatering system so as not to impede construction activities.

Carry out dewatering program in such a manner as to prevent undermining or disturbing foundations of existing structures or of previously completed or ongoing work.

Do not excavate below the seasonal high groundwater elevation until the dewatering system is operational.

Unless otherwise specified, continue dewatering uninterrupted until all structures, pipes, and appurtenances below the seasonal high groundwater level have been completed and sufficiently backfilled and/or anchored such that they will not be floated or otherwise damaged by an increase in groundwater elevation.

Discontinue open pumping from sumps and ditches, if such pumping is resulting in boils, loss of fines, softening of the ground, instability of the slopes or other adverse impacts on or off-site. Modify the Dewatering Plan and submit to the Engineer at no additional cost to the Owner.

Where subgrade materials are disturbed or become unstable due to dewatering operations, remove and replace the materials at no additional cost to the Owner.

DEWATERING DISCHARGE

Groundwater or accumulated surface runoff to be infiltrated does need not be treated, unless known to be contaminated or noticeably impacted with oil or hazardous waste. Contractor shall provide infiltration as described in Section 1.2.A.3 that complies with relevant local, state and federal regulations.

The effluent (discharge) shall be tested for turbidity on a daily basis and shall not exceed 280 NTU, averaged over 5 consecutive days. Sufficient measures shall be employed to provide

effective ways to remove turbidity, color and potential coliform organisms (from sewer work) prior to discharge

Transport pumped or drained water to discharge location in compliance with applicable permits and without interference to other work; damage to or contamination of pavement, other surfaces, or property; erosion; or siltation.

Provide separately controlled pumping lines.

Immediately notify the Engineer and Owner if groundwater is encountered that is suspected to be contaminated with substances other than those for which the treatment system has been designed. Do not pump water found to be contaminated with oil or other hazardous material to the discharge locations. Sampling, testing and characterization of the groundwater shall include (but not be limited to) criteria within part 1.2 of this specification section to determine the final disposal of the groundwater. Groundwater disposal shall follow all local, state and federal permits and regulations.

COMPLIANCE WITH DEWATERING AND RELATED PERMITS AND REGULATIONS

Discharging groundwater and allowing for natural infiltration may not be a viable option for controlling groundwater in the project area. Should dewatering activities be required where the Contractor needs to discharge groundwater to a location other than the point of origin, then the Contractor shall store, treat and discharge the water in accordance with applicable permits and regulations. Periodic sampling, as may be required to demonstrate treatment effectiveness and compliance with pretreatment standards specified in any local, state, or federal discharge permit required shall be the responsibility of the Contractor and its Dewatering Professional. If on-site infiltration, discharge to the local sanitary sewer system or off-site disposal are not feasible options, the Contractor shall be responsible for seeking coverage under one of the following EPA NPDES permits: Construction General Permit (CGP) for projects disturbing >1 acre; Dewatering General Permit (DGP) for projects disturbing <1 acre; or Remediation General Permit (RGP) for any project with known groundwater contamination. The Contractor shall be prepared to comply with standard local permit conditions including periodic testing of the effluent and with standard NPDES permit conditions including periodic testing of the treatment system influent, midfluent and effluent. The Dewatering Plan shall include a description of procedures and information related to the collection of readings, maintenance of logs and other required documents. At a minimum, the Dewatering Plan shall describe compliance with relevant provisions of the applicable NPDES Permit or other discharge permit and the local Conservation Commission Order of Conditions. Copies of the applicable NPDES or other permit authorization to discharge shall be provided to the Owner prior to the start of dewatering activities.

The Contractor, through its Dewatering Professional:

Shall furnish all labor, equipment and materials necessary to obtain accurate representative samples of the groundwater and for analysis for the set of analytical parameters specified above and as required by local, state and federal permits and regulations.

Shall coordinate sampling activities with the Engineer. The Engineer reserves the right to sample treated and untreated dewatering flows at any time.

Shall take readings from the treatment system in accordance with the Dewatering Plan.

Shall collect an initial sample of untreated and treated groundwater at the beginning of dewatering activities within the construction area. Sampling and start-up shall be conducted in accordance with applicable permits.

Shall prepare and keep in proper order all records required by regulatory authorities and permits.

Shall maintain logs and other records in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan.

Shall coordinate analysis of samples by an appropriately certified analytical laboratory in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan, and ensure that laboratory detection limits meet permit requirements.

Shall comply with reporting requirements in a timely manner and in the format required by the relevant permit. Reporting in compliance with permit requirements includes, but is not limited to: notification to the appropriate regulatory agencies, Owner and Engineer prior to discharge; submittal of laboratory analytical reports for each sampling event; submittal of reports for each reporting period during which no discharge occurs; notification of non-compliant discharges; notification of termination of discharge; and response to permit-related questions posed by regulatory agencies or the Owner and Engineer.

If water will be discharged under a National Pollutant Discharge Elimination System (NPDES) permit, submit notifications and reports to both the Environmental Protection Agency (EPA) and the appropriate regional office of the Massachusetts Department of Environmental Protection (MassDEP) and the Engineer. Comply with pre-discharge notification, discharge reporting, notification of no discharge, and termination of discharge notification requirements; and respond to inquiries or correspondence from EPA or MassDEP regarding permit issues.

If water will be discharged under a local permit, submit notifications and reports as required in the permit.

Observe and record daily the elevation of the groundwater during the length of the dewatering operation and provide data to Engineer on daily basis. For monthly or less frequent reporting deadlines, provide the Engineer with copies of all reports fourteen (14) days prior to the reporting deadline, and submit reports to the appropriate agency(ies). Provide copies of other dewatering documents to the Engineer immediately.

Install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified and in accordance with the Dewatering Plan.

The Contractor shall obtain all federal, state, county, and local permits and variances to allow transport of materials on public roadways, should such transport be necessary.

The Contractor shall dispose of all wastes resulting from construction dewatering activities in accordance with local, federal and state regulations.

The Contractor is solely responsible for the implementation of the permit requirements, and is solely responsible for any punitive action resulting from any violation of the permit. The actual permit issued shall become part of this Contract by either addendum or by change order. If the actual permit is included by change order, no additional costs for implementing the permit will be considered by the Owner, when the actual permit is issued.

REMOVAL

Do not remove dewatering system without written approval from the Engineer.

Backfill and compact sumps or ditches with crushed stone wrapped with geotextile fabric in accordance with the MassDOT Specifications.

All dewatering wells shall be abandoned upon completion of the work, and completely backfilled with cement grout.

COMPENSATION

Dewatering will be measured and paid for at the Contract unit price per day for which dewatering measures are required for the installation of utilities, which price shall include but not be limited to the design of the water control systems, as well as all equipment, materials, permits and labor needed for the installation, maintenance, removal, disposal of the materials used for water control, and disposal of any siltation materials caused by the pumping operation. All costs required for permits, transport, special handling, inspection, testing, etc., shall be included in the Contract bid price, which shall also include all labor, materials, equipment, tools, and incidental costs required to complete the work.

GENERAL

RELATED DOCUMENTS

General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.

Asbestos Cement Pipe (ACP) Project Checklist; refer to the form at the end of this Section.

Item 183.5 – Soil and Waste Management

SCOPE OF WORK

Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of identified or assumed asbestos-cement pipe (ACP) and asbestos-containing waste material (ACWM) specified herein, and required to complete the installation of the replacement piping as shown on the drawings. The Contractor’s work shall be performed with qualified persons with appropriate worker training in accordance with MADLS Regulation 453 CMR 6.00. Alternatively, work involving the removal of non-friable, asbestos-cement pipe may be performed by workers with (minimum) MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.

The Contractor shall inform and include the Owner in all communications with any regulatory authorities during the project or having to do with the project. This includes initial asbestos notification (ANF-001) filing and any changes to the notification (e.g., end date extensions, project closure, quantity changes, etc.).

If suspect ACP is uncovered during the course of excavation, the Contractor shall cease all excavation activities and consult with the Resident Engineer and Framingham DPW before proceeding.

PROJECT DESCRIPTION

The Work includes removal, packaging, transporting, and disposing ACP and ACWM, as identified herein, conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class II work. This shall include all necessary excavation to access ACP for removal.

Materials, as discovered outside of those listed (either above or below), will be measured and paid or credited by unit prices to be negotiated prior to commencement of the Work. The quantities are estimates only and should be field-verified by the Contractor.

The following table summarizes the locations of the Work with estimated ACP quantities. Note quantities provided below are order-of-magnitude estimates only. Refer to drawings for specific locations of known/assumed ACP.

MATERIAL TYPE	LOCATION	QUANTITY	NOTES
Asbestos-Cement Pipe Removal	None Identified	NA	

CY = Cubic Yards; LF = Linear Feet;

Notes:

A portion of the Work may be performed in multiple mobilizations, at different periods of time, in conjunction with other utility/road work.

The Contractor shall be responsible for providing temporary water, power, heat (as needed), and trench shoring at the Site to perform the Work.

DEFINITIONS

The following definitions relative to ACP abatement apply:

1. Amended Water: Water to which a surfactant (wetting agent) has been added.
2. Asbestos: The name given to a number of naturally-occurring, fibrous silicates. This includes the serpentine and the amphiboles forms, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically-altered.
3. Asbestos Cement Pipe (ACP): Fiber-reinforced cement pipe where the reinforcing fibers are asbestos.
4. Asbestos Competent Person: One who is capable of identifying existing asbestos hazards and selecting the appropriate control strategy for asbestos exposure and who has the authority to eliminate them.
5. Asbestos-Containing Waste Material (ACWM): Any friable ACM removed during a demolition/renovation project and anything contaminated in the course of a demolition/renovation project including asbestos waste from control devices, bags or containers that previously contained asbestos, contaminated clothing, materials used to enclose the work area during the demolition/renovation operation, and demolition/renovation debris.
6. Asbestos Notification Form (ANF-001): Official form used to notify MassDEP and MADLS prior to the start of an asbestos abatement project.
7. Asbestos Project Designer: The MADLS-certified Asbestos Project Designer.

8. Asbestos Project Monitor: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring, personal protection equipment, and ACP removal procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
9. Asbestos Supervisor: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Supervisor.
10. Asbestos Work Area: A regulated area, as defined by OSHA Title 29 CFR, Part 1926.1101, where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated areas for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
11. Asbestos Worker: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Worker, or any person who has completed a MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
12. Consultant: A company, retained by the Owner, to provide services enumerated in this Section during asbestos removal activities.
13. Contractor: Company with qualified persons with appropriate worker training in accordance with: MADLS Regulation 453 CMR 6.00; or MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
14. Deteriorated ACP: ACP that is crushed, flattened, or pulverized as determined by the Contractor's Asbestos Competent Person.
15. EPA: The United States Environmental Protection Agency.
16. HEPA Filter: High-Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.
17. HEPA-Vacuum Equipment: Vacuum equipment where all the air drawn into the machine is expelled through a HEPA filter with none of the air leaking past it and with a HEPA-filter as the last filtration stage.
18. MADLS: The Commonwealth of Massachusetts Department of Labor Standards.
19. MassDEP: The Commonwealth of Massachusetts Department of Environmental Protection.
20. Negative Exposure Assessment: A demonstration by the Contractor that Asbestos Worker exposure during an operation is or will be consistently below the PEL.
21. NESHAP: National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.
22. Non-Friable ACM: Any material that contains > 1% asbestos as determined using the method specified in EPA Title 40 CFR, Part 763, Appendix A, Subpart F, Section 1, via PLM, or is presumed to contain asbestos, that cannot be crumbled, pulverized, or reduced to powder by hand pressure (when dry).
23. OSHA: The Occupational Safety and Health Administration.

24. Owner: Framingham Department of Public Works.
25. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers/cc of air as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc of air averaged over a sampling period of thirty (30) minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.
26. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 - 265).
27. Regulated Area: An area established by the employer to demarcate where Class II asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate.
28. Site: Property address and facility included on Asbestos Notification Form ANF-001 as required for notification of the Work.
29. Supervisor: Competent person with appropriate 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
30. Surfactant: A chemical wetting agent added to water to improve penetration into ACM.
31. Temporary ACWM Storage Location (TASL): Secure, Owner controlled area located within Framingham, Massachusetts where the Contractor shall maintain a suitable covered, locked container(s), used for the storage of ACWM for 30 days or less (from project completion) prior to transportation and disposal of ACWM at final receiving facility.
32. TWA: Time-Weighted Average.

CONSULTANT

The Owner shall retain a third-party, firm for the purposes of overseeing the Contractor and advising the Owner on all asbestos handling compliance requirements. The Consultant will represent the Owner during the removal project. The Contractor will regard the Consultant's direction as authoritative and binding, as provided herein, in matters particularly, but not limited to, the following:

1. Work area approval.
2. Monitoring results review.
3. Completion of various work segments.
4. Final abatement completion.
5. Data submission.
6. Daily field punch-list items.

USE OF THE CONTRACT DOCUMENTS

It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.

All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.

It is not intended that this Section show every detail of the Work, but the Contractor shall be required to furnish, within the Contract Sum, all material and labor necessary for the completion of the Work in accordance with the intent of this Section.

In case of ambiguity among the Contract Documents, the more stringent requirement, as determined by the Consultant, shall prevail.

The Work includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts.

All items not specifically mentioned in the Contract Documents, but implied by trade practices to complete the Work, shall be included.

SITE EXAMINATION

It is understood that the Contractor has examined the Site, and reviewed information made available by Framingham DPW relating to assumed ACP, to make their own estimates of the existing conditions and difficulties attending to the execution of the Work and has based their price thereon.

CONTRACTOR QUALIFICATIONS

The Contractor (including their proposed subcontractors) shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year of similar size and scope. The Contractor shall list the experience and training of the Asbestos Supervisor (or Supervisor) and the Asbestos Abatement Workers (or Trained Workers). The information that should be included is as follows:

1. Project Name and Address
2. Owner's Name and Address
3. Consultant's Name
4. Summary of work
5. Contract Amount
6. Date of Completion
7. Extras and Changes

The Contractor selected must employ workers who have received the (at a minimum) MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course. MADLS-certified Asbestos Workers (32-hour Asbestos Worker training) are also qualified to perform this work. At least one asbestos trained workers shall be on-site when any excavation work is being conducted.

1. If the Contractor intends to use an Abatement Subcontractor, the Contractor shall ensure the Subcontractor meets all contractor requirements established herein.

ADDITIONAL GENERAL REQUIREMENTS

The Contractor shall employ an Asbestos Competent Person, with experience on projects of similar scope and magnitude, who shall be responsible for all work involving ACP removal (as described in the Contract Documents and defined in applicable regulations) and have full-time, daily supervision of the Work during excavation activities.

If required by federal, state, local, or any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this contract to be inspected. The Contractor shall immediately notify the Owner and Consultant and shall maintain written evidence of such inspection for review by the aforementioned parties.

The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.

The Contractor shall immediately notify the Owner and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or of occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the aforementioned parties for verification and recording.

SUBMITTALS

The Contractor shall submit the following Asbestos Work Plan to the Consultant, in one complete package, prior to the pre-construction meeting and at least ten (10) business days before the start of the Work:

1. Submit a schedule to the Owner and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final visual inspection.
2. Submit copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
3. Submit the name and address of the hauling contractor and the landfill to be used. Also, submit current, valid operating permits and certificates of insurance for the transporter and landfill.
4. Submit a detailed, site-specific work plan including, but not limited to, work area isolation and removal methods.
5. Submit the training certificate, medical and respirator fit test records, and current, valid MADLS certification of each employee who may be on the Site (as applicable).

6. If the Contractor's Asbestos Competent Person is not conducting OSHA-required employee exposure monitoring, submit the name, address, and qualifications of the air sampling professional that the Contractor proposes to use on this project for this task. The Contractor shall note if this does not apply. Alternatively, the Contractor may submit a Negative Exposure Assessment performed within the last 12 months that documents that personnel were not exposed to asbestos levels above the established PEL.
7. Submit the name, address, and qualifications of proposed laboratories intended to be utilized for Contractor personal air sampling analysis as required by this Section (if applicable).
8. Submit detailed product information on all materials and equipment proposed for ACP removal work on this project.
9. Submit pertinent information regarding the qualifications of the Asbestos Competent Person for this project.
10. Submit a chain-of-command for the project. The chain-of-command should include the name, title, and contact number for each person listed.
11. Unless submitted as part of the Contractor's Emergency Response Plan, submit a site-specific emergency response information for the project. The emergency response information may include emergency procedures to be followed by Contractor personnel to evacuate the Site, hospital name and phone number, most direct transportation route from the Site, emergency telephone numbers, etc. If this information is contained within an Emergency Action Plan prepared by the Site's General Contractor, a copy shall be submitted for review.
12. Submit a written, site-specific Respiratory Protection Program for employees undertaking the Work, including make, model, and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable). The Contractor shall note if the Respiratory Protection Program is not required at the Site (i.e., Negative Exposure Assessment completed within the last 12 months).
13. Submit a worker orientation plan that, at a minimum, includes a description of asbestos hazards and removal methodologies, a review of worker protection requirements, and the outline of safety procedures.

No work on the Site will be allowed to begin until the Owner and the Consultant approve the Asbestos Work Plan. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.

The Contractor shall be responsible for submitting the abovementioned submittal requirements for subcontractors hired by the Contractor to address ACP.

The Contractor shall submit the following to the Consultant during the Work:

1. Copies of training, MADLS certifications, respirator fit test records, and medical records for new employees to start work 24 hours in advance of the new employee arriving at the Site (as applicable).

The Contractor shall submit the following to the Consultant during the Work on a daily basis (refer to Part 4 in this Section):

1. Completed Asbestos Cement Pipe (ACP) Project Checklist (Form 1).
2. Completed TASL Daily Transport Form (Form 1A).

The Contractor shall submit the following to the Consultant at the completion of the Work. The Owner reserves the right to retain payment(s) until all items are received in completion:

1. Original final completed copies of the WSR, signed by all transporters and the designated disposal site owner/operator within 30 days.
2. Original final completed copies of weight tickets, recycling tickets, and manifests for all specified materials.
3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, MADLS certifications, medical records, and respirator fit test records (as applicable).
4. Copies of all OSHA personal air monitoring results.

REGULATIONS AND STANDARDS

The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:

1. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M).
2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E).
3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101).
4. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 - 180).
5. MassDEP Asbestos Regulations (310 CMR 7.00 and 7.15).
6. MassDEP Asbestos Cement Pipe Guidance Document and Conditional Enforcement Discretion, June 2011, amended May 22, 2015.
7. MADLS "The Removal, Containment or Encapsulation of Asbestos" Standards for Asbestos Abatement (453 CMR 6.00).
8. Life Safety Code, National Fire Protection Association (NFPA).
9. Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

EXEMPTIONS

Any deviations from the Contract Documents require the written approval and authorization from the Owner and Consultant. Any modifications from the standard work practices identified in MADLS Regulations 453 CMR 6.00, or MassDEP Regulations 310 CMR 7.15, or MassDEP Asbestos Cement Pipe Guidance Document and Conditional Enforcement Discretion, June 2011, amended May 22, 2015, must be requested in writing and approved in writing by both regulatory agencies.

When conditions deviate from the conditions and work practices established herein, the Contractor shall immediately stop work.

A Non-Traditional Asbestos Work Plan (NTWP) will be required if any of the following are required or occur during the project:

1. Bulk loading of soil
2. Cleanup of contaminated soil stockpile
3. Any other occurrence outside of the conditions and work practices described herein, or at the City of Framingham's discretion.

NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

Planned Work

1. The Contractor shall make the following notifications and provide the submittals to the following agencies prior to the start of work. Submissions may be made electronically on eDEP File. This notification is required ten (10) calendar days prior to the start of the abatement project. Upon submission, a copy of the notification shall be provided to the Consultant. The supervisor and laboratory information submitted on the form must be accurate or a revision will be required.
 - a. Commonwealth of Massachusetts Department of Environmental Protection
Asbestos Program
Enforcement Division
P.O. Box 4062
Boston, MA 02211
 - b. Commonwealth of Massachusetts Department of Labor Standards
19 Staniford Street, 2nd Floor
Boston, MA 02114

The minimum information included in the notification to these agencies includes:

- a. Work location/address.
- b. Name of Supervisor (Asbestos Competent Person).

- c. Work type (water, sewer, drain, etc.)
- d. Amount of asbestos to be removed.
- e. Work schedule, including proposed start and completion date.
- f. Asbestos removal procedures to be used.
- g. Name and location of disposal site for generated asbestos waste, residue, and debris.

If the ACP quantity exceeds the estimated total by more than 20%, a new asbestos notification (ANF-001) will be required.

Emergency Notification

1. The Contractor shall request and receive the Owner's approval before filing an Emergency Asbestos Notification with MassDEP.
2. In Consultation with the Owner, the Contractor shall adhere to the following procedures when filing an Emergency Asbestos Notification Form (ANF-001).
 - a. The Contractor shall contact the MassDEP Northeast Section to obtain an emergency waiver number.
 - b. If no one responds at MassDEP, the Contractor shall leave a phone/email message with the following information:
 1. Work location/address;
 2. Contractor contact information;
 3. Work type (water, sewer, drain, etc.); and
 4. Methodology for ACP removal (reference ASBESTOS CEMENT PIPE GUIDANCE DOCUMENT AND CONDITIONAL ENFORCEMENT DISCRETION, June 2011, amended May 22, 2015)
 - c. MassDEP will issue a project specific waiver number that shall be included in the Notification.
 - d. If no project specific waiver number is issued within 24-hours, the Contractor shall again contact the MassDEP Northeast Section.
 - e. The Contractor shall provide the waiver number to the Owner.
 - f. The Contractor shall provide the Owner with a copy of the filed ANF-001.

WORK SITE SAFETY PLAN

The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:

1. Injured worker evacuation.
2. Emergency and fire exit routes from all work areas.
3. Emergency first aid treatment.
4. Local telephone numbers for emergency services including ambulance, fire, and police.
5. A method to notify persons on a public right-of-way, or at adjacent private properties, in the event of an emergency requiring area closures.

The Contractor shall be responsible for training all workers in these procedures.

CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

The Contractor shall independently retain an air-sampling professional or the Asbestos Competent Person shall monitor total airborne fiber concentrations in the worker breathing zones to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101 (if applicable). Alternatively, a Negative Exposure Assessment completed within the last 12 months can be submitted.

The Contractor's air sampling professional shall document all air sampling results and provide a report to the Owner or Consultant within 48 hours after sample collection (if applicable).

All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101 (if applicable).

PROPER WORKER PROTECTION

This Subsection describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:

1. Methods of recognizing asbestos
2. Health effects associated with asbestos
3. Relationship between smoking and asbestos in producing lung cancer
4. Nature of operations that could result in exposure to asbestos
5. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
 - a. Engineering controls
 - b. Work Practices
 - c. Respirators
 - d. Housekeeping procedures
 - e. Hygiene facilities
 - f. Protective clothing
 - g. Decontamination procedures
 - h. Emergency procedures
 - i. Waste disposal procedures
6. Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
7. Appropriate work practices for the work

8. Requirements of medical surveillance program
9. Review of OSHA Title 29 CFR, Part 1926
10. Pressure Differential Systems
11. Work practices including hands on or on job training
12. Personal Decontamination procedures
13. Air monitoring, personal and area

The Contractor shall provide medical examinations (as required for respirator use) for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA.

The Contractor shall maintain control of, and be responsible for, access to all work areas to ensure the following requirements:

1. Non-essential personnel are prohibited from entering the Regulated Area.
2. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with this specification Section.
3. Any materials, equipment, or supplies that are removed from the Regulated Area shall be thoroughly cleaned and decontaminated by wet-cleaning methods and/or HEPA vacuuming of all surfaces.

PRODUCTS

MATERIALS

Deliver all materials in the original packages, containers, or bundles bearing the brand name, manufacturer name, and product technical description.

The Contractor shall have a sufficient inventory of, or dated purchase orders for, materials necessary for the Work (e.g., protective clothing, respirators, respirator filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, spray adhesive, air filters, etc.).

Damaged or deteriorating materials are not permitted for use and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as ACWM.

Poly sheeting (packaged in a roll to minimize the frequency of joints) shall be delivered to the Site with factory label indicating four (4) or six (6)-mil thickness.

Poly disposable bags shall be 6-mil with OSHA-required pre-printed labels (OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii)).

Tape or adhesive spray shall be capable of sealing joints in adjacent poly sheeting, and shall be able to attach poly sheeting to finished or unfinished surfaces of dissimilar materials. Tape and adhesive spray shall also be capable of adhering under both dry and wet conditions (including use of amended water).

Surfactant (wetting agent) shall consist of fifty percent (50%) polyoxyethylene ether and 50% polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of 1 ounce surfactant to 5 gallons of water, or as directed by manufacturer.

The Contractor shall have spray equipment capable of mixing wetting agent with water. Spray equipment shall be capable of generating sufficient pressure and volume; the hose length must reach all areas within the Regulated Area.

Impermeable containers shall be used to receive and retain any asbestos-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii) [June 1, 2015 requirements]. Containers must be airtight and watertight.

Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used.

TOOLS AND EQUIPMENT

The Contractor shall provide all clean tools and equipment necessary for asbestos abatement activities.

If required/requested by Framingham DPW, the Contractor's air monitoring professional or Asbestos Competent Person shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly and air samples shall be calibrated with a recently calibrated (within 6 calendar months) rotometer.

The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work, including protective clothing, respirators, respirator filter cartridges, poly sheeting of proper size and thickness, tape, spray adhesive, and air filters.

The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and/or electrical power sources (e.g., generators, etc.).

The Contractor shall be responsible for coordinating electrical and water services, and shall pay for these services for the duration of the project (if applicable).

The Contractor shall assist the Consultant by providing necessary tools and equipment (e.g., coveralls, ladders, extension cords, lighting, etc.) for the Consultant to perform project monitoring activities (e.g., final visual inspection(s), etc.). The Consultant reserves the right to reject such items that are deemed unsafe and/or do not function properly, and may request items be replaced with adequate replacements. The work areas must be safe to enter/occupy by the Consultant at all times.

HEPA-Vacuum Equipment, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

EXECUTION

PRE-CONSTRUCTION MEETING

A pre-construction meeting may be scheduled prior to the start of Work. The Contractor must attend this meeting (as required by the Owner); the assigned Asbestos Competent Person must also attend this meeting.

The Contractor shall present a detailed project schedule and project submittals at the pre-construction meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.

Following the pre-construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

The Contractor shall complete Form 1 and Form 1A as required for the duration of the project to document proper work practices(see attached at end of Section).

WORK AREA PREPARATION

The Contractor shall demarcate the work area by restricting access to authorized personnel.

The Contractor shall expose the pipe in a manner that will minimize the risk of making it friable or releasing asbestos dust into the environment.

The Contractor shall start by exposing the ACP with minimal disturbance by excavating no closer than 6 inches of the pipe.

The Contractor shall carefully uncover the remainder of the soil surrounding the pipe by hand or shovel.

The Contractor shall stockpile the excavated soil adjacent to the excavation in accordance with OSHA set-back requirements.

The Contractor's Asbestos Competent Person shall assess the ACP to determine if it is damaged, cracked, or broken.

Regardless of ACP assessment, the Contractor shall place 6-mil thick poly sheeting under the ACP to prevent soil contamination. Note that if the excavation is filled with water, the placement of poly sheeting is not required.

ACP REMOVAL PROCEDURES – INTACT ACP

The Contractor shall have an Asbestos Competent Person on the Site at all times to ensure proper work practices are followed throughout the project.

If a Consultant is retained for pre-abatement services, abatement work shall not commence until authorized by the Consultant.

Prior to the removal of ACM, the Contractor shall ensure that work area preparations have been conducted in accordance with applicable Subsections of this Section.

The Contractor shall adequately wet the full-length of exposed ACP with amended water before and during removal.

The Contractor shall separate ACP at the nearest coupling (i.e., bell or compression fitting), if possible.

The Contractor shall prepare the excavation for saw cutting of intact ACP. Note that if breakage or cutting of the ACP is required, the procedure in Damaged ACP section (3.05) shall be followed.

Slide the ACP 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.

Wrap the wet ACP in two layers of 6-mil poly sheeting, seal with duct tape, and label in accordance with the requirements set forth in this Section. Note this work can be done in the excavation or adjacent to the excavated area.

Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work area at an appropriate time in the cleaning sequence.

At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections verify decontamination.

After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person or Asbestos Project Monitor. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation.

ACP REMOVAL PROCEDURES – DAMAGED ACP

If visible ACP debris is observed in the excavation, the Contractor shall remove it with (minimum) one inch of underlying soil and disposed of as ACWM.

1. Soil must be containerized in 6-mil poly bags or drums lined with 6-mil poly. Bulk loading of soil is not permitted without MassDEP approval of a non-traditional asbestos work practice.

Adequately wet full-length of exposed ACP with amended water before and during removal.

Saw cutting of ACP shall only be conducted with approved wet-cutting equipment (ICS or Wachs Guillotine).

Wrap wet ACP in two layers of 6-mil poly sheeting, seal with duct tape, and label.

Manage wrapped ACP, poly, and any other material contaminated with visible asbestos debris as ACWM.

Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work area at an appropriate time in the daily cleaning sequence.

At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections verify decontamination.

After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person or Asbestos Project Monitor. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation.

SOIL CONTAINING ACP FRAGMENTS – BEFORE LOADING

If soil is observed to contain ACP fragments before it is loaded, the Contractor shall containerize the soil in 6-mil poly bags or lined drums and handle it as ACWM in accordance with this Section.

If containerization is not feasible, the Contractor shall contact the Consultant and City of Framingham Project Manager to contact MassDEP to approve an NTWP to address the bulk loading of contaminated soil.

SOIL CONTAINING ACP FRAGMENTS – AFTER LOADING

If soil is observed to contain ACP fragments after it has been loaded onto the Contractor's vehicle the Contractor shall immediately cease loading operations.

The Contractor shall secure the vehicle and the soil shall be covered with poly sheeting or tarpaulin.

The Contractor's Asbestos Competent Person shall inform the Consultant and City of Framingham Project Manager.

The Contractor shall transport the soil to a designated TASL (at the direction of the City of Framingham Project Manager).

The Contractor shall transfer the soil onto poly sheeting or tarpaulin in a manner that does not raise dust.

The Contractor shall cover the soil stockpile with poly sheeting or tarpaulin.

The Contractor shall ensure the soil is disposed of as directed by the Consultant and City of Framingham Project Manager.

SOIL CONTAINING ACP – OFF-SITE STOCKPILE LOCATION

If soil is observed to contain ACP fragments after it has been transferred to the Contractor's off-site temporary location, the Contractor shall cease operations impacting the stockpile.

The Contractor shall cover the stockpile with poly sheeting or tarpaulin.

The Contractor shall contact the Consultant and City of Framingham Project Manager.

The Contractor shall proceed at the direction of the Consultant and City of Framingham Project Manager.

ASBESTOS CEMENT PIPE TAPPING

The Contractor shall place 6-mil poly sheeting under the ACP to prevent soil contamination.

The Contractor shall adequately wet the ACP with amended water before tapping to avoid creating airborne dust.

The Contractor shall dispose of any material contaminated with visible asbestos debris as ACWM.

DEWATERING

If water is observed within an excavation, the Contractor shall try to pump the water out of the excavation to expose the ACP.

The Contractor shall assess the condition of the ACP and determine whether it is intact or deteriorated.

If ACP is intact the Contractor shall pump the water from the excavation and discharge it to the closest storm drain.

If the ACP is broken or deteriorated, the Contractor shall pass the standing water (after initial pump and discharge to storm drain) through a 5-micron filter before being discharged to the closest storm drain. The filter shall then be disposed of as ACWM.

CONSULTANT'S/CONTRACTOR'S INSPECTION RESPONSIBILITIES

The Contractor's Asbestos Competent Person or the Owner's Resident Engineer may conduct inspections throughout the progress of the removal project. Inspections will be conducted to document the removal work progress, as well as the Contractor's procedures and practices.

The Contractor's Asbestos Competent Person or the Owner's Resident Engineer may perform the following inspections during abatement activities:

1. Pre-Commencement Inspection: If required or retained for this service, pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
2. Work Area Inspections: If required or retained for this service, work area inspections shall be conducted on a daily basis, at the discretion of the Consultant. During the work inspections, the Consultant's Asbestos Project Monitor shall observe the Contractor's removal procedures, assess project progress, and, if deficiencies are noted, inform the Contractor of specific remedial activities.

The Contractor's Asbestos Competent Person or the Owner's Resident Engineer shall perform the following inspections after removal activities are completed:

Final Visual Inspection: When removal is complete, the Contractor's Asbestos Competent Person or the Owner's Resident Engineer will conduct a final visual inspection inside each excavation. The Consultant shall be informed 24 hours prior to the time that the inspection is needed. After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation. If residual debris is identified during the final visual inspection, the Contractor shall re-clean the excavation to meet the "no visible, suspect dust or debris" standard.

TEMPORARY ASBESTOS STORAGE LOCATION (TASL)

All ACP waste material shall be transported to the Owner's Temporary Asbestos Storage Location (TASL)(229 Arthur Street, Framingham, MA).

The Contractor shall provide a locked, covered, and labeled dumpster for the storage of ACP waste.

The Owner shall provide space at the TASL for the Contractor's waste dumpster.

The Owner will provide access to the secured TASL through the Resident Engineer.

The Contractor shall be responsible for the 30-day disposal deadline and final transport to an approved disposal facility.

ASBESTOS DISPOSAL

ACM and/or ACWM disposal (including supplies, rags, disposable clothing, respirator filter cartridges, etc.) shall be completed in accordance with MassDEP and EPA regulations. Waste receptacles (bags, drums, etc.) shall be labeled in accordance with the most current OSHA regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101) and contain the following:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

Disposal site approvals shall be obtained and accepted prior to the start of asbestos removal activities.

A copy of the signed disposal authorization shall be provided to the Owner, Consultant, and any required federal, state, or local agencies.

Copies of all Waste Shipment Records (WSR) shall be provided to the Owner no later than 35 calendar days from when the waste was removed from the Site for inclusion in the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator shall sign the WSR so the quantity of asbestos debris leaving the Site and arriving at the landfill is documented for the Owner.

All wash water and shower water shall be collected and filtered through a five-micron filter before discharge to a sanitary sewer with prior appropriate permitting or publicly-owned treatment works (POTW) approval. Alternately, wash and shower water can be used to moisten ACWM.

All ACWM shall be transported in covered sealed vans, boxes, or dumpsters which are physically isolated from the driver by an airtight barrier. All vehicles must be properly-licensed to meet Commonwealth of Massachusetts and United State Department of Transportation (DOT) requirements.

Any vehicles used to store or transport ACWM will either be removed from the Site at night, or securely locked and posted to prevent disturbance.

Any incident and/or accident that may result in spilling or exposure of ACWM outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

Asbestos Cement Pipe (ACP) Project Checklist

Section 1: Project Details (to be completed each day)		
Date:	Project Name:	PW #:
Project Location: (e.g., street name, intersection, "in vicinity of" address, etc.):		
Who is performing the work? <input type="checkbox"/> DPW <input type="checkbox"/> Other _____		
Is the work planned or an emergency? <input type="checkbox"/> Planned <input type="checkbox"/> Emergency		
What type of work is it? <input type="checkbox"/> Removal/Repair <input type="checkbox"/> Soil Handling <input type="checkbox"/> Tapping <input type="checkbox"/> Lining <input type="checkbox"/> Filling		
Is today the 1st day of the Project? <input type="checkbox"/> Yes <input type="checkbox"/> No (proceed to Section 4)		
Section 2: Pre-Mobilization/Planning Phase		
How was the presence of ACP determined?	<input type="checkbox"/> As-Built drawings <input type="checkbox"/> Visual Identification/Field Observations <input type="checkbox"/> Assumed ACP <input type="checkbox"/> Sample Analysis	
Pre-Renovation/Demolition Survey Completed by:	Name: Company:	Signature: Date:
Qualifications: <input type="checkbox"/> 8-hour OSHA Class II <input type="checkbox"/> MADLS Certified		
Section 3: Notification		
Asbestos Project Number:	Emergency Waiver/NTP Number: (if applicable)	
ACP Quantity Estimate: [Refer to ANF-001 Section A(14)]	Impacted soil? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, _____CY (as ACWM)	
Project Start Date:	Project End Date:	
Notification Filed by:	Name: Company:	Date Filed:
Section 4: Work Site		
Asbestos Qualified Person:		
Company: <input type="checkbox"/> DPW <input type="checkbox"/> Other _____		
SOP Excavation Procedures Followed: <input type="checkbox"/> Yes <input type="checkbox"/> No, explain:		

COMPENSATION

Measurement for Payment for Item 183.3 Asbestos Cement Pipe Removal shall be on the basis of feet and tenths thereof of pipe actually disposed, as measured in the ground prior to removal and at the disposal facility with no variation allowed between the two separate measurements.

Payment for Item 183.3 Asbestos Cement Pipe Removal shall be on the basis of feet of pipe actually disposed, including all labor, materials, facilities, equipment, services, incidentals, employee training and testing, Asbestos Work Plan (AWP), permits and agreements required for handling, excavating, managing and disposing of asbestos cement pipe or asbestos contaminated soil/fill within the excavation limits allowed for on the Contract Documents. The work includes, but is not limited to: remove, handle, and dispose of asbestos cement pipe, segregate, handle, stage, test, and characterize all soil and fill material suspected of containing asbestos-containing materials; all controls necessary to maintain compliance with regulatory requirements relative to asbestos in soils; procuring all health and safety equipment; protecting the excavation from accidental entry; controlling windblown litter and the spread of airborne contaminants; all fees, permits, and taxes; and construct, maintain, and remove a secure asbestos contaminated staging area for stockpiling pending analytical testing, reuse, or disposal.

<u>ITEM 201.</u>	<u>CATCH BASIN (SINGLE GRATE CATCH BASIN)</u>	<u>EACH</u>
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Description

The work to be done under this item shall conform to the relevant provisions of Section 201 of Standards Specifications, Section 4.6 of the City Construction Standards and the following:

Construction Methods

The work shall consist of constructing catch basins with single grates and 4' deep sumps. Catch basins shall be constructed as shown in in the Plans

All proposed catch basins shall be constructed on a bedding of 12 inches of crushed stone. Crushed stone for bedding shall be in conformance with MassDOT Materials Section M2.01.1. Crushed stone will be paid under Item 156.

When utility conflicts are encountered alternate offset cones or flat slabs designed to meet or exceed H-20 loading shall be used in place of the standard cone section at no additional cost. Offset cones and flat tops

All castings located within the pavement area shall not be set to finished grade until after the binder course has been placed. The tops of the grates shall be set 1/8 inch below finish grade.

All frames shall be set in a concrete collar conforming to Framingham Construction Standard Detail D-4.3.1 prior to placement of the top course pavement.

Method of Measurement

Catch Basins will be measured as complete units per each, regardless of depth.

Basis of Payment

Catch Basins will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

The castings for the catch basins shall be paid for under Item 222.3, Frame and Grate (or Cover) Municipal Standard.

Hoods will be paid for under Item 224.12

<u>ITEM 202.5</u>	<u>MANHOLE (5 FOOT DIAMETER)</u>	<u>EACH</u>
<u>ITEM 202.6</u>	<u>MANHOLE (6 FOOT DIAMETER)</u>	<u>EACH</u>
<u>ITEM 202.7</u>	<u>MANHOLE (7 FOOT DIAMETER)</u>	<u>EACH</u>

Description

The work will consist of the construction of drain manholes of various diameters and shall conform to Section 201, 901 and Materials Sections M4 and M8 of the Standard Specification, Section 4.6 of the City Construction Standards and/or amended as follows:

Construction Methods

Drain manholes shall be precast concrete conforming to the latest ASTM Specifications for precast reinforced concrete sections (ASTM C478). Concrete shall have a minimum compressive strength of 4,000 psi. Reinforcing steel shall conform to the latest ASTM A185 Specifications. The manhole shall be capable of supporting an HS-20 load.

The joints of precast manhole sections shall be sealed with either a round rubber "O"-ring gasket or a flexible joint sealant. The "O"-ring shall conform to ASTM C443.

The cone sections of manholes shall be replaced with flat tops sections, when approved by the Engineer, at no additional cost.

The manhole shall be placed on a bedding of 12 inches of crushed stone.

The manhole casting shall be a standard frame and cover. The cover shall be marked "FRAMINGHAM DRAIN".

All castings located within the pavement area shall not be set to finished grade until after the binder course has been placed. Adjustment to grade for frame and cover shall be made using courses of brick conforming to ASTM C32, Grade 55, or by use of precast concrete rings conforming to

ASTM C478. The tops of frames and covers shall be set 1/8 inch below finish grade in paved areas.

All frames shall be set in a concrete collar conforming to Framingham Construction Standard Detail D-4.3.1 prior to placement of the top course pavement. The cost of the concrete collar shall be included in the unit price bid for this item.

Method of Measurement

These items will be measured as a complete unit per each, regardless of depth.

Basis of Payment

These items will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

Castings will be paid for under Item 222.3 Frame and Grate (or Cover) Municipal Standard.

Crush stone for bedding shall be paid for under Item 156. Crushed Stone.

ITEM 202.8

MANHOLE WITH DEEP SUMP

EACH

Description

The work to be done under this item shall conform to the Contract Documents, the relevant provisions of Section 201 and the following:

Construction Methods

Manholes With Deep Sump shall be precast concrete conforming to the latest ASTM Specifications for precast reinforced concrete sections (ASTM C478). Concrete shall have a minimum compressive strength of 4,000 psi. Reinforcing steel shall conform to the latest ASTM A185 Specifications. The manhole shall be capable of supporting an HS-20 load.

Deep Sump Manholes shall be precast concrete structures with a 4 foot sump and shall be provided with hood on the outlet pipe as shown on the detail sheet. Hoods will be paid under Item 224.12. Frame and cover shall conform to and be paid for under Item 222.3 Frame and Grate (or Cover).

The joints of precast manhole sections shall be sealed with either a round rubber "O"-ring gasket or a flexible joint sealant. The "O"-ring shall conform to ASTM C443.

Backfilling for Deep Sump Manholes shall consist of suitable materials uniformly distributed and thoroughly compacted in conformance with relevant provisions of Sections 150 and 200 of the Standard Specifications. The structures shall be constructed on a bedding of 12 inches of crushed stone.

The cone sections of deep sump manholes shall be replaced with flat tops sections, when approved by the Engineer, at no additional cost.

All castings located within the pavement area shall not be set to finished grade until after the binder course has been placed. The tops of frames and covers shall be set 1/8 inch below finish grade in paved areas.

All frames shall be set in a concrete collar conforming to Framingham Construction Standard Detail D-4.3.1 prior to placement of the top course pavement. The cost of the concrete collar shall be included in the unit price bid for this item.

Method of Measurement

This item will be measured by the unit each, regardless of required depth. There shall be no additional compensation for the deep sump.

Basis of Payment

This item will be paid for at the Contract unit price per each, which shall be full compensation for all excavation, labor, materials, equipment and incidentals necessary to complete the work.

ITEM 222.3 FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD EACH

Description

Work under this Item shall conform to the relevant provisions of Section 220 of the Standard Specifications and the following:

Construction Methods

Frames and grate (or cover) shall be from a manufacturer on MassDOT's Qualified Construction Materials List.

Manhole frames and covers shall be minimum Class 25 conforming to ASTM "Standard Specification for Gray Iron Castings," Designation: A48. Manhole frame shall have a clear opening of 26 inches and be a minimum of 6 inches in height. The words "FRAMINGHAM DRAIN" shall be prominently cast in the top of all drain manhole covers.

Catch basin grates shall be bicycle safe with a 24-inch square grate and an 8-inch heavy duty frame. Grates shall have the following wording cast into the outside borders: "Dump No Waste" and "Drains to Waterway". Text shall be bold capital letters, at least 1 inch high. Placement may be as per manufacturer.

The tops of frames and grates/covers shall be set 1/8 inch below finished grade in paved areas.

Each frame and grate and/or cover shall also be encased with a concrete collar as shown in the Framingham Construction Standard Detail D-4.3.1 and shall be included in the cost of the frame and cover.

Method of Measurement

Frame and grate (or cover) municipal standard will be measured per each with one unit measured as the frame with grate or cover.

Basis of Payment

Frame and grate (or cover) municipal standard will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 223.1

FRAME AND GRATE (OR COVER) REMOVED AND STACKED

EACH

Description

The work under this Item shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

Construction Methods

The existing frames and grates or covers from existing structures shown on the Plans to be abandoned, removed, or changed in type, shall be removed and stacked unless, in the judgment of the Engineer, they are unsuitable for salvage. Unsuitable frames, grates and covers shall become the property of the Contractor and shall be legally disposed of off the site at no additional cost to the Owner. New frames, grates, and covers shall be furnished and installed for new structures and change in type structures, and paid for under their respective items.

Existing frames and grates or covers owned by the Municipality shall be removed, transported, unloaded, and stacked at the Municipality's Department of Public Works Yard as required by the Engineer.

Method of Measurement

Frame and Grate or Cover Removed and Stacked will be measured for payment per each for each existing structure whose frame and grate or cover was actually removed and stacked (or discarded).

Basis of Payment

Payment for work to be done under this Item will be at the unit price bid each which price will be full compensation for removing, transporting, and stacking of the frames and grates or covers.

ITEM 224.12

12 INCH HOOD

EACH

Description

Work under this item shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

Hoods shall be “Eliminator” by Ground Water Rescue, Inc., “Snout” by Best Management Products, Inc., or “Ultra-Oil & Debris Blocker” by Ultra-Tech International, Inc., or approved equal.

Hoods shall be installed as shown on the plans.

Method of Measurement

This item will be measured for payment per each for hood installed, complete in place.

Basis of Payment

Payment for this Item will be at the unit price bid each which price will be full compensation for all labor, materials, equipment, and incidental costs necessary to complete the work

ITEM 357.12

12 INCH GATE BOX

EACH

Description

Work under this item shall conform to the relevant provisions of Section 301 of the Standard Specifications, Section 2 of the City Construction Standards and the following:

Construction Methods

Gate boxes shall be extra grade grey iron and of the adjustable sliding, heavy-pattern type and shall be provided at main valves, branch-line valves, and at other locations, as specified. The gate boxes shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valves and shall be centered and plumb over the wrench nut of the valves with the box cover flush with the surface of the finished pavement or such other level as may be directed.

The top section shall be 24 inches in height and the bottom shall be 36 inches in height. The upper or sliding section of the box shall be provided with a top flange having sufficient bearing area to prevent undue settlement.

The lower section of the box shall have a bell shaped bottom to enclose the operating nut and stuffing box of the valve and fit over the valve bonnet, without bearing on the valve bonnet, and rest on the backfill.

The boxes shall be adjustable through at least 6 inches vertically without reduction of lap between sections to less than 4 inches. The length shall be as necessary to suit ground elevation. The inside diameter of the boxes shall be at least 4.5 inches.

Covers shall be close fitting and substantially soil-tight. The top of the cover shall be flush with the top of the box rim. The word "WATER" and the word "OPEN", with an arrow indicating the direction of opening valve shall be prominently cast in the top of the cover. The gate box extension shall be 12 to 15 inches in length. The extension shall be extra grade grey iron and shall fit on the top of the bottom section of the gate box.

Castings for valve boxes shall be strong, tough, even grained, and without defects. The gate boxes shall be of American manufacture.

Method of Measurement

Gate boxes will be measured per each, complete in place.

Basis of Payment

Gate boxes will be paid for at the Contract unit price per each, which shall be full compensation for all excavation, labor, materials, equipment, and incidental costs necessary to complete the work.

ITEM 376.5

HYDRANT ADJUSTED

EACH

The work under this item shall conform to the relevant provisions of Section 301 Water Systems and the following:

All existing hydrants designated to be adjusted shall be adjusted to meet the proposed grade by adjusting the riser to the appropriate height.

Hydrants noted on the plans to be adjusted shall be carefully removed and temporarily set on blocks to avoid damaging the hydrant. The Contractor shall install a riser extension of the appropriate length and reset the hydrant plumb. Extension sections used to adjust hydrants shall be ductile iron only and shall adapt readily to the existing hydrant and fittings. Extension sections shall also include extensions for the hydrant stem which shall be approved by the City.

The Contractor shall coordinate the work with the City. The Contractor shall give at least 48 hours written notice to the Fire Department and the Department of Public Works prior to adjusting any hydrant.

Method of Measurement

This item shall be measured by the unit each, complete in place.

Basis of Payment

This item will be paid for at the contract unit price per each, which price shall be considered full compensation for all labor, equipment, materials, and incidentals necessary to complete the work.

ITEM 697.1

SILT SACK

EACH

Description

The work under this item shall conform to the relevant provisions of Section 670 of the Standard Specifications and the following:

Materials

The work under this item includes furnishing, installing, maintaining and removing a reusable fabric sack to be installed in drainage structures for the prevention of silt and sediment from the construction site entering the storm water collection system. Devices shall be ACF Environmental (800)448-3636; Reed & Graham Inc. Geosynthetics (800)644-9223; The BMP Store (800)644-9223; or approved equal.

Construction Methods

Silt sacks shall be installed in retained existing and proposed catch basins within the project limits and as required by the Engineer.

The silt sack shall be as manufactured to fit the opening of the drainage structure under regular flow conditions and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as directed by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically to remove and dispose of accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed by the Contractor. The silt and sediment from the silt sack shall be legally disposed of off site. Under no condition shall silt and sediment from the insert be deposited on site and used in construction.

All curb openings shall be blocked to prevent stormwater from bypassing the device.

All debris accumulated in silt sacks shall be handled and disposed of as described in Section 227.

Method of Measurement

Silt sacks will be measured for payment per each, complete in place.

Basis of Payment

Silt sacks will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the insert, but all costs in connection therewith shall be included in the Contract unit price bid.

<u>ITEM 701.</u>	<u>CEMENT CONCRETE SIDEWALK</u>	<u>SQUARE YARD</u>
<u>ITEM 701.1</u>	<u>CEMENT CONCRETE SIDEWALK AT DRIVEWAYS</u>	<u>SQUARE YARD</u>
<u>ITEM 701.2</u>	<u>CEMENT CONCRETE PEDESTRIAN RAMP</u>	<u>SQUARE YARD</u>

The work under these items shall conform to the relevant provisions of Section 701 of the Standard Specifications, Subsection 5.6 of the City Construction Standards and the following:

Fibermesh fibers (100% virgin polypropylene, collated, fibrillated fibers) shall be added to the concrete at a rate of 1.5 lb. per cubic yard of concrete for reinforcement. Installation shall be per manufacturer's recommendations.

The depth of the cement concrete at pedestrian ramps shall be 6 inches.

Detectable warning panels for pedestrian ramps shall be brick red in color.

ITEM 706.01**BRICK PAVER ACCENT STRIP****SQUARE YARD**

The work under this item shall conform to the relevant provisions of Section 701 of the Standard Specifications and the following:

The work under this item shall consist of furnishing and laying of brick paving with hand-tight butt joints swept with a sand/cement mix on mastic adhesive on an asphalt setting bed on a cement concrete base on a gravel base course to the required lines and grades. The finished brick paver surface will have a cross slope to provide for surface drainage, unless otherwise required by the Engineer.

Before proceeding with the work, the Contractor will be required to submit brick samples to the Engineer for approval. Samples of brick shall be submitted in whole straps or panels to show the color range and texture. Before construction is begun a sample panel of at least twenty-five (25) bricks shall be laid as a job site panel to be retained for reference until the project is accepted.

Brick

The bricks shall be for exterior paving, and shall meet or exceed the requirements and allowances of ASTM C-902, Class SX, Abrasion Type I, Application PS.

The bricks shall be wire cut brick pavers and shall be eight inches by four inches by two and one quarter inches (8" x 4" x 2-1/4"). The color shall match the newly constructed Concord St Downtown Reconstruction Project. All materials shall be delivered, stored, and handled to protect them from wetting, staining, chipping, or other damage. Perishable materials shall be stored in watertight sheds with elevated floors. Bricks shall be stored off the ground and under watertight covers. Any material showing evidence of water or other damage will be rejected.

Mastic Adhesive - Adhesive shall consist of 2 percent neoprene (Grade WM1) oxidized asphalt with 155° F. softening point (80 penetration) and 10 percent fibers.

Sand Asphalt Setting Bed - Asphalt cement shall conform to ASTM D 946, penetration grade 85-100. Sand shall be clean, hard sand with durable particles uniformly graded from course to fine and all passing the No. 4 sieve and conforming to ASTM C 144. The asphalt cement and sand shall be mixed at an asphalt plant in the proportion of 7 percent asphalt cement and 93 percent sand. The mix shall be heated to 300° F.

Brick Laying

All brick shall be laid by skilled workmen under adequate supervision, true to lines and levels and patterns. Contractor will take care to select bricks which will allow accurate patterns and uniform joint alignment, especially for corner conditions around tree grate bands.

Cut bricks to provide butt joints with parallel brick edges. Use no brick smaller than one-half size in any dimension for any cut pieces. All brick cutting shall be accomplished with a water-cooled masonry saw only.

The brick paving has been designed to provide adequate drainage at all points. If any condition is encountered between given elevations where drain-off is questionable, the Contractor shall notify the Engineer and not proceed with the work until instructions are given.

Apply asphalt mastic adhesive to the sand asphalt setting bed using a trowel having 1/16-inch serrations.

Set brick with hand-tight joints in the various patterns shown on the drawings. Saw cut brick to fit as required by job conditions. Use machine saw cuts only. Particular care shall be taken to set brick behind existing granite curbing that has been removed and reset to provide a tight fit and to minimize the joint width.

Protect newly installed units with plywood panels against uneven settlement and misalignment and correct any deficiencies. Continually check the surface for finished line and grade with a straight edge. If any settlement occurs that produces a mismatch of more than 1/16-inch at the interface between brick pavements and other pavements prior to final acceptance, relay the bricks near the interface for a sufficient distance to provide a smooth transition of the brick surfaces and to provide a satisfactory match between brick and adjacent surfaces.

Fill joints between bricks with 4:1 sand/cement mix swept into joints until completely filled. Fog surface with water to compact mix into the joints. Repeat the process until joints are compacted and filled. Clean all stains immediately by Steam Jenny with capacity of 150 gallons per hour, 325° F coil temperature, 120 psi.

Method of Measurement

Brick paver accent strip will be measured for payment by the square yard, complete in place.

Basis of Payment

Brick paver accent strip will be paid for at the Contract unit price per square yard, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for setting, bricks, edge restraints, adhesive or joint filler but all costs in connection therewith shall be included in the contract unit price bid for this item.

Excavation, fine grading, cement concrete sidewalk and gravel borrow will be paid for separately under their respective items.

ITEM 706.9 TEXTURED DECORATIVE PAVEMENT CROSSWALK SQUARE YARD

The work under this item includes furnishing and installing imprinted aggregate reinforced preformed thermoplastic pavement markings that replicate brick in a relief surface pattern in hot mix asphalt pavement areas. The work also includes pavement sawcutting, pavement removal and disposal to the limits of proposed imprint areas, pavement surface preparation in the areas to receive the imprint, and protecting the surface until accepted and open to traffic.

Unless otherwise authorized by the City upon the Contractor's assurance that quality will not be compromised, it is assumed that the finish pavement course will be completed prior to the work of this item. Pavement removal refers to sawcutting and removal of that portion of the finished pavement required to install the imprint material.

A 3 foot by 3 foot “mock up” shall be constructed for review and approval by the City and the Engineer. Cost for constructing the “mock up” shall be included in the contractor’s estimate.

Material

Manufacturer: The preformed thermoplastic pavement manufacturer must be ISO 900 1:2008 certified for design, development and manufacturing of preformed thermoplastic, and provide proof of current certification.

Preformed thermoplastic material: The material shall consist of a resilient, aggregate reinforced preformed thermoplastic product which contains a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements and where the top surface contains anti-skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale).

The material shall be supplied in panels typically measuring 2ft x 2ft.

The preformed material must be resistant to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids, etc.

Preformed thermoplastic material shall be composed of an ester-modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements. Pigments and anti-skid/anti-slip elements shall be uniformly distributed throughout the material. The material shall conform to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state, being non-reflective, and potentially being of a color different from white or yellow. The preformed thermoplastic material shall be capable of application at ambient and road temperatures down to 45°F (7°C) without any preheating of the pavement to a specific temperature.

Pigments:

White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6 190 Table 5 and Table 6 as revised and corrected.

Other Colors: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

Skid Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.

Slip Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum static friction coefficient of 0.6 when tested according to ASTM C 1028 (wet and dry), and a minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.

Thickness: The material must be supplied at a minimum thickness of 150 mil (3.8mm).

Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

Storage Life: The material may be stored for 12 months, if stored indoors and protected from the elements.

Transverse Lines to Supplement System Application: Transverse lines shall be supplied as white, retroreflective preformed thermoplastic line stripe material in 90 mil (2.3 mm) or 125 mil (3.2 mm) thicknesses in material widths of 6 in., 8 in. or 12 in.

Packaging: The preformed thermoplastic material shall be packaged in cardboard cartons with a plastic sheet between each layer of preformed thermoplastic. The cartons in which packed shall be non-returnable and shall not exceed 25 in. in length and 25 in. in width. The cartons shall be labeled for ease of identification. The weight of the individual carton must not exceed seventy (70) pounds. A protective film around the carton must be applied in order to protect the material from rain or premature aging.

Construction Methods

Preformed thermoplastic pavement shall only be applied to a stable, high quality asphalt pavement substrate over a stable base that is free of defects. The asphalt pavement substrate surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, deicing materials, and chemical residue.

The area of preformed thermoplastic pavement application shall be sawcut to neat straight lines and the asphalt pavement removed to a uniform depth having a smooth surface approved by the manufacturer's representative prior to application of the material.

The material shall be applied to the asphalt pavement substrate using reciprocating infrared heating equipment. A two-part epoxy sealer shall be applied to the substrate prior to preformed thermoplastic application to ensure proper adhesion and to provide reinforcement for larger volumes of material. A specialized sealer dispensing gun specific to the application shall be used to dispense the required two-part epoxy sealer onto the substrate. Immediately following sealer application, panels of aggregate reinforced preformed thermoplastic shall be positioned properly on the asphalt substrate with the aggregate side facing up. The preformed thermoplastic shall then be heated to the required melting temperature. Additional anti-skid/anti-slip aggregate conforming to the properties of the preformed material aggregate shall be applied to the preformed thermoplastic

surface as needed following the melting process to achieve added friction properties and a uniform surface appearance or if the factory applied anti-skid/anti-slip elements embed too deeply into the surface of the molten thermoplastic material during the heating process. The additional aggregate shall be applied by spray by means of an air powered spray hopper. As the material is cooling, it shall be imprinted with a stamping template made from 3/8 inch flexible wire rope in the required design using a vibratory plate compactor to create crisp, clean lines which define the pattern. A hand held finishing tool shall be used that enables the applicator to complete the imprinting of the thermoplastic in areas around permanent structures, such as curbs and manholes covers, which may be inaccessible to the stamping template.

For crosswalks, it shall be demarcated by applying white preformed thermoplastic transverse lines on both sides of the installation. The preformed thermoplastic material is then allowed to cool thoroughly before being opened to vehicle or pedestrian traffic.

The reciprocating infrared heating equipment shall be of a design specifically to elevate the temperature of the preformed thermoplastic material and asphalt pavement without adversely affecting it. The primary heating unit shall employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, thereby allowing the operator to monitor the temperature of the preformed thermoplastic at all times during the pavement heating process.

A smaller, mobile infrared heater designed specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters shall be utilized as necessary for the work. This secondary heater also allows the operator to monitor the temperature of the preformed thermoplastic at all times during the heating process.

An approved hand-held propane heat torch shall be used to heat isolated areas of the preformed thermoplastic if required.

A vibratory plate compactor (700-900 lb.) shall be used for pressing the 3/8 inch wire rope stamping templates into the thermoplastic to create the specified pattern in both the thermoplastic and asphalt substrate.

The color and surface pattern shall be in accordance with the design approved by the City.

Any residue resulting from this work shall be removed and disposed of in a proper manner. The completed work area is to be left in a neat and clean condition.

Special care must be exercised by the contractor during the operation of work to save from harm and injury, any structure, public or private, situated above or below the surface and lying within the project limits. If during the execution of the work, the contractor, through willfulness or carelessness, permits or causes any damage, the cost of satisfactory repair or replacement shall be the responsibility of the Contractor.

Manufacturer Certified Applicator Requirement: The preformed thermoplastic material shall be applied only by an approved certified applicator. The applicator shall provide proof of current certification by the manufacturer before commencing work. The certified applicator shall follow the manufacturer's current published application procedures.

Method of Measurement

Textured Decorative Pavement Crosswalk will be measured for payment by the square yard of surface, complete in place and accepted.

Basis of Payment

Textured Decorative Pavement Crosswalk will be paid for at the Contract unit bid price per square yard, which price shall include all labor, material, tools and equipment, and all incidental cost required to complete the work.

No separate payment will be made for sawcutting, existing pavement removal or “mock-up” but all costs in connection therewith shall be included in the contract unit price bid for this item.

ITEM 707.16

SIX FOOT METAL BENCH

EACH

Description

Work under this item includes supplying and installing benches as shown on the drawings and as specified herein.

Materials

The bench shall be comprised of steel bands or bar stock, cast iron supports, stainless steel fasteners and expansion anchor bolts. Benches shall have backs and either integral or bolt on arms.

Finish shall be polyester powder coating over zinc rich primer. Powder coat shall be black.

Anchoring bolts shall be stainless steel.

Benches shall as manufactured by DuMor, Inc. P.O. Box 142, Mifflintown, PA 17059-0142 (1-800-598-4018) www.dumor.com or approved equal.

Six foot bench shall be Dumor model number 160-60 surface mount. Benches shall have integral arms and shall be bolted to pavement surface.

Cement concrete pavement at bench pad shall be 4000 psi conforming to Section M 4.02.00 of the Standard Specifications.

Contractor shall submit shop drawings for approval, including anchoring device, prior to ordering.

Construction Methods

Assemble and install benches as per manufacture's recommendations.

Anchors shall be long enough to penetrate through the concrete and be securely anchored with epoxy cement in the concrete sidewalk or concrete base course.

Contractor shall protect benches from damage until final acceptance. Touch-up, repair or replace damaged products before substantial completion. Damaged items will not be accepted.

Method of Measurement

This item shall be measured per each, complete in place.

Basis of Payment

This item will be paid at the Contract unit price per each which shall be full compensation for furnishing all labor, equipment, tools, materials and incidentals required to complete the work.

ITEM 707.9

BICYCLE RACK

EACH

Description

The work will consist of the installation of steel bicycle racks in accordance with these specifications and at specific locations shown on the plans or established by the Engineer.

Materials

The bike racks shall be manufactured by shall be Dero Bike Hitch, 16.5" width, 35" height, composed of 2" schedule 40 pipe with a 1.5" OD 11 gauge steel tube ring, with surface mounting

as manufactured by Dero 5522 Lakeland Ave. N. Minneapolis, MN 55429 der.com (888)337-6729. Finish shall be polyester powder coat. Color shall be black.

Bicycle parking racks are to carry a one-year manufacturer's limited warranty against defects in materials and workmanship.

Anchoring bolts shall be stainless steel.

Submit product data sheet for approval.

Construction Methods

The Contractor shall consult the manufacturer in order to install the bicycle rack properly and shall provide a representative who is thoroughly familiar with the installation process. The Contractor shall install the bicycle racks level, plumb and true.

Engineer shall approve the locations of the bicycle racks prior to installation of the pavement.

The Contractor shall protect bicycle rack finishes on exposed surfaces from damage by applying a temporary protective covering or wrapping before shipping. Materials shall be stored in compliance with the manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other causes.

The Contractor shall inspect the bike rack after installation is completed and remove spots, dirt, and debris from all components. The Contractor shall repair damaged finishes to match the original finish or replace the damaged component.

Method of Measurement

This item shall be measured per each, complete in place.

Basis of Payment

This item will be paid at the Contract unit price per each which shall be full compensation for furnishing all labor, equipment, tools, materials and incidentals required to complete the work.

ITEM 756. NPDES STORM WATER POLLUTION PREVENTION PLAN LUMP SUM

Pursuant to the Federal Clean Water Act, construction activities which disturb one acre or more are required to apply to the U.S. Environmental Protection Agency (EPA) for coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities (NPDES is the acronym for the National Pollutant Discharge Elimination System). On July 1, 2003 (68 FR 39087), EPA published the final NPDES construction general permit for construction activity. On August 4, 2003 (68 FR 45817), EPA reissued the General Permit for the Commonwealth of Massachusetts and included state specific requirements.

The NPDES General Permit requires the submission of a Notice of Intent (NOI) to the EPA prior to the start of construction (defined as any activity that disturbs land, including clearing and grubbing). There is a seven (7) day review period commencing from the date EPA enters the NOI into their database. The Contractor is advised that, based on the review of the NOI, EPA may require additional information, including but not limited to, the submission of the Storm Water Pollution Prevention Plan (SWPPP) for review. Work may not commence on the project until final authorization has been granted by EPA and the Massachusetts Department of Environmental Protection DEP (if applicable, see below). Any additional time required by EPA or DEP for review of submittals will not constitute a basis for claim of delay.

If the project discharges to an Outstanding Resource Water, vernal pool, or is within a coastal Area of Critical Environmental Concern (ACEC) as identified by the DEP, a separate filing to DEP is required. Filing fees may be associated with a DEP filing and shall be paid by the Contractor.

Separate NOI's must be submitted by all required Permittees, including but not limited to, the owner (City of Framingham) and the Operator (the Contractor). The Contractor is responsible to ensure that all required Permittees have submitted an NOI and shall provide proof of same to the Engineer prior to the start of any work.

The NPDES General Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the aforementioned statutes and regulations. The SWPPP shall include the NPDES General Permit conditions and required information, City's Performance Standards and detailed descriptions of erosion and sedimentation controls to be implemented during construction. It is the responsibility of the Contractor to prepare the SWPPP to meet the requirements of the most recently issued NPDES General Permit and, if applicable, the DEP requirements. The Contractor shall submit three (3) copies of the draft SWPPP to the Engineer for review and approval at least four weeks prior to any site activities. It is the responsibility of the Contractor to be familiar with the NPDES General Permit conditions and the conditions of any Wetlands Protection Act Order of Conditions or Determination, Water Quality Certification, Army Corps of Engineers Section 404 Permit and all other environmental permits and regulations applicable to this project. The Contractor shall include in the SWPPP the methods and means necessary to comply with applicable conditions of said permits and regulations.

It is the responsibility of the Contractor to complete the SWPPP in accordance with the NPDES General Permit and DEP requirements, provide all information required, and obtain all certifications

as required by the NPDES General Permit. Any amendments to the SWPPP required by site conditions, schedule changes, revised or additional work, construction methodologies, regulations and the like are the responsibility of the Contractor. Amendments will require the approval of the Engineer prior to implementation.

Included in the NPDES General Permit conditions is the requirement for inspection of all erosion controls and site conditions on a weekly basis as well as after each incidence of rainfall exceeding 0.5 inches in twenty-four hours. The Contractor shall choose a qualified individual (hereinafter referred to as the "Inspector") who will be on-site during construction to perform these inspections. The Engineer must approve the contractor's Inspector. In addition, if the Engineer determines at any time that the Inspector's performance is inadequate, the Contractor shall provide an alternate Inspector. Written Weekly Inspection forms, Storm Event Inspection forms, and Monthly Summary Reports shall be completed and provided to the Engineer within two (2) business days of completion. Monthly Summary Reports must include a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs.

The Contractor is responsible for preparation of the SWPPP, all required certifications, inspections, forms, reports and any and all corrective actions necessary to comply with the provisions of the NPDES General Permit. In addition, the Contractor shall provide the City with at least three (3) copies of all documents associated with the SWPPP including, but not limited to, the final approved SWPPP, required SWPPP amendments (including revisions/addenda pre, during and post-construction), certifications, NOIs, NOTs, Weekly Inspection forms, Storm Event Inspection forms, Monthly Summary reports (including photographs). Additional copies are to be provided by the Contractor if requested by the Department.

Work associated with performance of inspections of all erosion controls and site conditions is considered incidental to this Item. The Standard Specifications require adequate erosion control for the duration of the Contract. Inspection of these controls is considered incidental to the applicable items. Additional erosion controls beyond those specified in bid items elsewhere in this contract which are selected by the Contractor to facilitate and/or address the Contractor's schedule, methods and prosecution of the work shall be considered incidental to this item.

The CGP requires the submission of a Notice of Termination (NOT) from all Permittees (Operators, Owners, etc.) when final stabilization has been achieved. Approval of final stabilization by the Engineer and confirmation of submission of all NOT's by the Contractor will be required prior to submission of the Resident Engineer's Final Estimate.

Payment

Payment for all work detailed above, including, but not limited to, SWPPP preparation, required SWPPP amendments (including revisions/addenda pre, during and post-construction), NOI and NOT submissions, certifications, DEP filing fee (if required), inspections, preparation of weekly, monthly and other required reports, distribution of copies and all other requirements as described

in this special provision are included in the Lump Sum price for this Item. Upon final acceptance of the SWPPP by the City, a payment equal to 50% of the Contract Lump Sum price shall be paid. The remaining 50% of the Lump Sum shall be paid in 10% increments distributed equally throughout the remaining period of the Contract, not including extensions of time.

ITEM 767.121

SEDIMENT CONTROL BARRIER

FOOT

The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer's instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

Compost Filter Tube

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed

by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

MAINTENANCE

Maintenance of the sediment control barrier shall be per Section 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).
- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 767.121 will be measured and paid for at the contract unit price per foot of sediment control barrier which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damaged by construction activities shall be repaired or replaced as directed by the Engineer at the Contractor's expense.

Sedimentation fence used in conjunction with compost filter will be measured and paid for separately under Standard Item 697, Sedimentation Fence.

<u>ITEM 772.037</u>	<u>ARBORVITAE – DARK AMERICAN 6-7 FEET</u>	<u>EACH</u>
<u>ITEM 775.431</u>	<u>LOCUST - HONEY - 'SHADEMASTER' 2-2.5 INCH CALIPER</u>	<u>EACH</u>
<u>ITEM 777.037</u>	<u>OAK - NORTHERN RED 2-2.5 INCH CALIPER</u>	<u>EACH</u>
<u>ITEM 778.027</u>	<u>GINKGO - 'GOLD SPIRE' 2-2.5 INCH CALIPER</u>	<u>EACH</u>
<u>ITEM 778.169</u>	<u>BIRCH - RIVER 'HERITAGE' 2-2.5 INCH CALIPER</u>	<u>EACH</u>
<u>ITEM 783.046</u>	<u>SERVICEBERRY - AUTUMN BRILLIANCE 5-6 FEET</u>	<u>EACH</u>
<u>ITEM 785.591</u>	<u>HOLLY – ‘SOFT TOUCH’ 18-24 INCH</u>	<u>EACH</u>
<u>ITEM 785.637</u>	<u>INKBERRY - 'SHAMROCK' 18-24 INCH</u>	<u>EACH</u>
<u>ITEM 786.475</u>	<u>JUNIPER - 'SEA GREEN' 2.5-3 FEET</u>	<u>EACH</u>
<u>ITEM 789.741</u>	<u>CHOKEBERRY-'LOWSCAPE MOUND'- 18-24 INCH SPREAD</u>	<u>EACH</u>
<u>ITEM 791.321</u>	<u>FOTHERGILLA - 'MOUNT AIRY' 3-4 FEET</u>	<u>EACH</u>
<u>ITEM 793.055</u>	<u>NINEBARK SHRUB - 'TINY WINE' 2-3 FEET</u>	<u>EACH</u>
<u>ITEM 794.322</u>	<u>SUMAC SHRUB – FRAGRANT ‘GRO LOW’ 18-24 INCH</u>	<u>EACH</u>
<u>ITEM 794.741</u>	<u>SUMMERSWEET SHRUB 'SUGARTINA' 18-24 INCH</u>	<u>EACH</u>
<u>ITEM 794.815</u>	<u>SWEETSPIRE-'MERLOT' 2-3 FEET</u>	<u>EACH</u>
<u>ITEM 796.425</u>	<u>DWARF FOUNTAIN GRASS - LITTLE BUNNY 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.457</u>	<u>SWITCH GRASS – ‘HEAVY METAL’ 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.459</u>	<u>SWITCH GRASS – ‘SHENANDOAH’ 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.753</u>	<u>DAYLILLY - 'HAPPY RETURNS' 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.754</u>	<u>DAYLILLY - 'PURPLE D-ORO' 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.756</u>	<u>DAYLILLY - 'STELLA D'ORO' 1 GALLON</u>	<u>EACH</u>
<u>ITEM 796.788</u>	<u>LAVENDER - HIDCOTE 1 GALLON</u>	<u>EACH</u>

The work for these Items shall consist of furnishing and planting specified plants and trees at the locations as shown on the plans and/or as directed by the Engineer and in accordance with the Standard Specifications and the following:

The Contractor shall take note of the requirements for submittals and allowable planting dates.

Planting Soil Mix for shall be four parts loam borrow to one part organic material. Loam Borrow shall meet the requirements of M1.05.0 of the current Standard Specification with the exception that the soil Ph range shall be between 5.5 and 6.75.

Mulch shall meet the requirements of Item 767.6 Aged Pine Bark Mulch

Basis of Measurement and Payment

The quantity of trees, shrubs, vines, grasses and ground cover plants measured will be paid for at the contract unit prices per each for planting of the types, species and sizes called for in the bid schedule. The unit price per planting item shall include furnishing and delivering all plants, furnishing and delivering prepared backfill soil, mulch, fertilizer, excavation for plant pits, backfilling, planting, pruning, guying and staking, mulching, weeding, watering, cleanup, plant

establishment work and care including replacements, and for all labor, equipment, tools and incidentals necessary to complete the work prescribed in this section.

Mulching will be paid for under Item 767.6 Aged Pine Bark Mulch.

ITEM 804.3

**3 INCH ELECTRICAL CONDUIT
TYPE NM - PLASTIC - (UL)**

FOOT

The work under this item shall conform to the relevant provisions of Section 801 of the Standard Specifications, and the following:

The conduit shall be installed to have a cover of no less than 3-feet and up to 5-feet to avoid existing utilities and other buried features. The Contractor shall perform a test pit where new conduit crosses existing utilities and as directed by the Engineer to verify existing utility depth.

When back-filling the trench for the conduit through the existing roadway, sand shall be placed around the existing gas main, as directed by the Engineer. The trench shall be back-filled with control density (flowable fill) to match the bottom of existing pavement. The trench shall be patched as detailed in the plans.

All asphalt pavement shall conform to the relevant provisions of Section 400 of the Standard Specifications.

Measurement and Payment

3 Inch Electrical Conduit, Type NM – Plastic (UL) will be measured and paid for by the foot. The unit contract price shall include the cost of excavating (regardless of depth), backfilling (regardless of depth), sand, installing the conduit, milling of pavement, sawcutting, tack coat and all other work incidental to complete the work and accepted by the Engineer.

Hot mix asphalt for temporary patching will be paid for under Item 472 Hot Mix Asphalt for Miscellaneous Work.

Test pits shall be paid for under item 141.1 Test Pits for Exploration.

Controlled density fill for backfilling of trench within roadway will be paid for under item 153 Controlled Density Fill - Excavatable.

ITEM 811.27 **ELECTRIC HANDHOLE - (MUNICIPAL STANDARD)** **EACH**

The work of this item shall conform to the relevant provisions of Sections 801, 813 and 820 of the Standard Specifications and the following:

The work shall include the furnishing and installation of open bottom, precast concrete electric handholes for street lighting system as shown on the plans and as directed. Handholes shall be provided with minimum nominal dimensions of 20" wide x 32" long x 33" deep arranged for bottom conduit entry. Handhole cover shall be bolt down type and labeled with notation to read "Street Lighting". Handholes shall be heavy duty type and rated for installation adjacent to traffic areas.

Handhole covers shall be set flush with the top of sidewalk and shall be positioned no closer than 12" to the edge of the concrete sidewalk.

A 3/4 inch diameter x 10 ft long copper clad steel ground rod shall be installed in each handhole and connected to the equipment grounding conductors from all circuits entering the handhole.

Measurement and Payment

Electric Handhole will be measured and paid for at the Contract unit price per each, which price shall be full compensation for all labor, materials, grounding, ground rods, and incidental costs required for the work.

ITEM 811.28 **FIBER OPTIC HANDHOLE POLYMER** **EACH**
CONCRETE WITH COVER

The work under this item shall conform to the relevant portions of Section 801 of the Standard Specifications, and the following:

The work shall include the furnishing and the installation of Quazite polymer concrete fiber optic handholes with covers in accordance with the plans and as directed by the Engineer.

All handholes and covers shall be load rated Tier 15 (15,000 lbs.) in accordance with

ANSI/SCTE 77. All handholes shall be 40" x 40" with a height of 36".

All handholes shall have a clear opening of 36" x 36", with an open bottom.

All handhole covers shall measure 38" X 38" x 3" with "FIBER" stamped in the top. The cover shall be a one piece unit with a 0.5 COF skid resistant surface. Two 1/2 inch by 4 inch pull slots shall be provided with each cover. Each cover shall be secured with two 3/8 – 16 UNC stainless steel hex bolts and washers.

All light standard foundations shall be constructed per Section 801.62 of the Standard specifications, except deviations may be required based on field conditions. All deviations must be approved by the engineer prior to making any changes.

Light standard foundations should be placed per the plans and positioned using an approved grade. Cast in place concrete foundations shall be installed using a sonotube of required diameter. Cast in place or precast concrete foundations shall include galvanized reinforcing rods and hoops, as shown on the plans, and per the manufacturer's Structural Engineer's recommendations. Confirm exact light fixture pole base anchor bolt requirements for size, length, projection, bolt circle diameter and pattern with the pole manufacturer prior to furnish and installation and install accordingly. Anchor bolts shall be hot dipped galvanized and j-hook style. For the foundations serving the ornamental post top lighting, the diameter of the foundation shall be adjusted to exceed the diameter of the decorative base by 3" all around. Minimum foundation diameter shall be as indicated on the plans.

Furnish and install 2 inch galvanized rigid metal conduit in foundation and coupling and 2 inch plastic type NM conduit stub out over to adjacent handhole, as shown on the plans.

A 3/4 inch diameter x 10 ft long copper clad steel ground rod shall be installed for each foundation.

Measurement and Payment

Light Standard Foundation Concrete will be measured for payment by each foundation installed.

Light Standard Foundation Concrete will be paid for at the Contract unit price per each installed, which price shall be full compensation for all labor, materials, cement mortar mix, galvanized reinforcing rods and hoops, galvanized anchor bolts, galvanized nuts and washers, 1-1/2" rigid metal conduit, 1-1/2" plastic Type NM conduit, elbows, sweeps, compaction and leveling, excavation (except rock), backfilling and all incidental costs required for the work.

ITEM 815.11

ELECTRONIC BLANK-OUT SIGN

EACH

The electronic blank-out signs shall have the text message of "NO TURN ON RED", as indicated on the plans. The electronic blank-out signs shall consist of Light Emitting Diodes (LED's) and shall be housed in IP66/NEMA 4X cabinets.

- Construction and Operation
 - Cabinet Housing
 - Right, left, rear and front cabinet walls shall be oriented vertically. The top and bottom sides shall be oriented horizontally.
 - Cabinet shall protect internal components from rain, ice, and dust
 - Primary cabinet structure shall consist of 0.125" thick 6063-T6 aluminum alloy.

- External hardware shall be fabricated from stainless steel suitable for outdoor sign applications.
- Structural assembly hardware shall be stainless steel, aluminum, or galvanized steel, and must be appropriately sized for the application. Assembly hardware includes all nuts, bolts, washers, and latches.
- Cabinet Interior
 - All components shall be placed to avoid drip points.
 - All wiring shall incorporate drip loops and strain relief
- Cabinet Finish
 - The cabinet shall have a powder coated finish with the color black.
 - The finish shall meet the following criteria:
 - 60° Gloss 5% ±5% per ASTM D523
 - Pencil Hardness 2H per ASTM D523
 - Flexibility 100% D1737/D522
 - Direct Impact 80min in lbs @2.5 mils per ASTM D2794
 - Reverse Impact 80min in lbs @2.5 mils per ASTM D2794
 - Salt Spray 1000 Hours Typical per ASTM D1654
- Lifting Hardware
 - When needed, multiple galvanized steel lifting eyebolts shall be mounted to the top of the cabinet. Eyebolt hardware shall attach directly to the cabinet frame, and is installed at the factory.
 - All mounting points of eyebolts shall be sealed to prevent water from entering the cabinet. Lifting hardware, as well as the cabinet frame, shall be designed such that the cabinet can be shipped and handled without damage or excessive stress before or during installation to its support structure.
- Welding
 - All exterior seams shall be continuous TIG welded to form a single structure.
 - All welds shall be performed to the documented in-house welding procedures
 - The welds shall be performed by certified welders and inspected by a certified welder.
- Chemical Bonding
 - In some instances, a chemical bonding agent is the preferred method of assembly. In these cases, a two-part adhesive will be permitted. All necessary testing shall be completed to the adhesive manufacturer's specifications.
- Hinged Face Construction
 - Hinged Face shall be attached to cabinet using a full-length extruded hinge.
 - The cabinet face shall be flanged on all sides to shed water. The door shall close around its flanged frame and compress against a closed-cell silicone gasket, which is adhered to the door. The door shall contain a positive stop that prevents the door from being opened beyond 90° open position.

- Front frame shall consist of a replaceable 0.25” tinted polycarbonate protective face.
- The polycarbonate shall cover the entire frame opening and will be sealed to prevent water and other elements from entering the cabinet by 2 rounds of ¼” closed-cell silicone gasket.
- The polycarbonate shall contain UV inhibitors to protect the circuit board from the effects of ultraviolet light and prevent the premature aging of the polycarbonate face.
- The polycarbonate face shall have the following characteristics:
 - Rockwell Hardness: M70, R118 ASTM D785
 - Light Transmission: 86% @ 0.125”ASTM D1003
 - Refractive Index: 1.586 @ 77°F ASTM D542A
 - Tensile Strength, Ultimate 9,500 psi ASTM D638
 - Tensile Strength, Yield: 9,000 psi ASTM D638
 - Tensile Modulus: 340,000 psi ASTM D638
 - Flexural Strength, Yield: 13,500 psi ASTM D790
 - Flexural Modulus: 345,000 psi ASTM D790
 - Impact Strength, Izod: 18 ft-lbs/inch ASTM D256A
 - Heat Deflection Temperature: 270°F@264psi ASTM D648
 - Coefficient of Thermal Expansion: 2.75×10^{-5} ASTM D696
- LED Circuit Boards
 - General
 - LED circuit boards shall be manufactured using an FR-4 laminated fiberglass/epoxy printed circuit board with the front face printed with black UV cure ink or black paint.
 - The failure of an LED string shall not cause the failure of any other LED string.
 - Exposed traces, vias, and solder joints on the LED circuit board, with the exception of connector contacts and terminals, shall be protected from water and humidity by application of conformal coating.
 - The conformal coating shall contain a UV brightener to aid in visual inspection.
 - The presence of ambient radio signals, magnetic interference, and electromagnetic interference shall not impair the performance. Interference includes power lines, transformers, and motors. The sign will not radiate electromagnetic signals that adversely affect any other electronic devices, including those located in vehicles passing underneath or near the sign and its’ controller.
 - The Cabinet and sign components shall operate in the following temperature and humidity conditions:
 - Operational & storage temperature range: -40°F to +165°F
 - Humidity range: 0% to 99% (non-condensing)
 - Discrete LEDs

- The discrete LEDs shall be driven at a current level that is in accordance with their operating environment. Signs will use voltage pulse width modulation (PWM) to achieve the proper LED intensity level for ambient light conditions. The drive pulse shall be modulated at a frequency high enough to provide flicker-free operation.
- The LED drive circuit board shall contain a microcontroller regulation circuit that controls the PWM duty cycle.
- LED Specifications

LED Type	Color (nm)	Min Brightness (mcd)
Red	625	3,000
Red	625	2,200
Orange	605	6,000
Amber	590	2,600
Amber	590	5,000
Green	525	3,000
Green	525	9,000
Blue	470	700
White	x= 0.31 y= 0.32	5,500
White	x= 0.31 y= 0.32	27,000

- Regulated DC Power Supplies
 - The LED Circuit board shall be powered with auto-ranging regulated switching power supply that converts the incoming AC electricity to DC, at a nominal voltage of 12VDC.
 - Power supplied shall be UL recognized.
 - Power supplies shall be arranged in a redundant parallel configuration, and rated such that if one supply fails the remaining supply shall be able to operate 100% of the LEDs in the sign message.
 - The pair of power supplies shall contain two physically and electrically independent supplies. The pair of power supplies shall be placed in parallel according to the manufacturer's recommendations.
 - Power supplies used to power the LED sign message and its controller board shall be identical and interchangeable.
 - Power Supply Specifications:
 - Input voltage: 100-240 VAC
 - Nominal output voltage: 12 VDC \pm 10%.
 - Operating temperature range for 100% output power: -40°F to +140°F
 - Operating input voltage range: 85 VAC to 264 VAC.
 - Typical power supply efficiency: 81%

- Minimum power factor rating: 0.93.
- The power supply shall not be taxed beyond 65% of its rated maximum rated output.
- Power supply input circuit shall be fused.
- Automatic output shutdown and restart if the power supply experiences any of the following output faults: over-voltage, short circuit, or over-current.
- Wiring and Power Distribution
 - Internal Wiring
 - Wiring for the sign components shall be installed in a neat and professional manner. Wiring shall not impede the removal of power supplies or other sign components.
 - Wires shall not make contact with, nor bend around sharp metal edges. All wiring shall conform to the National Electrical Code
 - All internal wiring shall use drip loops.
 - Earth Grounding
 - Cabinet shall have one earth ground lug that is electrically bonded to the sign cabinet. All earth grounding shall conform to the National Electrical Code.
 - UL/cUL Listed for wet locations
- Environmental Monitoring System
 - Ambient Light Measurement
 - Sensors that measure the outdoor ambient light level at the site shall be mounted directly to the LED circuit board.
 - Three photocell sensors shall be placed such that they measure the ambient light striking the front face. The sign controller shall continuously monitor the light sensors and adjust the LED light intensity to a level that creates a legible message on the face.
 - Photocell sensors shall operate in a redundant manner such that if one sensor fails, the remaining light sensors shall continue to adjust the LED light intensity to create a legible message on the face.
 - The LED automatic dimming functionality shall continue normally with only a single functioning sensor remaining.

Measurement and Payment

Electric Blank Out Sign will be measured for payment by each sign installed.

Electric Blank Out Sign will be paid for at the Contract unit price per each installed, which price shall be full compensation for all labor, materials, cabinet housing, LED circuit boards, DC power supplies, wiring, and all incidental costs required for the work.

ITEM 816.01 TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. 1 LUMP SUM
ITEM 816.02 TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. 2 LUMP SUM
ITEM 816.03 TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. 3 LUMP SUM

All traffic signal work under these Items shall conform with the relevant provisions of Section 800 “Traffic Control Devices” of the MassDOT Standard Specifications for Highways and Bridges, the 2009 Manual on Uniform Traffic Control Devices (MUTCD) and shall consist of the traffic signal work at the following locations:

Location 1: Central Street / Water Street

Location 2: Central Street / Concord Street / Elm Street

Location 3: Concord Street / Watson Place

At these locations, the work shall include furnishing and installing the following items: traffic signal controller and cabinet on a new foundation with concrete pad, ornamental signal posts and bases, ornamental steel mast arm assemblies with anchor bolts and foundations, signal housings, retroreflective backplates, 360-degree video detection cameras, pedestrian signals with countdown timers and audible warning devices, pedestrian push buttons with signage, emergency vehicle pre-emption systems, providing service connections and all necessary wire, cable, and require ancillary equipment.

The work shall include all incidental materials and labor necessary for operating and controlling the traffic control signals at this location, as shown on the plans and as specified herein, all in accordance with the applicable provisions of the MassDOT Standard Specification for Traffic Control Devices (Section 800), NEMA Standards Publication No. TS-2, Type 1 Chassis Configuration, the Manual on Uniform Traffic Control Devices (2009 Edition) and the following:

Timing, sequence, and operation shall be as shown on the Sequence and Timing chart included in the Contract Drawings.

A list of the major traffic signal items required is included on the Sequence and Timings Plans.

Only traffic control equipment listed on MassDOT’s Qualified Traffic Control Equipment List shall be furnished for this project. Equipment not on the list will be rejected.

Within 30 calendar days following execution of the Contract, the Contractor shall submit shop drawings for signal supports, a list of equipment, and manufacturer’s equipment specifications to the Engineer in accordance with the relevant provisions of Section 815.20.

The Contractor shall not commence any work until approval of the shop drawings and the manufacturer’s data has been received in writing from the Engineer. Approval of these drawings shall be general in character and shall not relieve the Contractor from the responsibility of, or the necessity of, furnishing materials and workmanship conforming to the plans and specifications.

The Contractor shall deliver to the Engineer a certificate of compliance with the manufacturer for all materials purchased from the manufacturer.

All Electrical Contractors performing work on roadways or signals under the jurisdiction of MassDOT shall have International Municipal Signal Association (IMSA) Certification as a Traffic Signal Electrician Level II.

In general, work under this Item shall include but not be limited to the following:

Existing Traffic Control Signal Systems

The Contractor shall, to the maximum extent practical, maintain operation of the existing traffic control signal systems throughout the construction period.

Flashing Operation

Changes from automatic flashing to stop-and-go operation and from stop-and-go to automatic flashing operation shall occur as set forth in Section 4D.29 of the MUTCD.

Traffic Controller Cabinet

The controller cabinet shall conform to the NEMA TS 2 Type 1 Standards, Section 7. The controller cabinet shall be made of aluminum and shall be painted black.

Note: The control cabinet shall be initially wired with a "D" harness. All wires for this harness shall be properly terminated on the back panel.

The cabinet shall also be wired with a normally closed switch connected to a user defined input to the controller for remote monitoring of the control cabinets' door open status. The controller cabinet shall also be supplied with a Manual Police Button to manually control the operations of the traffic signal via the Police Door Access Panel.

Controller cabinet foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is impaired.

The following requirements are applicable to the signalized location and are designed for effective use of a laptop computer in conjunction with traffic signal controller. These requirements are also designed to permit all engineers, electricians and technicians (including those who are disabled but ambulatory) to work in the cabinet in a safe, effective and comfortable manner. To this extent, the following meets applicable ADA requirements.

1. Furnish and install one slide-out/slide-in shelf or swing-out/swing-in shelf appropriate for the size and load of a laptop computer. This moveable shelf shall support the bottom of the laptop computer at a height between 3'-4" and 3'-8" above finished grade in front of the cabinet.
2. Both the firmware and software version in each timer unit shall be the same throughout the project, and shall be the latest version available on the market. In addition, the contractor shall promptly furnish to the owner and install all upgraded versions of both firmware and software

through the last day of the inspection period, guarantee period or warranty period, whichever date is later.

3. The contractor shall furnish one cable with each new timer unit to connect a controller timing mechanism to a laptop computer. This cable shall have a termination at one end to match the controller. It shall have a termination on the other end to match the type of serial port found on laptop computers, usually DB9. This cable shall be wired to provide serial RS232C communication between the controller and the computer.
4. Furnish and install a paved pad in front of the control cabinet. This pad shall be cement concrete, built in accordance with standard sidewalk specifications, approximately level, approximately 1" above the surrounding unpaved surface, or at even grade with the adjacent surface if paved. This pad shall abut the front of the cabinet, project at least 1" to each side of the cabinet and at least 36" in front. No pad is required if the front of the cabinet immediately abuts an existing or proposed paved sidewalk or other paved surface.

Payment for the work described above shall be deemed to be incidental to and included in the prices bid for the traffic signal work, and no additional payment shall be made for the work described above.

Cabinet Door Sticker

The Contractor shall supply and install a laminated door sticker on each proposed cabinet. This sticker shall be permanently affixed to the upper left hand side of the interior main cabinet door. The sticker shall contain, at a minimum, the following:

- Vehicle and bicycle detection information including detector channel assignment, phase assigned, approach and termination points.
- Network communications information including IP address, subnet mask and MAC address.
- Per approach preemption information including channel, approach/direction and termination points.

Traffic Signal Controller

The controller unit shall be a keyboard-entry menu-driven unit conforms to the Standard Specifications, with internal time base coordination, emergency preemption, and programmatic capability. The controller shall also be complete with a module for closed loop system functions.

Controller shall be Siemens M60 (Model 8132-1900-018) or approved equal.

Controller shall conform to Section 3, Controller Units of NEMA No. TS 2 Standard, Traffic Controller Assemblies. The controller unit shall meet all applicable requirements of the NEMA Standard Publication No. TS 2 Type 1 and the Department's 1988 Standard Specifications and supplemental specifications. Controller shall utilize an input/output interface conforming to

Section 3.3.1 of the NEMA TS 2 Standard for all input/output functions with the back-panel terminals and facilities, the malfunction management unit, detector rack assemblies and auxiliary devices. The controller unit shall also meet the requirements of Paragraph 3.3.6 “NTCIP Requirements” of the NEMA TS 2 Standard.

The controller shall be complete with a module, including modem card and physical connector to support future closed loop communication.

Traffic Signal Equipment

The traffic signal controller unit (CU), malfunction management unit (MMU), detector amplifiers, cabinet power supply, bus interface units (BIUs) and all other ancillary traffic signal control components included in the traffic control cabinet shall comply with the National Electrical Manufacturers Association (NEMA) Standard TS 2-1988, Traffic Controller Assemblies with National Transportation Communications for ITS Protocol (NTCIP) Requirements.

Malfunction Management Units

The malfunction management units (MMU) shall comply with Section 4 of the NEMA TS 2 standard. The MMU shall be capable of operating as either a Type 16 with 16 channels (8 vehicle, 4 pedestrian, 4 overlap) or a Type 12 with 12 channels (8 vehicle, 4 overlap). The MMU's supplied shall be configured to operate as Type 16 units.

The MMU's in either the Type 16 or Type 12 configuration shall be capable of operating in a NEMA TS 2 Type 1 cabinet, a NEMA TS 2 Type 2 cabinet, or a NEMA TS 1 cabinet without loss of functionality. The MMU shall be connected directly to the controller unit to support enhanced MMU monitoring of controller operations.

Bus Interface Units

The Bus Interface Unit (BIU) shall comply with Section 8 of the NEMA TS 2 Standard. The BIU shall be fully interchangeable with any other manufacturer's unit and interchangeable in a NEMA TS 2 Type 1 cabinet assembly.

At a minimum the BIU shall perform the interface function between Port 1 at the controller unit, the malfunction management unit, loop detector rack assembly, and the backpanel terminal and facilities. The cabinets shall be supplied with the appropriate number of BIUs required to provide an operating traffic control signal according to the plans and these specifications.

At a minimum, two (2) LED indicators shall be provided on the BIU front panel. One indicator shall serve a dual use: as a power on indication and as a diagnostic indicator for proper operation of the device. The second indicator shall serve as a transmit indicator illuminating each time data is transmitted.

Video Detection System

General

This specification sets forth the minimum requirements for a system that detects vehicles on a roadway using only video images of vehicle traffic.

The system shall be installed by technicians that have been trained and certified by the manufacturer.

System Hardware

The Contractor shall provide and install a Single-Point Video Detection System (SPVDS) as shown on the plans and these special provisions. The SPVDS shall consist of these components: Camera assembly, machine vision processor (MVP), detection algorithms, application software, and all associated equipment required to setup and operate in a field environment including a field setup computer, if required, connectors and camera mounting hardware.

System Software

The system shall include software that detects vehicles in multiple lanes using only the video image. Detection zones shall be defined using only an on-board video menu and a pointing device to place the zones on a video image. Up to 8 detection zones per system shall be available. A separate computer shall not be required to program the detection zones.

SPVDS System

1. The SPVDS shall use camera assembly(ies) to collect video image data for the MVP for purposes of detecting vehicle and bicycle presence and generating traffic data.
2. The SPVDS shall include a performance data module capable of generating traffic data including, but may not be limited to, traffic volume counts, length-based classifications, turning movements, red and green occupancy, and cycle lengths. This data should be downloadable wirelessly and/or via laptop.
3. The SPVDS shall provide near-real-time vehicle detection.
4. The SPVDS shall be able to detect either approaching or departing vehicles and bicycles in multiple traffic lanes, and multiple intersection approaches simultaneously.
5. The SPVDS shall provide flexible detection placement anywhere within the field of view of the camera assembly(ies). A single SPVDS detection camera shall be able to replace multiple in-ground or aboveground detectors.

6. The SPVDS shall provide complete video surveillance of all intersection approaches simultaneously, including the center of the intersection, for situational awareness and incident monitoring while fully actuated detection is active.
7. The SPVDS shall incorporate the use of three-dimensional vehicle modeling for purposes of improving system performance across various image perspectives.
8. The SPVDS shall operate at a level of presence detection accuracy at or above 97%, excluding issues of occlusion due to limitations imposed by camera placement.
9. The SPVDS shall feature fail-safe operation, triggering a state of "all call" to the controller in the event of an equipment failure or system malfunction.
10. The SPVDS provides the user-selected option of operating in either presence detection mode or SCATS-compatible pulse mode.

Camera Assembly

1. Power: 48 VDC, single burial grade CAT 5e cable (or better).
2. Operating Temp: -35C to +60C.
3. Humidity: Up to 100%.
4. Dimensions: 10" diameter x 9".
5. Weight: less than 11 lbs.
6. The camera shall include an ultra-wide-angle lens.
7. The camera shall feature a heater or other mechanism to prevent the formation of ice and condensation. This shall not interfere with the operation of the camera electronics, and it shall not cause interference with video signal.
8. The camera, when properly installed and configured, shall be able to concurrently observe at least 5 lanes of traffic per approach.
9. The camera shall be able to concurrently observe more than one approach.

Machine Vision Processor (MVP)

1. Power: 120-240 VAC, requiring 150 watts or less.
2. Operating Temp: -34C to +74C.

3. Humidity: Up to 95% non-condensing.
4. Dimensions: 12.25" wide x 11.25" depth x 5" high.
5. Weight: 12 lbs.
6. Enclosure: Rack mount in traffic cabinet.
7. The MVP shall save configurations and zone plans locally to maintain operation with or without monitoring equipment connected.
8. The MVP shall be designed to function dependably in the adverse environment found in the typical roadside traffic cabinet.
9. The MVP shall include at least 24 detector outputs.
10. The MVP shall include an SDLC connection for TS2 type controllers.
11. The MVP shall include a USB on the front surface for simple data collection on non-networked systems.
12. The MVP shall include both LAN and WAN RJ-45 interface ports on the front surface of the unit.

Application Software

1. The application software shall support the creation and modification of at least twenty-four (24) polygonal detection zones within the graphical user interface.
2. The application software will show images of the detection zones superimposed on the video image of traffic.
3. The application software shall support the assignment of a detector output(s) to each zone. These assignments can be modified at any time through the software.
4. The application software shall support assignment of direction of travel within detection zones. The vehicle detection zone shall not activate for objects traveling any direction other than the one specified for detection. Cross-street and wrong way traffic shall not cause detection. Programming delay timings (within the MVP or controller) will not be allowed to correct for cross-street or wrong way detection.
5. The application software shall support the import and export of detector configurations and zone plans.

6. The application software shall change the color of the zone within the graphical user interface as vehicles enter or exit a detection zone, changing its occupancy status. This will be required for real-time or historical monitoring, and may be turned on or off by the user at any time.
7. The application software shall feature the ability to digitally pan, tilt, and zoom around the entire intersection without movement of the camera and without disrupting the primary fully actuated vehicle detection.
8. The application software shall maintain a database of current and historical traffic data, and allow for the user to run reports against this data to include as a minimum the following data: traffic counts, turning movement counts, average speed, and vehicle classification by length.
9. The SPVDS shall collect vehicle data at an accuracy at or above 95%, excluding issues of occlusion due to limitations imposed by camera placement.
10. The application software shall feature the ability to mask objects that occlude the camera field of view and/or disrupt the camera automatic gain and exposure control.
11. The application software shall feature an optional reporting interface offering point and click reporting for turning movement counts and vehicle classification.

Installation

1. The camera assembly(ies) shall be capable of accurate detection when mounted greater than 30 feet (9.14 m) above the road surface.
2. The camera assembly(ies) shall be capable of accurate detection when mounted up to 150 feet (45.72 m) from the stopbar.
3. With proper equipment and infrastructure, the entire intersection SPVDS shall be installed and operational in less than 6 hours.
4. Installation of the camera shall require no aiming or focusing of the camera assembly.
5. The system shall be able to be setup and configured entirely with a mouse and monitor connection to the SPVDS processor unit. No additional equipment shall be required for setup and configuration.
6. The Contractor shall verify the final location of the camera in the field to provide optimal traffic signal operations. The Contractor may be required to field adjust the location of the camera(s) and/or detection zones in the presence of the Engineer to properly detect vehicles and/or bicyclists.

Warranty and Maintenance

1. The SPVDS shall be warranted free of defects in material and workmanship for a minimum of three (3) years following installation and warranty registration. During the warranty period, the supplier shall repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect provided the product is returned FOB to the supplier's factory or authorized repair site. Product repair or replaced under warranty by the supplier will be returned with transportation prepaid. This warranty does not apply to products damaged by accident, improper operation, abuse, serviced by unauthorized personnel or unauthorized modification.
2. The camera shall feature an additional warranty to require no aiming or focusing for a period of five (5) years, following successful installation and configuration by trained and certified installers. This excludes any changes required due to lane shifts or due to extraordinary impact or duress on the camera.
3. Ongoing software support by the supplier shall include updates of the application software and detection algorithms. These updates shall be provided free of charge during the warranty period or while under an active extended warranty agreement.
4. The manufacturer shall maintain an adequate inventory of parts to support maintenance and repair of all systems under warranty or extended warranty agreement, or for a period of 10 years, whichever occurs last.

Environmental and Certifications

1. The system shall be designed to operate reliably in an operating temperature ranging from -34° C (-30° F) to +74° C (+165° F) at 0 percent to 95 percent relative humidity, non-condensing.
2. The camera, mounting hardware, and any related material, when properly installed, can withstand 150 mph (241.4 kph) wind speeds.
3. The camera enclosure shall be waterproof and dust-tight to the latest (National Electrical Manufacturers Association) NEMA-4 and IP66 specifications.
4. The camera shall meet FCC class B requirements for electromagnetic interference emissions.
5. Vibration and shock resistance meet the requirements of Sections 2.1.9 and 2.1.10, respectively, of NEMA TS-2.
6. System components comply with the environmental requirements detailed in the NEMA TS-2 standard.

7. Detection system field hardware meets the requirements in the Federal Communications Commission (FCC) 2005 Code of Federal Regulation (CFR) Title 47, Part 15 and does not interfere with any known equipment.

8. All system components shall be manufactured according to ISO 9001:2000 standards.

Load Switches

Load switches shall comply with Subsection 6.2 of the NEMA TS 2 Standard. All load switches shall utilize optically isolated encapsulated modular solid-state relays. Discrete components on circuit boards are not acceptable.

Load switch indicator lights shall be LED-type and wired on the input side of the device.

Note: The controller cabinet assembly shall be initially supplied with a full complement of load switches to accommodate each available position of the backpanel.

Flasher

Flashers shall comply with Section 6.3.3, No. 10 of the NEMA TS 2 Standard.

Flash Transfer Relays

Flash transfer relays shall comply with Subsection 6.4 of the NEMA TS 2 Standard.

Note: The controller cabinet assembly shall be initially supplied with a full complement of flash transfer relays to accommodate each available position of the back panel.

Ornamental Mast Arm Poles and Foundations

All ornamental steel mast arm poles and bases shall match the details and specifications of the ornamental tapered steel mast arm poles and bases submitted and installed at the Concord Street signalized intersections with School Street and A Street as part of the Concord Streets Improvements project.

All ornamental steel mast arm poles and bases shall be primed and painted black.

Acceptance of ornamental steel mast arm poles and bases shall be contingent upon review and approval of shop drawings submitted by the Contractor and stamped by a Civil or Structural Engineer licensed in the Commonwealth of Massachusetts. The Contractor is responsible to select and design the mast arm pole and arm. Longhand design calculations shall be submitted by the Contractor's design engineer with the shop drawings for all ornamental steel mast arms.

The Contractor is responsible for both the design and construction of all traffic signal mast arm foundations. The Contractor shall be required to provide, at their own expense, a foundation design by a Massachusetts Registered Professional Engineer in accordance with the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and detailed similarly to the Plans. Available boring logs have been included in the

Contract Documents for the Contractor's information. The need for additional borings is at the discretion of the Contractor. The cost of additional borings shall be included in the cost of the foundation design. The Contractor shall submit all calculations, designs, and details to the Engineer in the form of a shop drawing in accordance with Article V. No work shall be performed until approved shop drawings have been returned to the Contractor.

Cement Concrete Foundations

Foundations for Signal Posts, Mast Arm Poles, and Controller Cabinets Foundations shall be constructed using 4000 psi, ¾ inch, 565 Cement Concrete Masonry conforming to the relevant provisions of Section M4 of the Standard Specifications and the following:

1. Reinforcing steel shall be ASTM A-615, Grade 60.
2. The top forming of cast-in-place units shall extend downward for a minimum of 24" on the side of any foundation. The lower portions of all foundations shall be placed directly against undisturbed earth. No forms or reinforcing for foundations for mast arm poles, span wire poles and control cabinets shall be set nor shall concrete be placed until the excavation has been inspected by the Engineer and his approval to proceed has been given.

Foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is not impaired.

Signal Heads

All signal heads shall be equipped with 12 inch red/yellow/green ball or red/yellow/green arrow light emitting diode (LED) traffic modules, as indicated on the plans. Signal heads shall be made of aluminum. Signal heads shall be installed with cut tunnel visors and 5 inch non-louvered backplates with 3 inch retroreflective borders as noted on the plans.

LED Vehicle Signal Module

All LED Vehicle Signal Modules used on this project shall conform to the following:

The LED signal module shall conform to "Interim LED Purchase Specification of the Institute of Transportation Engineers, Vehicle Traffic Control Signal Heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules", July, 1998, or most current version, Institute of Transportation Engineers (ITE), 525 School St., S.W., Suite 410, Washington, DC 20024-2797, Telephone: (202) 554-8050, FAX: (202) 863-5486, and shall conform to the following: (In the case of a conflict, the following special provision shall overrule.)

An independent laboratory shall certify that the LED signal module complies with Section 6 Quality Assurance of the above state ITE LED Purchase Specification. LED Modules shall be approved and on the MassDOT Qualified Traffic Control Equipment List.

The LED signal module shall be replaced or repaired by the manufacturer if it exhibits a failure due to workmanship or material defects within the first 60 months of field operation.

The LED signal module shall be replaced or repaired by the manufacturer if it exhibits either a greater than 40 percent light output degradation or a fall below the minimum intensity levels within the first 36 months of field operation.

Pushbutton-Integrated Accessible Pedestrian Signals

Accessible Pedestrian Signal (APS) system shall be provided at the locations specified. The ADA compliant pushbutton-integrated APS system shall include the following key features: pushbutton locator tones, audible and vibrotactile walk indications, automatic volume adjustment, confirmation of button push via latching LED.

Pedestrian pushbutton controls shall be raised from or flush with their housings and shall be a minimum of 2" in the smallest dimension. The force required to activate the controls shall be no greater than 3.5 Pound Force.

A maximum mounting height of 42 inches above the finish sidewalk grade shall be used for pedestrian push buttons.

Where the two APS is separated by 10 feet or more, the audible walk indication shall be a percussive tone; where the distance between two APS is less than 10 feet, a speech walk message shall be used for the audible walk indication. A locator tone shall be provided during the pedestrian clearance and don't walk phases. Sounds will be emitted from inside a unit via a weatherproof speaker mounted behind the pedestrian sign. All audible tone duration and volume shall be set in accordance with the latest MUTCD requirements.

The APS shall consist of a pedestrian pushbutton unit and control unit. The contractor shall provide extension bracket mounted on signal posts such that a pedestrian pushbutton detector shall be located within the 10 inches from the back of wheelchair ramp level landing. The extension bracket including pushbutton and signs shall not encroach into level landing resulting in a level landing area smaller than 4 feet by 5 feet. The bracket extension shall provide the provision of mounting pushbutton and 9 inch by 15 inch sign required per ADA and MUTCD guidelines. The bracket extension shall be installed per manufacturer's recommendation and the length of the extension shall be field verified and adjusted as needed. If the final installed location of pushbutton and sign is located outside of the specified range, the Contractor shall be responsible for reinstalling the bracket extension with pushbutton at the specified location at no additional cost to the Town. The final location shall be approved by the Engineer.

Pedestrian Signal Heads

Pedestrian head indications shall be illuminated L.E.D. type displaying the graphical symbols of a walking person and/or upraised hand and countdown timers. All LED indications on the pedestrian

signal shall have an automatic dimming circuit for night illumination to reduce long-term degradation to the LEDs. Pedestrian heads shall be made of aluminum.

Each visual pedestrian indication shall be complemented by a time display indication. Each time display indication shall be self-programming and microprocessor based, with red LEDs used in the display. The time display will countdown the amount of time remaining in each walk and flashing don't walk time interval for viewing by the ambulatory public. The time display pedestrian indication shall be as shown on the plans and shall meet or exceed the specifications of the TASSIMCO Countdown Pedestrian Signal.

Emergency Vehicle Pre-emption

New emergency vehicle pre-emption equipment shall be installed.

Optically actuated emergency preemption equipment shall be installed for local control of the signals during the passing of appropriately equipped emergency vehicles through intersections. Traffic Signal Plans illustrate the proposed locations for the emergency preemption receivers and pre-empt control of the intersection.

The emergency vehicle preemption control system shall consist of a data-encoded phase selector to be installed within the traffic control cabinet. This unit will serve to validate, identify, classify and record the signal from the optical detectors located on support structures at the intersection. Upon receiving a valid signal from the detector, the phase selector shall generate a preempt call to the controller initiating a preemption operation as shown on the plans.

The optical detectors shall be single input, single output units used to control one approach.

The Contractor shall install a confirmation strobe at the traffic signal location as shown on the plans.

The following description of work specifies the responsibilities involved in the installation of an optical Emergency Vehicle Preemption system.

The Contractor is required to supply material and labor, required or shown, for the complete installation of optical preemption equipment including optical detectors, cable, interfacing equipment to the local controller, making electrical connections and all required incidentals. Prior to ordering, the Contractor shall coordinate with the City of Framingham to ensure that the new pre-emption equipment is compatible with the City's existing pre-emption equipment.

The following are the optical requirements of the emergency preemption system:

The Contractor shall arrange for a trained representative of the manufacturer of the optical energy preemption equipment to perform the following field supervision and turn-on services.

The representative shall initiate documentation for As-Built drawings.

The representative shall demonstrate the system and instruct the drivers of fire fighting vehicles in the operation of the system. Any operation problems occurring within the next 30-days shall be corrected by the Contractor or by a Field Service Representative if the Contractor cannot do so.

The cost of these field supervision and turn-on services shall be included in the Lump Sum Bid Price, and no additional payment shall be made therefore. Pre-emption System design and Documentation shall include the following:

Provide the controller manufacturer, Engineer, and Owner with electrical diagrams.

The installer shall install the equipment consistent with the pre-emption equipment, the manufacturer's recommended installation procedures and electrical diagrams in a neat and workmanlike manner.

The preemption equipment manufacturer shall be responsible for operational checkouts of the specified preemption functions prior to final acceptance and approval.

Operating checkouts includes the following:

- Verifying that the priority system timing and range are properly set.
- Preemption equipment warranties are put into effect.
- Signal Timing and Sequence under Preemption Control. See preemption data as shown on the Traffic Signal Plan(s).

Equipment Finish and Color

Traffic signal equipment including, but not limited to, ornamental signal pole/posts, bases, signal heads, visors (outside), doors, ornamental mast arms, pushbutton saddles, controller cabinets, service meter socket box, optical preemption detectors, hardware, and rigid mounting brackets for signal and signs shall be black. The Contractor shall submit to the Engineer paint chips and sample finishes on steel and aluminum of the intended color prior to any work being done under this heading.

Signal heads, doors, visors, mounting brackets, and hardware supplied direct from the manufacturers in the color stipulated above may be acceptable provided it meets or exceeds the finish process for the material indicated below.

Miscellaneous Requirements:

Software

All local controller, malfunction management unit, video detection and emergency vehicle preemption software shall be supplied with the latest available revision. Any software upgrades released by the manufacturer shall be supplied at no charge to the City for a period of five years

after acceptance of the traffic signal installation. Software and/or hardware shall be provided to allow the owner to make adjustments to the detection equipment. Software needed to make changes or additions to equipment that is installed on this project must be provided on a DVD to the City.

Documentation

Each programmable local hardware component (i.e. controller, malfunction management unit, video detection, emergency vehicle pre-emption phase selector) shall be initially programmed by the Contractor based on information contained on the plans.

Note: Three bound sets of hard copy programming per device shall be supplied to the municipality by the CONTRACTOR.

Upon final acceptance of the signal by the City, the Contractor shall supply 8½"x11" or 11"x17" laminated copy of the traffic signal design plan and sequence and timing chart to be left in the cabinet documentation envelope mounted on the inside of the cabinet door.

Testing Period

Upon completion of all work, the Contractor shall request a final inspection and test of signal equipment in writing at least thirty days prior to the inspection date. The testing date shall be established with mutual agreement among the Contractor, the City of Framingham, and the Engineer. Electrical tests shall be conducted by the Contractor, in the presence of the Engineer. The Contractor shall supply all necessary testing materials and labor for all tests and re-tests. The Contractor shall record the results of all tests and submit them to the Engineer for approval.

Fine Tuning and Adjustment Period

The Contractor shall employ the services of the manufacturer or his authorized representative to instruct City personnel on the use of the system as installed and configured, and to provide fine tuning and adjustments to all timing functions programmed within the controller units. Fine tuning and adjustment shall be accomplished at the direction of the Engineer and shall take place over a three-day period (8 hours per day). These days may or may not be consecutive and shall be established by the Engineer to allow for the study of the results of the adjustments. These events shall be scheduled and shall occur before final payment for this Item is approved.

Technical Manuals and "Box Prints"

Per MassDOT Specifications the Contractor shall provide prior to final acceptance as furnished by the manufacturer.

1. Controller Unit, Flasher, Load Switches, Conflict Monitor and all external logic units.
 - a. Electronic schematic of circuit boards.
 - b. Pictorial layout of components on circuit boards.

- c. Service manual for troubleshooting.
 - d. Manual describing the theory of operations.
 - e. Parts list showing manufacturer's part number and location.
2. Controller cabinet.
- a. Cabinet wiring diagram (3 sets).
 - b. Filed wiring diagram (3 sets).
 - c. GPS Synchronization System (1 set).

Global Positioning System and Clock Synchronization

The work under this item consists of furnishing and installing a complete Global Positioning System (GPS) to provide time reference and to synchronize the controller clocks at each traffic signal location. The system shall provide for clock synchronization reference between the controllers at the intersection of Main Street with North Street, the Stop & Shop entrance, Fisher Street, and Bullard Street / Willett Street.

GPS time reference receivers shall be installed at each cabinet by a trained representative of the manufacturer at a location determined by the representative. The Contractor shall coordinate with the manufacturer's representative for this installation.

The Contractor shall supply all other material and labor required for the complete installation of the GPS system including the interfacing equipment to the local controllers, electrical connections and all required incidentals.

Warranties on Equipment

The warranties that the Contractor receives from each manufacturer of the equipment and materials pertinent to the complete and satisfactory installation and operation of the traffic signal systems shall be transferred to the Town at the time of acceptance of the project, and at no cost to the Town. Each warranty shall indicate its expiration date and be in effect for a minimum of one year from the date the traffic signals were placed in continuous operation.

If within one year from the date the traffic signal system is placed on continuous operation the equipment and materials do not meet the warrants specified above and the Town notifies the manufacturer or its authorized representative promptly, the manufacturer or its authorized representative shall correct all defects either by repairing or replacing all defective parts at no cost to the Town.

The Contractor shall replace, at his own expense, all parts of the traffic signal control equipment found to be defective in workmanship, material or manner of functioning within six months from the final date of acceptance of all installations.

Method of Measurement

Items 816.01, 816.02 and 816.03 will be measured for payment by the unit “Lump Sum”.

Basis of Payment

The Lump Sum price bid for Items 816.01 and 816.02 shall constitute full compensation for all labor, materials, equipment and incidental costs required to complete the work at each location as specified.

Conduit shall be paid separately under Item 804.3, 3 Inch Electrical Conduit, Type NM Plastic (UL).

Pull boxes shall be paid separately under Item 811.31, Pull Box 12” x 12” - SD2.031.

Service Connection (Overhead) shall be paid separately under Item 813.8, Service Connection (Overhead).

ITEM 816.80 TRAFFIC CONTROL SIGNAL REMOVED AND STACKED LUMP SUM

The work under this item shall include the removal, transporting and stacking, as directed by the Engineer, of the existing traffic signal equipment at the following locations:

Location 1: Central Street / Water Street

Location 2: Central Street / Concord Street / Elm Street

Location 3: Concord Street / Watson Place

The Contractor shall minimize the amount of time that a traffic signal is not operational and actively controlling traffic at the intersection, and the Contractor shall plan and schedule the work accordingly. Unless otherwise approved by the Engineer, the Contractor's schedule shall provide for the new traffic signal to be operational before the end of the same working day when the existing traffic signal is turned off. Police and other temporary traffic control devices shown on the Plans must be used to safely control traffic at the intersection when the traffic signal is not operational.

The Contractor shall avoid damaging existing equipment and materials while removing traffic signal equipment. Damage that occurs due to the action or inaction of the Contractor shall be repaired by the Contractor at no additional cost to the City.

The individual items of work shall include, but not necessarily be limited to: removing, transporting and stacking existing traffic signal equipment including the removal and disposal of their foundations and electrical systems; removing and disposing existing hand holes, abandoning existing signal conduit; disconnecting the power source(s).

Unless otherwise indicated on the Plans, a Plan callout to remove and dispose the foundation of a mast arm, traffic signal pole or cabinet shall require the removal of the foundation, including all reinforcement, ground rods, and conduit/wiring within, to a minimum depth of twenty-four (24) inches below the finished grade surrounding the foundation, with the remaining portion of the foundation to remain buried in place. The resulting excavated areas shall be backfilled with suitable material, compacted, and finished in accordance with the applicable Section of the Standard Specifications so that the patched areas will match existing conditions to the satisfaction of the Engineer.

All existing mast arms, ground-mounted signal poles, signal heads, LED modules, backplates and visors; controller cabinets with internal components; and pull box frames and grates shall be carefully removed, and with prior approval of the Engineer, transported and stacked at the Department of Public Works, 110 Western Avenue, Framingham, MA 01702. If the City of Framingham Department of Public Works determines any equipment is not acceptable, it shall become the property of the Contractor for disposal off site at no additional cost.

Old cable and all unusable material, as determined by the Engineer, shall be disposed of by the Contractor. All work related to the disposal of old cable and all unusable material shall be considered incidental to this Item.

Compensation

Traffic control signal removed and stacked will be paid for at the Contract unit price per Lump Sum for Item 816.80, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for dismantling, loading, transporting, and stacking of the traffic control signals as designated above, the excavation and disposal of the existing foundations, the supplying and replacing of compacted gravel backfill and restoration or replacement, in kind, of the area where foundations and posts are removed, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 821.93 **ORNAMENTAL LIGHT POLE-POST TOP** **EACH**
(MUNICIPAL STANDARD)

The work under these items shall conform to the relevant provisions of Sections 820 of the Standard Specifications and the following:

The pole shaft, base, banner arm, luminaire, luminaire mount (arm/attachment), duplex outlet box and cover, decorative fittings and hardware shall be finished with a black polyester powder coat paint applied after multi-stage pre-treatment process to ensure uniformity of appearance. The complete assembly of the pole shaft, pole base and banner arm shall be rated for the design wind speed of 130 MPH per Subsection 820.41. AASHTO breakaway requirements shall not apply. Shop drawings and calculations shall be submitted, stamped by a professional engineer registered in the Commonwealth of Massachusetts.

The contractor shall submit shop drawings and catalog data for the pole, base, outlet, outlet cover, and luminaire as a complete and coordinated submittal indicating all mounting provisions of the various items, dimensioned.

All wiring, splices, grounding, fuses and connections installed within the light pole, base, and luminaire shall meet the requirements of Section 813.

The exterior of the pole components shall be free of protuberances, dents, cracks, discolorations and other imperfections marring their appearance.

All hardware shall be stainless steel.

The dead load deflection at the top of the shaft caused by the weight of the arm, luminaires and all appurtenances attached thereto shall not exceed 2% of the shaft length. The length of the pole shaft shall be determined by the contractor to meet the luminaire mounting height indicated on the plans.

Drawing Designation: B1

Pole and Base:

The decorative light pole shall consist of one-piece shaft with decorative, aluminum clamshell bases. Each pole shall be fabricated in a manner to accommodate a single post-top luminaire,

and where not part of the luminaire assembly – a weatherproof while in use duplex outlet. Base shall set flush with top of light pole foundation. A decorative base shall conceal the anchor bolts and nuts. A handhole in the decorative base shall be permitted.

1. Quantity in Each Configuration: 1 pole, 1 base
2. Pole Height: 14'-0"
3. Pole Diameter at Base Plate: 6"
4. Pole Taper: Round Taper @ 0.14" Per Ft.
5. Pole Shape: Round w/ 12 Flat Flute Profile
6. Pole Wall: 0.188" wall thickness
7. Base Cover: 19.5" diam (point to point) / 18.25" diam (flat to flat) x 2'-3" tall
8. Tenon: 3 1/2" diam x 3" long
9. Handhole: 3" x 5" (nominal) cover secured by (2) 1/4"-20 SS screws
10. Access Door: Locate street-side of pole
11. Anchor Bolts: (4) 3/4" diam x 24"L + 3" hook. Per ASTM F1554 – 07 – Gr55, fully hot dipped galvanized per ASTM A153 (1) hex nut and (1) flat washer
12. Bolt Projection: 3"
13. Bolt Circle: 9.5" Bolt Circle
14. Base Plate: 10.25" Square Base Plate w/ 1" slots to accommodate a 3/4" diam Anchor Bolt (4@ 90deg)
15. Ground Provision: Located inside pole handhole
16. Finish: T.G.I.C. polyester powder coat – gloss black
17. Weight: 60 lbs.
18. Material: Base: Cast Aluminum Alloy 356 per ASTM B26 "Clamshell;" Shaft: Aluminum Alloy 6063 per ASTM B221 and heat treated to T6 temper after welding
19. GFCI Outlet:
 - a. Located 1'-6" from top of pole
 - b. 20 Amp GFCI outlet in black finish
20. Outlet Cover:
 - a. Weatherproof while-in-use aluminum cover painted out to match pole, gloss black
 - b. Locate 90 degrees to handhole
 - c. To be installed facing away from oncoming drivers (consistent per street side)
21. Base Cover: Base Halves connect around pole base using (2) 5/16-18 X 3" stainless steel button head cap screws (Top) and (2) 5/16-18 X 1 1/2" stainless steel button head cap screws (Bottom)
22. Fluting: Bottom of fluting starts 1" above top of base cover (2'-4" from top of foundation)

Luminaire:

1. Quantity in Each Configuration: 1 luminaire
2. Optics: Baffled array acrylic rippled
3. Lamping: 60-watt LED
4. LEDs: ROHS compliant, 100% mercury and lead free
5. Lumens: 5,400 lm
6. Minimum Efficacy: 98 (lm/w)
7. Voltage: Universal Electronic, wired at 120v to 277v
8. CCT: 4,000K

9. CRI: Minimum of 70
10. Distribution: Type 3 (directed toward roadway)
11. Pole Adapter: K18 with internal 3-pin receptacle and long life photocontrol
12. Power Supply / Driver: Electronic Class 2 0-10V dimmable driver w/ IP66 minimum rating
 - a. Temp Range: -40deg Celsius to 40deg Celsius
 - b. Surge Protection: 20kV UL Surge Protection Device integral to fixture
13. Driver Location: Integral to fixture, mounted to heavy duty fabricated bracket to allow for ease of maintenance
14. Life: Minimum L90 of 60,000 hours minimum with projected L70 at 205,000 hours
15. Listing & Rating:
 - a. Minimum IP65
 - b. UL Wet Location (US/Canada)
 - c. Vandal Rating: IK10
 - d. Tested and in conformance w/ IESNA LM-79 & LM-80 test standards at 25-degree Celsius
 - e. DesignLights Consortium™ Premium Classification qualified product
 - f. International Dark Sky Association listed
16. Finish: T.G.I.C. polyester powder coat – gloss black
17. Options:
 - a. Solid Spun Top
 - b. #1 Vented Finial
 - c. Quick Disconnect Wiring
 - d. 540 Joule @ 2mS 20kA-8/20uS Surge Protection

Banner Arm:

A set of (2) "clamp-on" style banner arms designed to mount one 18-inch-wide x 30-inch-long banner shall be supplied with each light pole. Banners will be furnished and installed by the City of Framingham and are not part of this contract. The banner clamps shall be sized to fit to the pole shaft section for both upper and lower locations. Each clamp assembly shall include (2) ½-inch-diameter stainless steel hex head machine bolt fasteners and locking hardware and allow no more than a ½-inch gap between the matching clamp surfaces when assembled to the pole shaft. The banner arms shall be made from aluminum. One end of the pipe shall be equipped with a 1/4- 20 set screw used as a means to attach a removable 2-inch diameter cast aluminum ball finial.

1. Style: Clamp on
2. Material: Aluminum with stainless steel hardware
3. Finish: T.G.I.C. polyester powder coat – gloss black

Outlet / Outlet Cover:

The 20-amp, 125 volt, ground fault circuit interrupter weatherproof duplex receptacle shall be mounted in the post at height indicated. The receptacle shall be UL Listed according to E-48380 and UL 943 class A and UL 498. The cover shall be cast aluminum, lockable, UL listed and suitable for wet locations while in use and comply with NEC Article 410-57(b). Where available as a standard option, the receptacle may be furnished with the luminaire. The receptacle and cover shall mount to the outlet opening in the pole with stainless screws and a gasket.

All hardware shall be stainless steel.

The dead load deflection at the top of the shaft caused by the weight of the arm, luminaires and all appurtenances attached thereto shall not exceed 2% of the shaft length. The length of the pole shaft shall be determined by the contractor to meet the luminaire mounting height indicated on the plans.

Drawing Designation: B2

Pole and Base:

The decorative light pole shall consist of one-piece shaft with decorative, aluminum clamshell bases. Each pole shall be fabricated in a manner to accommodate a double post-top luminaire, and where not part of the luminaire assembly – a weatherproof while in use duplex outlet. Base shall set flush with top of light pole foundation. A decorative base shall conceal the anchor bolts and nuts. A handhole in the decorative base shall be permitted.

1. Quantity in Each Configuration: 1 pole, 1 base
2. Pole Height: 14'-0"
3. Pole Diameter at Base Plate: 6"
4. Pole Taper: Round Taper @ 0.14" Per Ft
5. Pole Shape: Round w/ 12 Flat Flute Profile
6. Pole Wall: 0.188" wall thickness
7. Base Cover: 19.5" diam (point to point) / 18.25" diam (flat to flat) x 2'-3" tall
8. Tenon: 3 1/2" diam x 3" long
9. Handhole: 3" x 5" (nominal) cover secured by (2) 1/4"-20 SS screws
10. Access Door: Locate street-side of pole
11. Anchor Bolts: (4) 3/4" diam x 24"L + 3" hook. Per ASTM F1554 – 07 – Gr55, fully hot dipped galvanized per ASTM A153 (1) hex nut and (1) flat washer
12. Bolt Projection: 3"
13. Bolt Circle: 9.5" Bolt Circle
14. Base Plate: 10.25" Square Base Plate w/ 1" slots to accommodate a 3/4" diam Anchor Bolt (4@ 90deg)
15. Ground Provision: Located inside pole handhole
16. Finish: T.G.I.C. polyester powder coat – gloss black
17. Weight: 60 lbs.
18. Material: Base: Cast Aluminum Alloy 356 per ASTM B26 "Clamshell;" Shaft: Aluminum Alloy 6063 per ASTM B221 and heat treated to T6 temper after welding
19. GFCI Outlet:
 - a. Located 1'-6" from top of pole
 - b. 20 Amp GFCI outlet in black finish
20. Outlet Cover:
 - a. Weatherproof while in use aluminum cover painted out to match pole, gloss black
 - b. Locate 90 degrees to handhole
 - c. To be installed facing away from oncoming drivers (consistent per street side)

21. Base Cover: Base Halves connect around pole base using (2) 5/16-18 X 3" stainless steel button head cap screws (Top) and (2) 5/16-18 X 1 1/2" stainless steel button head cap screws (Bottom)
22. Fluting: Bottom of fluting starts 1" above top of base cover (2'-4" from top of foundation)

Luminaire:

1. Quantity in Each Configuration: 2 luminaires
2. Optics: Baffled array acrylic rippled
3. Lamping: 60-watt LED
4. LEDs: ROHS compliant, 100% mercury and lead free
5. Lumens: 5,400 lm
6. Minimum Efficacy: 98 (lm/w)
7. Voltage: Universal Electronic, wired at 120v to 277v
8. CCT: 4,000K
9. CRI: Minimum of 70
10. Distribution: Type 3 (directed toward roadway)
11. Pole Adapter: K18 with internal 3-pin receptacle and long life photocontrol
12. Power Supply / Driver: Electronic Class 2 0-10V dimmable driver w/ IP66 minimum rating
 - a. Temp Range: -40deg Celsius to 40deg Celsius
 - b. Surge Protection: 20kV UL Surge Protection Device integral to fixture
13. Driver Location: Integral to fixture, mounted to heavy duty fabricated bracket to allow for ease of maintenance
14. Life: Minimum L90 of 60,000 hours minimum with projected L70 at 205,000 hours
15. Listing & Rating:
 - g. Minimum IP65
 - h. UL Wet Location (US/Canada)
 - i. Vandal Rating: IK10
 - j. Tested and in conformance w/ IESNA LM-79 & LM-80 test standards at 25-degree Celsius
 - k. DesignLights Consortium™ Premium Classification qualified product
 - l. International Dark Sky Association listed
16. Finish: T.G.I.C. polyester powder coat – gloss black
17. Options:
 - a. Solid Spun Top
 - b. #1 Vented Finial
 - c. Quick Disconnect Wiring
 - d. 540 Joule @ 2mS 20kA-8/20uS Surge Protection

Luminaire Arm:

1. Quantity in Each Configuration: 1 arm
2. Material: Cast aluminum SR319 alloy
3. Finish: T.G.I.C. polyester powder coat – gloss black
4. Orientation: Mounted parallel to roadway

Banner Arm:

A set of (2) "clamp-on" style banner arms designed to mount one 18-inch-wide x 30-inch-long banner shall be supplied with each light pole. Banners will be furnished and installed by the City of Framingham and are not part of this contract. The banner clamps shall be sized to fit to the pole shaft section for both upper and lower locations. Each clamp assembly shall include (2) 1/2-inch diameter stainless steel hex head machine bolt fasteners and locking hardware and allow no more than a 1/2-inch gap between the matching clamp surfaces when assembled to the pole shaft. The banner arms shall be made from aluminum. One end of the pipe shall be equipped with a 1/4- 20 set screw used as a means to attach a removable 2-inch diameter cast aluminum ball finial.

1. Style: Clamp on
2. Material: Aluminum with stainless steel hardware
3. Finish: T.G.I.C. polyester powder coat – gloss black

Outlet / Outlet Cover:

The 20-amp, 125 volt, ground fault circuit interrupter weatherproof duplex receptacle shall be mounted in the post at height indicated. The receptacle shall be UL Listed according to E-48380 and UL 943 class A and UL 498. The cover shall be cast aluminum, lockable, UL listed and suitable for wet locations while in use and comply with NEC Article 410-57(b). Where available as a standard option, the receptacle may be furnished with the luminaire. The receptacle and cover shall mount to the outlet opening in the pole with stainless screws and a gasket.

Basis of Design:

Luminaire: King Luminaire # K199R-B2AR-III-60(SSL)-1042-120:277-K18-SST-PE (Qty 2)
Pole: King Luminaire # KSBSCL-FF-A188-14-DR-BA (Qty 1)
Luminaire Arm: King Luminaire # KA71-T-2 (Qty 1)
Diver: Meanwell # HLG-100H (Qty 2)

Experience/Warranties:

The pole manufacturer shall have been in the business of manufacturing outdoor lighting products for the municipal street lighting market for a minimum of ten (10) years. Paint systems shall be warranted for a period of 5 years against peeling, cracking or excessive fading.

The reference to catalog numbers above is not intended to be all inclusive of the complete manufacturer's ordering number that may be required to meet all product and material or mounting height requirements of the specifications and drawings.

Method of Measurement

These items will be measured and paid for at the Contract unit price per each pole installed, which price shall be full compensation for all labor, materials, equipment and incidental costs required for the work.

Basis of Payment

No separate payment shall be made for all wiring, splices, fusing, grounding and connections installed within the light pole, base, bracket arm and luminaire, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.61**HIGHWAY LIGHTING LOAD CENTER****LUMP SUM**

The work under this item shall conform to the relevant provisions of Sections 815 and 820 of the Standard Specifications and the following:

The work shall include the furnishing and installation of Highway Lighting Load Centers at location shown on the street lighting plans and as directed by the Engineer.

The lighting load center shall include overall weatherproof enclosure of size required to enclose the required equipment, meter socket to comply with the local utility metering requirements, NEMA 1 electrical panelboard rated for 240/120 volt, single phase, three wire operation of size indicated, 20 amp bolt-on single pole and multi-pole branch circuit breakers, ground rods, grounding bushings, conduit, supports, fasteners and testing necessary to form a complete and operation lighting load center for the control and protection of the lighting and receptacle system. Overall enclosure material shall be aluminum and comply with the construction requirements of Standard section 815 for controller cabinet.

Measurement and Payment

Highway Lighting Load Center will be paid for at the Contract unit price per lump sum, which price shall be full compensation for all labor, materials, equipment and incidental costs required for the work.

ITEM 825.2**RRFB (2-POST ASSEMBLY SYSTEM)****EACH**

All work under this item shall be in accordance with Section 800 of the Standard Specifications, the Plans, and the following:

Description

This work shall consist of furnishing and installing an AC-powered, pedestrian actuated, Rectangular Rapid Flashing Beacon (RRFB) system on the west side of Concord Street at Fuller Street as shown in the plans. RRFBs are intended to provide supplemental warning to approaching vehicles of the potential for pedestrians to be crossing in an adjacent crosswalk.

Materials

One AC-powered RRFB shall, at a minimum, consist of the following items, which shall be included in the unit bid per each:

- (2) cement concrete foundation;
- (2) 15' traffic signal posts and pedestal;
- (2) APS pushbutton system;
- (2) dual rectangular yellow LED light bar in NEMA enclosures;
- (2) 9"x12" R10-25 (PUSH BUTTON TO TURN ON WARNING LIGHTS) sign;

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Construction Specifications

Saxonville Intersection Improvement Project

- (4) 30"x30" W11-2 (Pedestrian Warning) signs;
- (2) 24"x12" W16-7PR and (2) 24"x12" W16-7PL (Diagonal Downward Arrow) signs;
- (2) NEMA Type 3R or higher enclosures to house:
 - Electrical components, including wiring and solid-state circuit boards;
 - On-board user interface; and
 - Frequency hopping spread spectrum (or other alternate FCC approved) wireless activation unit with a minimum 150' range; and
- (2) Meter box;
- All mounting and supporting hardware and wiring necessary to complete a working system.

The Contractor shall supply cement concrete foundations per the Plans.

The Contractor shall supply Schedule 80 aluminum signal posts with a brushed or spun finish and square, pedestal aluminum bases with a natural finish unless otherwise shown in the Plans.

Each Light Bar shall have a pair of yellow beacons facing one or both directions of traffic, as shown in the Plans.

All sign designs shall conform to the MUTCD. Sign panel information, including dimensions, shall be per the Plans. The warning signs (MUTCD code W11-2, W11-15, or S1-1 signs – see Plans for sign type), and the diagonal downward arrow sign (W16-7P) signs shall be on Type A aluminum, conforming to 828.42: Panels. The sign sheeting shall be fluorescent yellow-green, conforming to ASTM D4956 Type IX.

An R10-25 sign, conforming to the MUTCD, shall be mounted above the APS Pushbutton on a Type A aluminum or may be integral to the button assembly.

Each assembly shall be rated for wind speeds of up to 90 mph.

Any proprietary software required for the programming and/or operation of the system during its lifetime shall be included at no additional cost.

RRFB controller and LED beacons, APS pushbutton systems, and traffic signal posts and pedestals shall be listed on the MassDOT Qualified Traffic Control Equipment List.

The light intensity of the LED beacons during daytime conditions shall meet the minimum specifications for Class 1 yellow peak luminous intensity in the Society of Automotive Engineers (SAE) Standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January, 2005. An automatic signal dimming device shall be included to reduce the brilliance of the LED beacons during nighttime conditions.

Prior to the Notice to Proceed the Contractor shall submit shop drawings for the RRFB system, including cutsheets for all components to show conformance with M10.05, M10.09.1, and M10.11.0 and these specifications.

All RRFB components shall include a minimum 1-year manufacturer's replacement warranty for manufacturing or installation defects starting at the date of acceptance by the Engineer.

Construction Methods

No work shall commence until the shop drawings are approved.

Layout and design of the RRFB system shall conform to the plans.

RRFBs shall be installed on new foundations at the locations as shown in the Plans. Bases shall be secured to the foundation in accordance with the manufacturer's specifications.

All systems shall be installed per the manufacturer's instructions.

The location and orientation of the system shall be per the Plans.

The arrow on each APS pushbutton shall be aligned parallel to the direction of travel of the crosswalk.

The Light Bar(s) shall be oriented towards the incoming lane(s).

Conduit installations shall be per Subsection 801.60.

Pull box installations shall be per Subsection 801.61.

Foundation installations shall be per Subsection 801.62. The top of the foundation shall be ¼" to 1" proud of the sidewalk and chamfered at 45 degrees. Gaps between the sidewalk and foundation shall be no larger than ¼" and grouted with preformed joint filler.

The contractor shall provide extension bracket mounted on the signal posts such that the pedestrian pushbutton detector shall be located within the 10 inches from the back of wheelchair ramp level landing. The extension bracket including pushbutton and signs shall not encroach into level landing resulting in a level landing area smaller than 4 feet by 5 feet. The bracket extension shall provide the provision of mounting pushbutton and 9 inch by 15 inch sign required per ADA and MUTCD guidelines. The bracket extension shall be installed per manufacturer's recommendation and the length of the extension shall be field verified and adjusted as needed. If the final installed location of pushbutton and sign is located outside of the specified range, the

Contractor shall be responsible for reinstalling the bracket extension with pushbutton at the specified location at no additional cost to the state. The final location shall be approved by the Engineer.

Equipment grounding shall be per Subsections 813.61 and 813.62.

Service connection shall be per Subsection 813.63. Contractor shall be required to pay all costs associated with the utility connection until final acceptance of the system. Upon acceptance, the contractor shall notify the Framingham Department of Public Works in writing with the account number and meter number in order to transfer payment of the account.

The Contractor shall diagnose and replace any part of the pedestrian activated warning system that is found to be defective in workmanship, material, or manner of functioning within six months of final acceptance by the Engineer. This requirement does not supersede the one-year warranty period on materials specified in Subsection 815.20.

All RRFB equipment including, but not limited to, signal pole/posts, bases, pushbutton saddles, and control cabinets shall be painted black.

System Operation

APS Pushbuttons

APS Pushbuttons shall actuate the RRFB system. Upon actuation, an audible speech message shall be broadcast from each pushbutton in the system that says, "Warning lights are flashing," shall be stated twice. This message shall be repeated upon each actuation. No other messages shall be allowed.

Each APS pushbutton shall have a tactile arrow. The tactile arrow shall be oriented to point in the direction of the crosswalk.

While the system is in dark mode, the APS Pushbuttons shall broadcast a locator tone. The locator tone shall have a duration of 0.15 seconds or less and shall repeat at 1-second intervals at all times that the system is in dark mode. The locator tone shall be set 2 to 5 dBA above ambient sound, shall automatically adjust intensity, but cap at a maximum volume of 100 dBA.

APS Pushbuttons shall have all other vibrotactile and percussive indications disabled.

Light Bar

The Light Bar shall remain dark until actuated.

Upon actuation, all Light Bars in the system shall be activated simultaneously for a predetermined repeating flash sequence. The flashing rate shall be 75 flashing sequences per minute.

The left and right yellow beacons shall operate using the following sequence:

1. The yellow beacon on the left-hand side shall be illuminated for approximately 50 milliseconds.
2. Both yellow beacons shall be dark for approximately 50 milliseconds.
3. The yellow beacon on the right-hand side shall be illuminated for approximately 50 milliseconds.
4. Both yellow beacons shall be dark for approximately 50 milliseconds.
5. The yellow beacon on the left-hand side shall be illuminated for approximately 50 milliseconds.
6. Both yellow beacons shall be dark for approximately 50 milliseconds.
7. The yellow beacon on the right-hand side shall be illuminated for approximately 50 milliseconds.
8. Both yellow beacons shall be dark for approximately 50 milliseconds.
9. Both yellow beacons shall be illuminated for approximately 50 milliseconds.
10. Both yellow beacons shall be dark for approximately 50 milliseconds.
11. Both yellow beacons shall be illuminated for approximately 50 milliseconds.
12. Both yellow beacons shall be dark for approximately 250 milliseconds.

The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be more than 5 flashes per second, to avoid frequencies that might cause seizures.

The sequence shall then be repeated until the duration time has been met and then all yellow beacons shall return to dark mode simultaneously. The duration time shall be per the Plans.

The predetermined repeating flash sequence shall be immediately initiated every time a pushbutton detector is actuated. If the RRFBs are already flashing and an actuation is received, it shall restart the duration time. There shall be no delay time programmed between actuations.

Service Connection

As soon as notice to proceed with construction is given, the electrical contractor shall submit a request to the servicing utility company for electrical service on behalf of the MassDOT.

Service connections shown on the plans are approximate only. The Contractor shall determine exact locations from the servicing utility, arrange to complete the service connections, and be responsible for all charges incidental thereto.

A 100-ampere meter socket approved by the servicing utility company shall be furnished and installed on the side of the control cabinet by the serving utility company.

A 3" PVC Conduit shall be installed from the controller cabinet to the utility pole and/or electric manhole, which will supply electrical service to the RRFB system. This conduit shall be encased in concrete where crossing roadways and/or driveways.

The Contractor shall furnish and install, or cause to be installed, all service equipment to the

satisfaction of the electric utility company. It shall also be the Contractor's responsibility to pay all charges to the utility company for performing the work previously described.

No direct reimbursement will be made under this contract to the Contractor for payment made to electric company, it being understood that full compensation for any payment made by the Contractor to the utility company will be included in the contract prices bid.

Grounding Cable – Grounding cable shall be bare copper No. 8 AWG wires.

Method of Measurement

RRFBs will be measured as a 2-Post Assembly furnished and installed.

Basis of Payment

The work will be paid for at the contract price each under the respective item for a 2-Post Assembly System. Any additional wiring, mounting equipment, or other materials or labor required to for an operating system per the Plans and Specifications shall be considered as incidental to the construction and be included in the contract price.

<u>ITEM 827.991</u>	<u>SMALL GATEWAY SIGN</u>	<u>EACH</u>
<u>ITEM 827.992</u>	<u>LARGE GATEWAY SIGN</u>	<u>EACH</u>

General

All work shall be done in accordance with the relevant sections of the Standard Specifications including Section 828.

Description

The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to fabricate, furnish and erect gateway signs, as indicated on the plans and as specified.

References and Standards

The following standards shall apply to the work of this Section.

1. National Building Granite Quarries Association, Inc. (NBGQA): Specs. for Arch. Granite
2. The Massachusetts Highway Department "Construction Standards"
3. 521 CMR as issued by the Massachusetts Architectural Access Board
4. ADAAG - Americans with Disabilities Act Accessibility Guidelines as issued by USArchitectural and Transportation Barriers Compliance Board.

Submittals

1. Manufacturers Qualifications per requirements of Quality Assurance.

2. Construction shop drawings for sign types showing shape, size, type styles, symbols, dimensioned graphic layouts, methods of graphic application, colors, materials, posts, and fabrication and mounting details.
3. 12" x 12" Sign panel sample. Sample to have sign colors, required finishes and vinyl lettering with clear coat finish.
4. Cut sheets for hardware
5. Submit name and sample of granite, manufacturer and quarry supplying granite for approval by the Engineer.

Warranty

Provide a written warranty for two years from date of final acceptance for the signs to be free of defects on workmanship and materials. The Contractor shall submit the warranty on corporate letterhead.

Permits

The sign contractor will obtain any permits if required for signs. The town will pay for permits at cost.

Quality Assurance

Qualifications of manufacturer: A firm with 5 years experienced in fabricating signs similar to the project as well as sufficient production capacity to manufacture required units. Provide documentation of 3 successful projects similar in design for review and approval.

Field verify all sign locations and notify the Engineer of any discrepancies. Any discrepancies with sign size and available space will be responsibility of Fabricator.

Comply with all federal, state and local laws, codes, ordinances, and regulations related to signs, including 521 CMR as issued by the Massachusetts Architectural Access Board, and ADAAG - Americans with Disabilities Act Accessibility Guidelines as issued by US Architectural and Transportation Barriers Compliance Board.

To facilitate preparation of submittals, the Engineer will provide digital graphic layouts for each sign type to the designated sign contractor.

Delivery, Storage, and Handling

All items shall be moved about the site or otherwise delivered to the job adequately protected from damage during transit.

Items shall be protected against staining, chipping, and other damage. Cracked, chipped, or stained items will be rejected and shall not be employed in the work.

MATERIALS

Gravel Base

Base materials shall consist of compacted gravel borrow (M1.03.0, Type C) as shown on Drawings.

Cement Concrete

Cement concrete for sidewalks shall be air-entrained 4,000 psi, $\frac{3}{4}$ Inch, 610, as specified in Section M4.02.00 of the Standard Specifications.

Granite Posts

Granite shall be Woodbury Gray or Blue Sky Gray; provide flamed finish on all exposed sides

Granite shall be standard grade, sound and uniform in quality, texture, and strength, and shall be free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects that may impair its strength, durability, function, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects that would affect its appearance.

Granite Fabrication

1. Obtain all granite from single source.
2. All faces shall be at right angles to the plane of the top unless otherwise noted.
3. Granite shall be cut accurately to required shapes and dimensions. Tolerances shall be less than 1/8".
4. Holes, cut-outs, sinkages and openings in granite work for anchors, cramps, dowels, supports, and lifting devices, shall be accurately cut or drilled to required dimensions, as shown on the approved Shop Drawings, and as necessary to secure granite in place to insure correct location and accurate fit of all fixtures.
5. Arrises shall be cut sharp and true to square and continuous with adjoining arrises. Where exposed, arrises shall be eased as shown on contract documents and approved shop drawings.

Sign Panels, Angles and Metal Posts

The drawings are diagrammatic and indicate "design intent" only. Details shown are intended as a guide for the interfacing of adjacent surfaces.

Provide workmanship and materials, free of defects. Defective is defined to include: Delamination, abnormal deterioration, fading and discoloration, weathering, failure of securing to substrates indicated, cracking, corrosion or coating damage, or visible scratches on surfaces.

Signage shall not bear manufacturer's code or other identifying marks on any area or part, which may be visible in the normal positioning, attitude, or use of the sign item.

Sign fabrication shall be done in a plant properly equipped for the production of the types of signs specified. Sign panels shall show careful workmanship and present a reasonably plane surface with the message and outlines clear and sharp.

Sign Panels, Angles and Metal Posts shall be fabricated from ASTM B 209, Alloy 6061-T6 or Alloy 5052-H38 or approved equivalent.

3" Square Post and Cap

1. Material: aluminum square tube 6061 - 3" x 3" x .250" wall
2. Fabrication process: extruded
3. Corners: square, smooth
4. Color: Black
5. Surface process: paint all exposed surfaces with Matthews acrylic polyurethane, with clear coat satin finish.

Aluminum Angle

Material: aluminum angle - 2" x 2" x .250" wall

1. Fabrication process: extruded, saw cut
2. Edges: square, smooth
3. Color: Black
4. Surface process: paint all exposed surfaces with Matthews acrylic polyurethane, with clear coat satin finish.
5. Weld angle to panel.
6. Fastener: tamper-resistant mechanically fastened to post.

Aluminum Sign Panel

1. Material: 1/4" thk aluminum sheet
2. Fabrication process: router cut
3. Edges: smooth
4. Color: as specified in the plans
5. Surface process: paint all exposed surfaces with Matthews acrylic polyurethane, with clear coat satin finish.

Logo and Letters

1. 3m uv/graffiti vinyl with clear coating
2. Color: as specified in the plans

Hardware

Material for attachment shall conform to the following specifications:

Part

Aluminum: ASTM

Stainless Steel: AISI

Reflective sheeting on drums shall meet or exceed ASTM D4956 Type VIII. All drums shall be maintained in a satisfactory manner including the removal of oils, dirt, and debris that may cause reduced retroreflectivity.

The Contractor shall use one of the following sequential flashing warning light systems unless otherwise approved by the Engineer:

1. Empco-Lite LWCS D
2. pi-Lit Sequential Barricade-Style Lamp; or
3. Unipart Dorman SynchronoGUIDE

Sequential flashing warning lights shall be secured to reflectorized drums per the light manufacturer's specifications.

Construction Methods

The first ten drums in any merging or shifting taper as designated in the Temporary Traffic Control Plan shall be equipped with sequential flashing warning lights. These lights shall be operating, at a minimum, between dusk and dawn when the taper is deployed.

The successive flashing of the sequential warning lights shall occur from the upstream end of the merging or shifting taper to the downstream end of the taper in order to identify the desired vehicle path. Each warning light in the sequence shall be flashed at a rate of not less than 55, nor more than 75 times per minute.

Warning lights shall be powered off when drums are not deployed in a taper.

Method of Measurement

A group of ten (10) reflectorized drums with sequential flashing warning lights is considered one (1) unit and will be measured by the day. Each period of up to 24 hours during which this unit is in use will be measured as one day regardless of the number of times that the drums are positioned, repositioned, removed, or returned to service.

Basis of Payment

Reflectorized Drums with Sequential Flashing Warning Lights will be paid for at the contract unit price per day, which shall include full compensation for furnishing, positioning, repositioning, and removing the group of ten (10) drums as directed by the Engineer.

<u>ITEM 860.116</u>	<u>4 INCH REFLECTORIZED WHITE LINE (PAINTED)</u>	<u>FOOT</u>
<u>ITEM 861.116</u>	<u>4 INCH REFLECTORIZED YELLOW LINE (PAINTED)</u>	<u>FOOT</u>

Description

The work to be done under this item shall conform to the relevant provisions of Section 860 of the Standard Specifications and the following:

All pavement markings shall conform to the MassDOT material specification M7.01.03. Standard white or yellow color shall conform to 2009 MUTCD standards.

Work under this item shall consist of the furnishing and installation of 4 inch reflectorized white and yellow lines on pavement surfaces as shown on the plans.

Method of Measurement

These items will be measured by the foot, complete in place.

Basis of Payment

These items will be paid for at the contract unit price per foot which price shall constitute full compensation for furnishing, installing, maintaining and removing the markings and all other labor, tools, equipment, materials and incidentals necessary to complete the work.

<u>ITEM 866.116</u>	<u>4 INCH REFLECTORIZED WHITE LINE (EPOXY)</u>	<u>FOOT</u>
<u>ITEM 867.116</u>	<u>4 INCH REFLECTORIZED YELLOW LINE (EPOXY)</u>	<u>FOOT</u>
<u>ITEM 868.12</u>	<u>12 INCH REFLECTORIZED WHITE LINE (EPOXY)</u>	<u>FOOT</u>

Description

The work to be done under this item shall conform to the relevant provisions of Section 860 of the Standard Specifications and the following:

Work under this item shall consist of the furnishing and installation of lead free white fast curing epoxy reflectorized pavement markings on pavement surfaces as shown on the plans.

As work incidental to this item, the Contractor or epoxy Material Supplier shall measure the performance of the pavement markings upon installation according to the measurement and sampling procedures outlined in ASTM D 6359, using a new hand-held 30-meter retroflectometer.

Materials

FAST CURING EPOXY TRAFFIC PAINT (no-track times < 10 minutes).

- Innovative Performance Systems HPS-3, Ph. 800.448.3482
- Epoplex LS-70, Ph. 800.822.6920

No work shall be commenced by the Contractor until approval of the shop drawings and manufacturer's data has been received in writing from the City. Approval of these drawings will be general in character and shall not relieve the Contractor from the responsibility of, or the necessity of, furnishing materials and workmanship conforming to the specifications.

Street Name Signs

Street Name Blank – Each street name shall consist of two sign blanks fabricated from flat sheet aluminum, ASTM B209, Alloy 5052-H38. The sign blanks shall be free of burrs, corrosion, white rust and dirt. The thickness of the sign blanks shall be 0.080 inches.

The sign blanks shall be 9 inches in height and have 1.5-inch radius corners.
All sign blanks shall have the street name legend on both side of each sign blank.

Background Sheeting – The background sheeting shall be blue reflective with a 0.5-inch white reflective border. The border shall have no margin. The reflective material for both the background and border shall be “High Intensity Prismatic Type III or IV”, conforming to ASTM D4956-01 specifications. All reflective sheeting shall be approved by the City prior to any manufacturing or installation.

Treatment of sign blanks prior to application of reflective sheeting shall be as described in Subsection of 828.42 of the MassDOT Standard Specifications.

Lettering – The legend (i.e., street name) for each street name sign shall be as shown in the Contract Drawings.

The legend shall be white reflective “High Intensity Prismatic Type III or IV”, conforming to ASTM D4956-01 specifications. All reflective sheeting shall be approved by the Town prior to any manufacturing or installation.

The legend shall be a combination of an initial 6-inch upper-case letter followed by 4.5 inch lower-case lettering.

All street name suffixes (i.e., St., Ave, etc.) shall be abbreviated per the U.S. Postal Service and shall also be a combination of an initial 3 inch upper-case letter followed by 2.25 inch lower-case lettering.

All lettering shall be Highway Gothic B font.

The street name shall be centered vertically within the sign blank. The street name suffix abbreviation shall be bottom level with the street name.

City Seal – The city seal shall be an exact replica of the official “City of Framingham” seal, 5.5 inches in diameter. A replica may be obtained from the City of Framingham Public Works - Engineering Division.

The seal shall be placed before the street name.

Sign Installation Methods

All mounting hardware shall be theft resistant. Street name signs shall be true, plumb, and level. All street name signs shall be mounted 7 feet above existing grade to the bottom on the lowest sign unless otherwise directed by the Engineer.

All street name signs shall be installed a minimum of 24 inches from the face of the adjacent curb or edge of roadway to the edge of the sign.

Inspection shall be made by the Town, in the presence of the Contractor, to determine the condition of the work. Damaged work and work not in compliance with these specifications shall be rejected at no additional cost to the Town.

Measurement and Payment

The work under Item 874.01 will be measured and paid for at the Contract unit price per Each, which price shall include all labor, material, equipment and incidental costs required to complete the work. No separate payment will be made mounting hardware, and staking of signs but all costs in connection therewith shall be included in the Contract unit price bid.

Existing street name signs to be removed and stacked will be paid for separately under Item 874.3, Traffic Signs Removed and Stacked.

ITEM 874.1

STREET SIGN REMOVED AND RESET

EACH

Description

The work under this Item shall conform to the relevant provisions of Section 840 of the Standard Specifications and the following:

Construction Methods

The work to be done consists of removing and resetting the existing street signs and their supports to new locations as shown on the Plans or as required by the Engineer.

The Contractor shall replace at his own expense, all sign panels and supports that are damaged or lost either directly or indirectly as a result of his actions.

If the Engineer determines the existing sign panel is unsuitable for reuse, a new sign panel equal to the existing sign panel, shall be furnished by the Contractor.

The sign shall be mounted in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the 1990 Standard Drawings for Signs and Supports.

When the visibility of the relocated sign panels is obstructed by trees and other vegetation, the Contractor shall clear the obstruction for proper sight distance. All clearing shall be done within the roadway layout, as approved by the Engineer. This work shall be incidental to this item.

Street sign panels, to be removed and reset, shall be cleaned before being reset. Damage during removal or resetting to any sign panel designated for reuse by the Engineer shall be repaired or replaced by the Contractor at his own expense. The Contractor shall furnish and install all necessary mounting fixtures (nuts, bolts and other miscellaneous items) required to complete the work.

Method of Measurement

Street Signs Removed and Reset will be measured per each as complete units, in place, as determined by actual count.

Basis of Payment

Street Sign Removed and Reset will be paid for at the contract unit price per each which price shall include all labor, materials, equipment and incidental costs required to complete the work.

If required by the Engineer, new sign posts shall be paid for separately under Item 847.1, Sign Support (Not Guide) and Route Marker with 1 Breakaway Post Assembly - Steel.

If required by the Engineer, new sign panels shall be furnished, installed and paid for under Item 832. Warning - Regulatory and Route Marker - Aluminum Panel (Type A).

ITEM 874.4

TRAFFIC SIGN REMOVED AND STACKED

EACH

Description

The work to be done under this item consists of dismantling, removing, and stacking existing warning and regulatory sign panels and guide signs, including their supports and all mounting hardware, designated for removal and stacked on the plans or as required by the Engineer.

Construction Methods

All signs and supports to be removed and stacked shall be picked up, transported and delivered by the Contractor to a location to be determined by the Owner.

from the bid allowance. No mark-ups will be allowed for Police Detail/Flagger, and invoices shall be submitted to the City at cost for payment, with no mark-up allowed.

ITEM 999.002

**PRICE ADJUSTMENTS FOR DIESEL FUEL
AND GASOLINE**

NA

This monthly fuel price adjustment is inserted in this contract because the national and worldwide energy situation has made the future cost of fuel unpredictable. This adjustment will provide for either additional compensation to the Contractor or repayment to the Commonwealth, depending on an increase or decrease in the average price of diesel fuel or gasoline.

This adjustment will be based on fuel usage factors for various items of work developed by the Highway Research Board in Circular 158, dated July 1974. These factors will be multiplied by the quantities of work done in each item during each monthly period and further multiplied by the variance in price from the Base Price to the Period Price.

The Base Price of Diesel Fuel is \$2.901 and Gasoline is \$2.848, and will be the price as indicated in the Department’s web site (<https://www.mass.gov/service-details/2018-massdot-contract-price-adjustments>) for the month in which the contract was bid, which includes State Tax.

The Period Price will be the average of prices charged to the State, including State Tax for the bulk purchases made during each month.

This adjustment will be effected only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No adjustment will be paid for work done beyond the extended completion date of any contract.

Any adjustment (increase or decrease) to estimated quantities made to each item at the time of final payment will have the fuel price adjustment figured at the average period price for the entire term of the project for the difference of quantity.

The fuel price adjustment will apply only to the following items of work at the fuel factors shown:

ITEMS COVERED	FUEL FACTORS	
	Diesel	Gasoline
Excavation: and Borrow Work: Items 120, 120.1, 121, 123, 124, 125, 127, 129.3, 140, 140.1, 141, 142, 143, 144., 150, 150.1, 151 and 151.1 (Both Factors used)	0.29 Gallons / CY.	0.15 Gallons / CY
Surfacing Work: All Items containing Hot Mix Asphalt	2.90 Gallons / Ton	Does Not Apply

This provision applies to all projects using greater than 100 tons (91 megagrams) of hot mix asphalt (HMA) mixtures containing liquid asphalt cement as stipulated in the Notice to Contractors section of the bid documents.

Price Adjustments will be based on the variance in price, for the liquid asphalt component only, between the Base Price and the Period Price. They shall not include transportation or other charges. Price Adjustments will occur on a monthly basis.

Base Price

The Base Price of liquid asphalt on a project as listed in the Notice to Contractors section of the bid documents is a fixed price determined by the Department at the time of the bid using the same method as the determination of the Period Price detailed below. The Base Price shall be used in all bids.

Period Price

The Period Price is the price of liquid asphalt for each monthly period as determined by the Department using the average selling price per standard ton of PG64-28 paving grade (primary binder classification) asphalt, FOB manufacturer's terminal, as listed under the "East Coast Market - New England, Boston, Massachusetts area" section of the Poten & Partners, Inc. "Asphalt Weekly Monitor". This average selling price is listed in the issue having a publication date of the second Friday of the month and will be posted as the Period Price for that month. The Department will post this Period Price on its website at <http://www.mhd.state.ma.us/> within two (2) business days following its receipt of the relevant issue of the "Asphalt Weekly Monitor". Poten and Partners has granted the Department the right to publish this specific asphalt price information sourced from the Asphalt Weekly Monitor. This method of period price determination was formerly called the New Asphalt Period Price Method. Separate website postings using both the New Asphalt Period Price Method and the Old Asphalt Period Price Method were discontinued after June 2013.

Price Adjustment Determination, Calculation and Payment

The Contract Price of the HMA mixture will be paid under the respective item in the Contract. Price Adjustments, as herein provided, either upwards or downwards, will be made after the work has been performed using the monthly period price for the month during which the work was performed.

Price Adjustments will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M3.11.03.

Price Adjustments will be separate payment items. The pay item numbers are 999.401 for a positive price adjustment (a payment) and 999.402 for a negative price adjustment (a deduction). Price Adjustments will be calculated using the following equation:

Price Adjustment = Tons of HMA Placed X Liquid Asphalt Content % X RAP Factor X (Period Price - Base Price)

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department approved extension of time.

***** END OF DOCUMENT *****

This contract contains price adjustments for Hot Mix Asphalt Mixtures. The base price for Hot Mix Asphalt Mixtures is **\$665.00** per ton.

End Division II