

ANNUAL BID

DEPARTMENT OF PUBLIC WORKS

CONTRACT SPECIFICATIONS

OWNER

Town of Ludlow

Board of Public Works:

Steve Santos	Chairman
John Davis	Vice-Chairman
Alex Simao	
Barry J. Linton	
Dan Soares	

Department of Public Works:

**198 Sportsmen's Road
Ludlow, Massachusetts 01056**

February 10, 2021

NO. _____

TOWN OF LUDLOW
Department of Public Works

INVITATION FOR BIDS
LUDLOW DPW 2021 ANNUAL MATERIALS & SERVICES CONTRACT

The Town of Ludlow will receive bids for furnishing materials and services as needed for the yearly period from February 10, 2021 to December 31, 2021. Specifications and Bid Forms will be available at Ludlow Dept. of Public Works, 198 Sportsmen's Road or on line at www.ludlow.ma.us beginning on 01/27/2021. Bid forms cannot be picked up unless the bidder is MassDOT Pre-Qualified for applicable bid items. Bids shall be submitted and addressed to the Board of Public Works and marked "Ludlow DPW Annual Bid for Materials and Services". Bids will be received at the Department of Public Works Office until 10:30 A.M. February 10, 2021 at which time they will be publicly opened in the Board of Public Works Conference Room. The Town of Ludlow reserves the right to accept or reject any or all bids and call for new bids. Contractors are required to comply with the Commonwealth of Mass. Department of Labor and Industries Prevailing Wage Rates in accordance with Mass. General Laws, Chapter 149, Sections 26 and 27D. The Town of Ludlow is an Equal Opportunity/Affirmative Action Employer.

Stephen Santos, Chairman
Board of Public Works

Ludlow Register – Published as a Legal Notice in the 01/27/2021 & 02/03/2021 editions

The Republican – Published as a Legal Notice in the 01/27/2021 & 02/03/2021 editions

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SECTION A

NOTICE TO CONTRACTORS

GENERAL REQUIREMENTS

A. AUTHORITY:

The Town of Ludlow, herein called owner, and the Bidder agree that the bid received and execution of Contract shall apply to work herein described for the Town of Ludlow, Springfield Water and Sewer Commission and the Ludlow Housing Authority.

B. PERFORMANCE BOND:

A Performance Bond in the amount of 100% of the total bid amount shall be required prior to execution of the contract. Failure to submit same within ten (10) days of contract award shall negate said contract which will then be awarded to the next lowest bidder. The total bid amount shall be the sum determined by extending the estimated quantities by the unit bid price. The Town reserves the right to waive bond requirements for materials purchased.

BID BOND:

A Bid Bond or Certified Check made out to the Town of Ludlow in the amount of five percent (5%) of the total bid amount shall accompany the Bid. The total bid amount shall be the sum determined by extending the estimated quantities by the unit bid price.

C. INSURANCE:

The successful bidder will be required to submit a Certificate of Insurance as follows:

Workers Compensation	\$ As required by law
General Liability-Property Damage	\$ 1,000,000 Aggregate
General Liability-Personal Injury	\$ 1,000,000 Aggregate
Vehicular Liability-Property Damage	\$ 1,000,000 Aggregate
Vehicular Liability-Personal Injury	\$ 1,000,000 Aggregate

D. PREVAILING WAGE REQUIREMENT:

Contractor shall be advised that any and all contracts resulting from this bid are subject to Prevailing Wage Rate Laws and requirements, and that the Contractor is required to pay Prevailing Wage Rates to employees for all phases of the project, including final cleanup, as determined by the Commissioner of Labor and Industries in accordance with Massachusetts General Laws Chapter 149, Sections 26 and 27D. The Prevailing Wage Rates for these contracts are available for review at the DPW office and will be part of each agreement for materials and services. The Contractor shall be required to submit a "Statement of Compliance", on the attached forms, to certify payment of wages in accordance with this requirement.

E. STANDARDS AND SPECIFICATIONS:

All work done under this contract shall be in conformance with the Massachusetts Department of Transportation *Standard Specifications for Highways and Bridges* dated 1988 and the *English Supplemental Specifications* dated June 6, 2006; The Standard Special Provisions contained in this book, the 1977 *Construction Standards* and the *Supplemental Drawings* dated April 2003; and these Special Provisions.

All work shall comply with Town of Ludlow DPW Construction Standards and Specifications. Copy is available at the DPW office. Also, all work associated with water facilities shall comply with Springfield Water and Sewer Commission standards and specifications.

The work to be done under this contract consists of furnishing all necessary labor, materials, and equipment required to perform the service or supply the materials.

Pre-Qualification by the Massachusetts Department of Transportation (Mass DOT) is required for Contractors to bid on any municipal project under provisions of Section 34 of Chapter 90 which is estimated to cost \$50,000 or more. A Contractor wishing to bid as a general or prime Contractor on any such project must then be certified by Mass DOT of Pre-Qualification and Contract Management in accordance with the "Regulations Governing Classification and Rating of Prospective Bidders" (regulations). A pre-qualification certificate from Mass DOT must accompany the bid documents for the bid to be considered complete as required and applicable for the work.

TESTING; The Town Engineer shall, if they deem necessary, require an independent testing of all materials covered under this contract. Said testing costs shall be borne by the Contractor.

BID; This Contract is being bid on under the provisions of Mass. General Laws Chapter 30. The low bid shall be determined individually by item by extending the estimated quantities times the unit bid price.

F. PERMITS

The Contractor is responsible for compliance and issuance of a Town of Ludlow Construction with the Public Way permit for work within the public way.

The Contractor is responsible for compliance and issuance of a Town of Ludlow Trench Permit from the Department of Inspectional Services.

G. SAFETY REGULATIONS:

The Contractor is responsible for compliance with any and all applicable safety laws of all jurisdictional bodies. For information regarding this provision, the Contractor is directed to contact the United States Government, Labor Department Occupational Safety and Health Administration. Telephone (413) 785-0123. The Contractor shall be responsible for all barricades, safety devices and traffic controls within the construction zone.

H. TRAFFIC CONTROL:

Traffic Control shall be provided by the Ludlow Police Department and **costs** for said service shall be paid by the Town of Ludlow. DPW shall coordinate and schedule Police traffic control services as required by the LPD and DPW.

I. WORK SCHEDULE:

Work on this project is restricted to a normal 8-hour day, during a 5-day week. Work which requires the closure of a travel lane shall not be performed between the hours of 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM. Set-up and removal of all equipment and materials for construction and/or traffic maintenance shall be done during the prescribed work hours. The roadway shall be free of the Contractor's personnel and operations during the restricted hours.

No work shall be done on this contract on Saturdays, Sundays, or Holidays. Work will not be allowed the day before or the day after a long weekend which involves a Holiday without prior approval by the Engineer.

J. EROSION AND SEDIMENT CONTROL

The work shall consist of temporary and permanent control measures as ordered by the Engineer during the work schedule to control erosion and sedimentation. An erosion control system consisting of silt fence is to be installed along any areas of construction adjacent to wetland resource areas. Hay bales are not to be placed adjacent to wetland resource areas.

Temporary erosion and sediment control provisions shall be coordinated with the permanent control features to the extent practical to assure economical, effective and continuous control throughout the construction and post-construction period.

The erosion and sediment control features installed by the Contractor shall be satisfactorily maintained by the Contractor until acceptance.

In the event of conflict between these specifications and laws, rules, and regulations of local agencies, the more restrictive requirements shall apply.

In the event that temporary erosion and sediment control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as part of the work as scheduled, and such additional measures are ordered by the Engineer, the work shall be performed by the Contractor at his own expense. Temporary erosion and sediment control work which is not attributed to the Contractor's negligence, carelessness or failure to install permanent controls, will be performed as ordered by the Engineer.

Repeated failures by the Contractor to control erosion, pollution, and/or siltation, shall be cause for the Engineer to employ outside assistance or to use his own forces to provide the necessary corrective measures. The cost of such assistance plus project engineering costs will be charged to the Contractor and appropriate deductions made from the Contractor's monthly progress estimate.

K. TEMPORARY ACCESS TO AREA ABUTTERS

Access to all residences must be maintained at all times. The Contractor shall provide a safe and ready means to enter and exit all residences, unless indicated to be temporarily closed on the plans, in the project area, both day and night, for the duration of the project.

The Contractor shall notify each abutter at least 24 hours in advance by means of a written form of the start of any work that will require the temporary closure of access, such as conduit installation, existing pavement excavation, temporary driveway pavement placement, and similar operations. A sample of the form shall be made available to this department if a contract is awarded to you.

L. 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 conduit, etcetera, will occur.

The Contractor shall notify the Massachusetts DIG SAFE and procure a dig safe number for each location prior to disturbing existing ground in any way. The telephone number of the Dig Safe Call Center is 1-888-DIG-SAFE (1-888-344-7233). The Contractor shall also notify all utility companies and agencies not affiliated with Dig Safe for locating and marking of their respective underground utilities and services.

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 as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefore.

**SECTION B
BID REQUIREMENTS**

A. RECEIPT OF BIDS:

All bids shall be submitted and addressed to the **Board of Public Works, 198 Sportsmen's Road, Ludlow, MA 01056** and marked: **LUDLOW DPW 2020 ANNUAL BID FOR MATERIALS & SERVICES.**

Bids must be filed no later than 10:30 A.M., December 12, 2019 and will be publicly opened at that time in the Board of Public Works Conference Room.

No Bidder may withdraw his bid within sixty (60) days after the date designated above for the opening of bids. The Town reserves the right to reject any and all bids, wholly or in part, and to accept any bid or part thereof deemed by it to be in the best interests of the Town. The Town also reserves the right to award each of the bid items, or group of items, as separate contracts.

B. DESCRIPTION OF CONTRACT:

The Contract will require that the successful bidder provide the Town of Ludlow the materials/services necessary, in accordance with the contract requirements, specification, bid form and other supporting documents. The contract is meant to be an annual bid for materials/services, comprising any and all of the quantities as needed during the contract period, January 1, 2020 to December 31, 2020, or as otherwise specified. The Contractor shall be required to begin work within thirty (30) days of notification to proceed with Contract.

The Town of Ludlow DPW will not award this Contract unless the Contractor furnishes satisfactory evidence of his/her ability and experience to perform this work, and that he/she has sufficient capital and equipment to enable him/her to prosecute the work successfully and to complete it within the time named in the contract. The Contractor shall not sublet any portion of this contract and will own all equipment used to complete such contract. The Contractor shall submit, upon the request of the DPW, a list of five similar and successfully completed jobs, whose relevance to the proposed job shall be deemed by the Town of Ludlow, DPW. The name, address, and telephone number of a contact person involved with each of these projects shall be included so they can be investigated prior to the award of the contract.

Any material or workmanship found to be defective for up to one year from the date of acceptance by the Town shall be replaced by the Contractor at no cost to the Town of Ludlow. Upon notification of defective material or workmanship, the Contractor shall immediately replace such defective areas, unless otherwise instructed by the Town Engineer.

C. PRICE ADJUSTMENT REQUIREMENTS:

Contracts and work funded by Commonwealth of Massachusetts Chapter 90 funds authorized by Chapter 303 or Chapter 86 of the Acts of 2008 are subject to price adjustment for the following: fuel, both diesel and gasoline, asphalt, concrete and steel. The base price for each item is stated and set by the Town of Ludlow and is listed in the appendix. The price bid shall be condensed as fixed and adjustment to the price bid for each item shall be made on a monthly basis when the monthly cost change exceeds +/- 5 per cent.

D. FORM OF BIDS:

All bids must be made on the accompanying bid form only and shall state the price as therein required. The bid form may not be changed and must be completed in its entirety and signed by the Bidder. Bids that are not complete or improperly signed or otherwise contrary to these instructions will be rejected as informal.

The Bidder shall complete all parts of bid form for Items of C-1 Hot Mix Asphalt and Bituminous Materials, C-2 Structure Adjustment, Repair and Reconstruction, C-4 Concrete Sidewalk and C-5 Bituminous Sidewalk to be considered for said work.

ITEM C-1

HOT MIX ASPHALT AND BITUMINOUS MATERIALS

Scope of Work

The work shall consist of the placement of various pavement types, as required, in accordance with these specifications and in conformity with the existing conditions, plans or direction of the Town of Ludlow DPW. Contractor shall comply with Mass DOT Standard Specifications, Section 460 construction methods for "In Place" procedures and equipment requirements.

- C-1.1 Hot Mix Asphalt Type I-1 (Various Mixes), No recycled Materials
- C-1.2 Hot Mix Asphalt Berm, Type A Modified
- C-1.3 Hot Mix Asphalt Type I-1 for Walk Surface
- C-1.4 Cold Patch
- C-1.5 Asphalt Emulsion for Tack Coat
- C-1.6 Hot Poured Rubberized Asphalt Sealer

C-1.1 thru C-1.4 HOT MIX ASPHALT AND COLD PATCH: To be furnished by batch plant manufacturers only. Specify price on a per ton basis, in place and picked up: Item C-1.1, Hot Mix Asphalt Type I-1 (including any of the following mixes, at the discretion of the Town – Base Course, Binder Course, Dense Binder Course, Top Course, Modified Top Course, Dense Mix and Surface Treatment), Hot Mix Asphalt Berm, Hot Mix Asphalt Type I-1 Walk Surface, Cold Patch, or approved equal. Materials and plant shall conform to MassDOT Standard Specifications. Delivery slips must be furnished for all deliveries of both "In Place" and "Picked Up" Materials/Services.

C-1.5 ASPHALT EMULSION FOR TACK COAT: No resurfacing will be allowed unless a tack coat is applied. Immediately prior to laying bituminous concrete resurfacing or leveling course on existing pavement, the existing paved surface shall be treated with a "tack" coat of asphalt emulsion (MassDOT Specification RS-1) at a uniform rate of 1/20 of a gallon per square yard surface. The tack coat shall be applied by an Asphalt Distributor having a power-driven pump and spray bar with nozzles capable of a minimum application width of twelve (12) feet. Application rates shall be accurately controlled by a tachometer or other approved control, and the distributor tank shall have an accurate gauge for direct reading of the volume of asphalt contained therein.

C-1.6 JOINT SEALER: All transverse and longitudinal joints on the Top Course of pavement shall be treated with a hot rubberized asphalt sealant meeting the requirements of Federal Specification SS-S-1401 or SS-S-1464 in accordance with Section 460.65 of the MassDOT Standard Specifications.

ALL "PICKED UP" BIDS SHALL BE F.O.B. TOWN TRUCK, WHICH INCLUDES LOADING MATERIAL ONTO TOWN TRUCK BY VENDOR EQUIPMENT/LABOR.

SCHEDULE: The Contractor shall be responsible for scheduling and adhering to roadway reclamation project to avoid delays from the time fine grading is completed with the reclamation procedure which could result in damage to the sub grade due to vehicle traffic or weather. The paving Contractor shall be responsible for the work and costs to restore, regrade, and compact the road damage.

ITEM C-2**STRUCTURE ADJUSTMENT, REPAIR AND RECONSTRUCTION****Scope of Work**

C-2 & C-2A ADJUSTMENT OF EXISTING STRUCTURES (CATCH BASINS AND MANHOLES): The work for structure adjustment up to 12 inches to line or grade shall include the removal of masonry and new masonry constructed to conform to the new grade as directed by the Engineer. The frame and grate and/or cover shall be replaced as determined by the Engineer. Frame and grate and/or cover will be supplied by the Town of Ludlow.

C2-B RECONSTRUCTION OF EXISTING STRUCTURES: The work for structure reconstruction shall be at the judgment of the Engineer for structures to be rebuilt. Existing structures that exhibit deterioration or failure; the material shall be removed until a sound base is obtained to support the new concrete block. The structure shall be reconstructed to grade as directed by the Engineer. The frame and grate or cover shall be replaced as determined by the Engineer. Frame and grate and/or cover will be supplied by the Town of Ludlow.

The Contractor shall be responsible for the protection of structures from damage during construction and if damaged, structures shall be repaired or replaced to a satisfactory condition at the Contractor's expense.

C2-C ADJUSTMENT OF STRUCTURES DURING ROAD RECLAMATION: The work for structure adjustment during the road reclamation procedure shall consist of the following tasks:

1. The upper section of the structure shall be adjusted by the removal and reconstruction of the structure to accommodate the reclamation of the road section. In general, the reclamation depth is 12 inches.
2. The structure shall be removed to a depth of a minimum of 6 inches below the reclamation of the base course.
3. The structure shall be covered by a steel plate conforming to the requirements as specified in Subsection 7.09 MDOT. The void from the structure removal shall be backfilled with suitable material. Road surface shall be patched with bituminous concrete paving.
4. After the bituminous base course is installed the upper section of the structure shall be reconstructed to finish grade. The frame and grate or cover shall be replaced as determined by the Engineer.

The Contractor shall be responsible for taking and preserving survey ties to locate structures. The Town of Ludlow will provide frame and grate and/or cover as needed.

ITEM C-3

ROAD MATERIALS

Scope of Work

C-3.1-C-3.8 ROAD MATERIALS: All materials, testing and certification shall conform to the Massachusetts Department of Public Works (Mass DOT) Standard Specifications for Highways and Bridges, 1988 Edition, except where otherwise specified. Approval of materials shall be in accordance with the applicable requirements of Control of Materials. Information regarding origin, composition and/or manufacture of any material shall be furnished upon request. Approval and acceptance of any material intended for use in work by the department is contingent upon the material conforming to a designated specification.

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|-------|--------------------------------------|-------|---------------------------------|
| C-3.1 | Washed Concrete Sand | C-3.5 | 3/8" Dense Graded Crushed Stone |
| C-3.2 | Screened Gravel (1½" minus) | C-3.6 | Fill |
| C-3.3 | Processed Crushed Gravel (1½" minus) | C-3.8 | Winter Sand |
| C-3.4 | 6" Rip Rap Rock | | |

C-3.1 thru C-3.6 Washed Concrete Sand, Screened Gravel, Processed Crushed Gravel, 6-inch Rip Rap Rock, 3/8-inch Dense Graded Crushed Stone, Fill. Specify prices picked up and delivered, per cubic yard.

C-3.8 WINTER SAND: Shall be bid on the basis of delivered F.O.B. to the department of Public Works Garage, 198 Sportsmen’s Road, Ludlow, MA., Monday through Friday, between the hours of 7:30 A.M. to 3:30 P.M. The successful bidder shall be capable of delivering a minimum of 300 cubic yards in an eight-hour day. Delivery will be required within twenty-four (24) hours of notice.

Winter Sand shall be free from loam or any foreign substance and shall consist of clean, hard, sharp, durable grains graded from course to fine. The sand shall conform to the following grading:

Pass 3/8-inch Mesh.....	100%
Pass No. 4 Mesh.....	95% Minimum
Pass No. 8 Mesh.....	90% Minimum
Pass No. 20 Mesh.....	55% Minimum
Pass No. 100 Mesh.....	5% Maximum

Delivery slips must be furnished with all deliveries or materials picked-up.

ALL "PICKED UP" BIDS SHALL BE F.O.B. TOWN TRUCK, WHICH INCLUDES LOADING MATERIAL ONTO TOWN TRUCKS BY VENDOR EQUIPMENT/LABOR.

ITEM C-4

CONCRETE SIDEWALK

Scope of Work

All concrete sidewalk construction, new and/or remove and replace, shall be for various amounts as required per job. This work shall consist of the construction of cement concrete sidewalk and wheelchair ramps in accordance with Mass Highway Specifications Section 701 and Town of Ludlow DPW Construction Standards and Specifications.

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| C-4.1 New Concrete Sidewalk | C-4.1A Remove & Replace Sidewalk |
| C-4.2 Concrete Sidewalk @ driveways-new | C-4.2A Remove & Replace Conc. Sidewalk @ driveway |
| C-4.3 Concrete Sidewalk & poured-in-place curb new | C-4.3A Remove & Replace Conc. S/W and |
| C-4.4 Unclassified Excavation & 8" processed gravel | pour-in-place curb |
| C-4.5 Install Bituminous Driveway and Apron | |
| C-4.6 Remove & Replace existing traffic signs & mail boxes | |

ITEM C-5**BITUMINOUS CONCRETE SIDEWALK****Scope of Work**

All bituminous concrete sidewalk construction, new and/or remove and replace, shall be for various amounts as required per job. This work shall consist of the construction of bituminous concrete sidewalk and wheelchair ramps in accordance with Mass DOT Specifications Section 701 and Town of Ludlow DPW Construction Standards and Specifications.

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|--|---|
| C-5.1 Bituminous Sidewalk-New | C-5.5 Remove & Replace Existing Traffic Signs & Mailboxes |
| C-5.1A Remove & Replace Bituminous Sidewalk | C-5.6 Install Bituminous Driveways & Aprons |
| C-5.2&3 Unclassified Excavation & 8" Processed Gravel Aprons | C-5.7 Misc. Removal of Existing Bituminous Driveways & Aprons |
| C-5.4 Bituminous Concrete Berm | |

ITEM C-6**ROADWAY RECLAMATION MILLING AND COLD IN-PLACE RECYCLING****Scope of Work**

The work under this contract will consist of the reconstruction of various roads or portions of roads in the Town of Ludlow as directed by the Town Engineer. All material, work practices and construction procedures shall conform to the applicable MassDOT Standard Specifications for Highways and Bridges, dated 1988 and the Town of Ludlow DPW Standard Specification.

C-6.1A thru C6.1F ROADWAY RECLAMATION: In general, the existing pavements will be scarified, pulverized and reshaped accordingly into a minimum 8-inch thick processed asphalt stabilized base.

The work shall consist of scarifying, pulverizing, regrading, compacting, fine grading, applying liquid calcium chloride, and otherwise preparing the existing roadway for the placing of a bituminous concrete surface.

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|--------------------------------------|---------------------------------------|
| C-6.1A Roadway Reclamation 0" to 2" | C-6.1D Roadway Reclamation 8"+ to 12" |
| C-6.1B Roadway Reclamation 2"+ to 5" | C-6.1E Grading Removal Base Material |
| C-6.1C Roadway Reclamation 5"+ to 8" | C-6.1F Miscellaneous Fine Grading |

The Department of Public Works shall provide a vertical & horizontal control base line for the work.

The Contractor shall employ or provide qualified personnel to set grade stakes for the reclamation operation to a quality and accuracy as established by the Department control base line. Staking shall be placed to denote edge of pavement, gutter lines, curb returns, etc.as needed to assure the alignment and grade of the work.

The Contractor shall furnish and set at his/her own expense; all remaining stakes required for the construction operations. The Contractor shall be solely responsible for the accuracy of the line and grade of all features of his/her work.

The Contractor shall be held responsible for the preservation of the control base line established by the Department.

The Contractor shall be responsible to grade the base material to finish grade elevations as needed, including the placement or removal of base material up to six (6) inches in depth as part of the work.

The grading operation to establish finish grade elevations requiring the removal of excess material over six (6) inches in depth shall be considered separately and payment shall be based on cubic yard measurement.

The transportation and disposal service of surplus road material not a part of the road section shall be provided by the Department of Public Works. The surplus materials are the property of the Town of Ludlow.

The Contractor shall provide an hourly rate schedule for finish grading the road surface to the prescribed specifications caused by weather or vehicle damage due to unforeseen delays in the binder paving installation.

Travel Restrictions:

The road shall be rehabilitated utilizing one-half width at a time for passage of through traffic. Provisions for detours of traffic shall be determined by the Town Engineer. The construction area shall provide passage of emergency vehicles at all times. The construction area shall be completely open and passable for traffic at the completion of each working day. The Contractor shall furnish and be responsible for detour signs and barricades, as required.

Work to Be Done by Others:

The Town shall bear the costs and perform any necessary clearing and grubbing, storm drain modifications, resetting signs and mailboxes, guard rails and Police details, prior to the start of work in each area. The Contractor shall develop, for approval by the Town Engineer and the Ludlow Police Department, a traffic plan for the traffic passage, detours, signage, etc.

Subcontracting:

The Successful Bidder agrees that no subcontracting, subletting or assignment of this Contract to others without the written approval by the Board of Public Works.

No such subletting or assignment shall release the Bidder from his obligations under his submitted contract.

ROADWAY MILLING

C-6.2A & C6.2B ROADWAY MILLING: These items shall consist of furnishing the equipment, operator, fuel and miscellaneous items thereto, to perform milling of bituminous roadways. The depths of milling shall be set by the Town and shall range from a minimum of 1-inch to a maximum of 2 ½-inches and shall consist only of bituminous material. The major machine shall be capable of milling a width of eight (8) feet in a single pass.

The Contractor shall furnish all trucks necessary to transport the material milled, and the surplus materials shall be the property of the Contractor.

The bid shall be in two parts. The first part shall be a "square yard" bid for furnishing the major machine, operator, etc. The second part shall be a "per hour" bid for furnishing a minor/hand machine and operator for milling around utility structures located in the roadway.

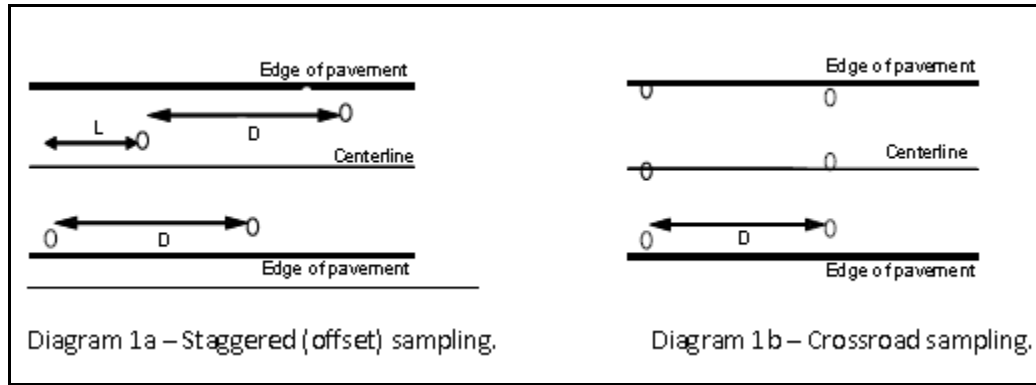
The Contractor shall supply two street sweepers to remove loose milled material during the milling operation. The Town shall furnish traffic control personnel for the operation. The Contractor shall install bituminous concrete ramps at each cut and match location as well as transition treatments at exposed utility structures when directed by the Town Engineer. The Contractor shall be responsible for the removal of ramps and transition treatments prior to the final paving installation.

C-6.2A Major Machine

C-6.2B Minor/Hand Machine

COLD IN-PLACE RECYCLING

C-6.3A & C-6.3B CORE SAMPLING AND MIX DESIGN: Core sampling and mix design are required to determine a road’s viability for the Cold In-Place Recycling process. It is also an optional process to assess existing road conditions. Cores shall be obtained using a pattern that results in a representative sample of the pavement to be recycled including at or near lane lines, within and between wheel paths, at the pavement edge, and within shoulders, if shoulders are to be recycled. The roadway shall be sampled in accordance with staggered or offset sampling (as illustrated in Diagram 1a) or crossroad sampling with no offset (as illustrated in Diagram 1b).



Core samples shall be obtained to the underlying base or subgrade soil. If a core breaks off prior to penetrating the underlying materials, coring shall continue to the bottom of the pavement for thickness measurement purposes. On retrieval, each core shall be measured to the nearest 1/8th inch, and then placed in a separate container and labeled. provided to the mix design laboratory.

D – 1 mile maximum

L – 0.5 mile maximum

a) At least 15% of the cores shall be in the shoulder, if the shoulder is getting recycled.

b) At least 25% of the cores shall be on or within 3 feet of centerline.

Arterial and Industrial Streets

D – 2,000 feet maximum

L – 1,000 feet maximum

a) At least 25% of the cores shall be in the shoulder, if it is getting recycled, or within 3 feet of gutter.

b) At least 25% of the cores shall be on or within 3 feet of centerline.

Residential Streets

a) For streets less than 250 feet long, a minimum of one core when grouped with other streets to obtain the quantity of material required for mix design.

b) For streets 250 feet to 500 feet long, a minimum of two cores when grouped with other streets to obtain the quantity of material required for mix design (one within 3 feet of gutter, and the other within 3 feet of centerline).

c) For streets over 500 feet long, a minimum of three cores when grouped with other streets to obtain the quantity of material required for mix design (one within 3 feet of gutter, one within 3 feet of centerline, and the third between the two).

Each sample hole shall be filled in accordance with the procedures described below. After sampling and filling the holes, the roadway shall be cleaned of all loose debris. A high-quality cold patch material shall be used to fill core or milling holes. The cold mix shall be compacted flush with a tamping rod, sledge or Marshall hammer. Approximately the same amount of cold patch (350lbs) will be required to fill the holes as is required for each mix design.

The cost of coring labor, equipment and materials shall be paid per day for each day of coring operations conducted.

Obtain cored samples for the project mix design. Three hundred and fifty pounds (350 lbs.) of representative material to be recycled is required for each mix design. An independent laboratory not owned or controlled by the Contractor shall develop and submit a Job Mix Formula (JMF) prior to the start of the CIR operation. Develop the JMF conforming to the requirements of Table 2B below.

Table 2B – CIR Minimum Mix Design Requirements for Stabilizing Agents

Test Method	Specification	Criteria
Gradation of RAP (Sieve Analysis of Aggregates)	ASTM C117 and C136	1 ½" sieve-100% passing 1" sieve-95 to 100% passing
Bulk Specific Gravity of Compacted Samples	ASTM D6752 or D2726	Report Only; Ndes=30
Maximum Theoretical Specific Gravity	ASTM D2041	Report Only
% Air Voids		Report Only
Tensile Strength (Resistance of Compacted Mixture to Moisture): Dry, psi	ASTM D4867 Part 8.11.1, 25oC, psi	Minimum 45
Wet (conditioned), psi	Conditioned ITS, ASTM D 4867, psi	Minimum 30
RAP Coating Test	AASHTO T 59	Minimum Good
Minimum Virgin Asphalt Content		1.5%
Foamed Asphalt Expansion Ratio		Minimum 8.0 Times
Foamed Asphalt Half-life		Minimum 6.0 Seconds

The lab equipment used to simulate the asphalt foaming process and RAP stabilization shall be substantially similar to the Contractor's recycling equipment to be used on the project. The mix design JMF shall be the baseline measure for the rate of stabilizing agent application and water blended with the RAP to construct the CIR mixture. The mix design shall indicate the allowable tolerance for field adjustments for the stabilizing agent and/or water so as not to jeopardize the performance of the mix in regard to Table 2B but allow the Contractor to adjust the mix in response to field conditions in consultation with the Engineer.

Provide the mix design report with the following minimum information:

- 1) Gradation of RAP
- 2) Density, maximum specific gravity, air void content, indirect dry tensile strength, indirect wet (conditioned) tensile strength, and tensile strength ratio at each recycling agent content iteration (minimum of 4, inclusive of recommended moisture and stabilizing contents) and at the recommended moisture and stabilizing agent contents
- 3) Recommended water content range as a percentage of dry RAP
- 4) Optimum stabilizing agent content as a percentage of dry RAP
- 5) Stabilizing agent designation, PG grading of asphalt binder, if applicable, supplier name and location, and certificates of compliance
- 6) Application means of recycling agent
- 7) Allowable tolerances for field adjustments for stabilizing agent and/or water
- 8) Portland cement, if needed

C-6.3C COLD IN-PLACE RECYCLING (CIR): This work consists of the full or partial depth milling of the existing HMA pavement to the width and depth specified on the plans, blending the processed material with a foamed asphalt stabilizing agent, water and other additives as necessary and required by the mix design, and placement and compaction of this mixture in accordance with the plans and specifications.

Mill the Reclaimed Asphalt Pavement (RAP) Material from the existing roadway and process it in-place. The RAP shall be free of contamination of concrete, silt, clay, or other deleterious materials. Remove rubberized crack filler, pavement markers, loop wires, fabric, or other materials as observed from the roadway during the recycling process. Appropriately size and homogeneously blend any residual materials with the RAP. The milled and processed material shall conform to the following gradation prior to addition of the stabilizing agent:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 ½"	100
1"	95 to 100

C-6.3D STABILIZING AGENT: The asphalt stabilizing agent shall be Foamed Asphalt. Provide asphalt binder performance grade for foamed asphalt of PG 64-22 or PG 64-28. Sufficiently heat asphalt binder to meet the mix design expansion and half-life criteria; not to exceed 375° F. Asphalt binder shall produce asphalt foam with a minimum expansion ratio of 8 and half-life of no less than 6 seconds.

C-6.3E MINERAL FILLER: If required by the mix design, the mineral filler shall be Portland Cement. Provide water added to the RAP for foaming asphalt. Water may be added to the RAP at the milling head and/or in a mixing chamber.

TESTING & QUALITY CONTROL: Conform to ASTM D 6938 for density testing and gauge monitoring methods. Roadway production lots will be defined as 4000 lane-feet. Each roadway production lot will consist of two 2000 lane-foot sub lots. Take roadway samples at a minimum frequency of 1 per lot of production. For each roadway sample, report the gradation of material as determined by use of a rocker screen, or equal, for the 1" sieve and larger. Report stabilizing agent foaming properties, if applicable, (i.e. half-life and expansion ratio) at a minimum frequency of 1 per lot of production. Conduct and report density testing at a minimum frequency of 3 random tests per sub lot. Conduct and report mill depth checks at a minimum frequency of 1 per sub lot. Report stabilizing agent temperature and application rate at a minimum frequency of 1 per sub lot. Provide a Daily Inspection Report to the Engineer summarizing the: daily beginning and ending stations, applicable mix design, sub lot test (mill depth check, density test, stabilizing agent temperature and application rate) locations and values, lot roadway sample locations, and any adjustments to the application rate of the stabilizing agent or water. If stabilizing agent adjustments exceed the allowable limits defined in the mix design or reduce the stabilizing agent application rate below the 1.5% mix design minimum specified in Table 2B, based on a single test or meter adjustment, re-evaluate the entire process. Obtain approval by the Engineer before resuming production.

CONSTRUCTION METHODS: Keep the road open to traffic during construction. Perform CIR operations only between the dates of April 15 and November 15 when the pavement temperature in the shade is above 55°F, and when the ambient air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is above 50°F and rising, and when the nighttime ambient air temperature is above 45°F the night prior and following, unless approved otherwise by the Engineer. Do not perform CIR operations during inclement weather such as heavy rain that will not allow proper mixing, placing, and/or compacting of the mixture. CIR operations and recycled pavement curing to allow adequate time for placement of the Complete finish wearing course prior to the onset of winter. The finish wearing course should be applied to protect the CIR no later than 14 days after the CIR process begins.

EQUIPMENT: Equipment used for CIR shall be subject to approval by the Engineer. Tankers supplying hot stabilizing agent components shall be equipped to constantly monitor temperature within the tank. Portland cement bulk spreader shall be fully automated and capable of achieving the application rate specified in the mix design. Portland cement spreader shall also be equipped with a water misting spray bar to reduce the amount of airborne cement dust from the spreading operation. Utilize milling units not inclusive of pre-mill/wedge-cut milling units capable of milling the existing pavement full lane width (12'- 6" minimum) to the depth shown on the plans, specified in the contract or directed by the Engineer, in a single pass. Utilize units equipped with automatic depth control that maintain constant cutting depth and width, uniform grade, and uniform slope. For processes not incorporating additional screening, sizing, or crushing, utilize a milling unit capable of producing RAP sized as specified in B.1. Use of a heating device to soften the pavement is not permitted. Processed RAP shall be mixed with the stabilizing agent and water in a mixing unit which shall be the milling machine cutter housing. The asphalt stabilizing agent shall be applied uniformly at the predetermined application rate using a computer controlled additive system. Monitor the metering of the stabilizing agent through a calibrated pump providing a continuous readout of quantities. The additive system shall contain separate pumping systems for adding stabilizing agent and water. Each system shall have an inspection or test nozzle for stabilizing agent and/or water sampling. The additive system shall include a heating system to maintain the PG binder flowing into the mixing chamber at the optimal foaming temperature. The PG binder heating system shall be heated electrically. The system shall be capable of producing a uniformly mixed, homogenous recycled pavement mixture.

PAVING AND COMPACTION EQUIPMENT: The placement and shaping of the recycled pavement mixture shall be completed using a self-propelled paver, with a minimum 10' and maximum 20' screed width. The screed shall not be heated when paving the recycled mix. The material shall be transferred directly into the paver hopper from the recycling equipment or with a pick-up device. When a pick-up device is used, the entire windrow shall be removed from the milled surface and transferred to the paver hopper. Compaction equipment shall be a minimum of 9 tons, self-propelled and include both dual smooth drum vibratory and pneumatic rollers. The number and types of rollers shall be as necessary to achieve the specified compaction and surface smoothness required for the finish wearing course.

PREPARATION: Inspect the pavement surface for any areas of failing subgrade. If needed, repair areas will be saw cut, and all inferior material shall be taken out. Removed materials shall be replaced with clean granular material compacted in lifts not to exceed 6" in thickness, up to within 6" of the road surface. The final 6", bringing the repair to road grade, shall be done with 3/4" hot mix binder. If pre-milling to remove the material ahead of recycling is warranted, it will be done by the low bidder under Items C-6.2A and C-6.2B. Any blading of the existing roadway shoulders away from the asphaltic surface edge to minimize contamination of the CIR pavement will be the responsibility of the owner. Saw cutting cost shall be incidental to the repair. Gravel to be furnished by the Town and hot mix asphalt to be furnished by Town or the low bidder under Item C-1.1.

PROCESSING AND PLACEMENT OF RECYCLED PAVEMENT MIXTURE: Mill the existing pavement to the required depth and width indicated on the plans. Blend the RAP material with the mix design specified proportions of stabilizing agent and water; produce a uniform and homogeneous recycled mixture. Spread the recycled mixture to the grade, elevations, and slopes specified on the plans; avoiding tearing or scarring of the recycled pavement surface. Ensure proper material transfer, handling, and spreading to prevent particle segregation. Overlap longitudinal joints between successive CIR operations a minimum of 3 inches. Overlap transverse joints between successive CIR operations a minimum of 2 feet. Control the addition of foamed asphalt to the CIR in overlap areas in order to avoid excessive localized high asphalt content in the CIR layer.

On the first day of production, construct a control strip to identify the target wet density for the CIR layer. Perform the control strip construction and density testing under the direct observation and/or assistance of the Engineer. Unless the Engineer approves otherwise, construct control strips to a minimum dimension of 500 feet long and one full lane width. Completed control strips may remain in-place to be incorporated into the final roadway cross-section. Construct additional control strips at a minimum, when:

- The CIR layer thickness changes in excess of 2.0 inches, or
- The percent of target density is less than 90% or exceeds 105.0%, and is outside the range of the 10 random measurements defining the control strip, on three consecutive sub lots.

Construct control strips using equipment and methods representative of the operations to be used for constructing the CIR layer. After compacting the control strip with a minimum of 2 passes, mark and take density measurements at 3 random locations, at least 1½ feet from the edge of the CIR layer. Take subsequent density measurements at the same 3 locations. After each subsequent pass of compaction equipment over the entirety of the control strip, take density measurements at the 3 marked locations. Continue compacting and testing until the increase in density measurements is less than 2.0 lb./cubic feet, or the density measurements begin to decrease. Upon completion of control strip compaction, take 10 randomly located density measurements within the limits of the control strip, at least 1½ feet from the edge of the base. The final measurements recorded at the 3 locations under paragraph (f) of this section may be included as 3 of the 10 measurements. Average the 10 measurements to obtain the control strip target density.

Compact the CIR layer to a required minimum density of 95% of the target density. Test the pavement surface at regular intervals using a 10-foot straightedge or other Engineer-specified device. The Engineer may direct the repair of surface deviations greater than 1/4 inch between two surface contact points. Correct high points by reworking, rerolling, trimming, milling, or grinding. Minor depressions greater than 3/4 inch may be corrected by reworking or have a tack coat applied and be filled with HMA immediately prior to placement of the surface treatment.

MAINTAINING THE WORK: After compaction is complete, determine whether the CIR is sufficiently stable and cured adequately to open to traffic. Apply a fog seal to minimize raveling and reduce water intrusion into the recycled pavement by the end of each CIR treatment day. Fog seal shall be a diluted CSS-1h emulsion (50% emulsion, 50%

water), or approved equal. After opening to traffic, and prior to placing a surface treatment, maintain the surface of the recycled pavement in a condition suitable for safe movement of traffic. Repair any damage to the recycled pavement prior to placement of the wearing course at no additional cost to the owner.

Application of a surface treatment will not be allowed until the moisture content of the CIR layer is not more than 1.5%. If the moisture content of the CIR layer does not reduce to 1.5%, the surface treatment may be applied after the change in moisture content is less than 0.10 percentage points for three consecutive calendar days. The finish wearing course shall be applied by the low bidder under Item C-1.1 as soon as curing is complete, not more than 14 days after the recycling process begins. Immediately before the application of the finish wearing course, an asphalt emulsion tack coat shall be applied at a minimum rate of 0.05 gal/SY. Do not use a hot asphaltic cement tack coat.

PRE-MILLING PAVEMENT in conjunction with the CIR shall be done by the low bidder under Item C-6.2 A and C-6.2B.

BASE REPAIR – GRAVEL AND HOT MIX ASPHALT: As determined by the Town Engineer, repair areas will be saw cut, and then all inferior material will be removed. Gravel will then be placed and compacted in 6" lifts. The final 2", bringing the repair area to CIR grade with hot mix asphalt binder. This work will be done by the Town or the low bidder on Items C- 1.1 and C-3.3.

ASPHALT PRICE ADJUSTMENTS: Asphalt Price Adjustments will be as stipulated in Section B paragraph C. and the Appendix.

LOWERING AND RAISING OF EXISTING STRUCTURES: Frames and Grates or Frames and Covers for CIR will be adjusted or rebuilt by the Town or by the low bidder under Items C-2B and C-2C.

ADJUSTMENT OF EXISTING WATER GATES: Valve boxes are to be lowered prior to the CIR process by the Springfield Water and Sewer Commission and raised after the CIR process.

BACKING UP ROAD EDGE: If determined by the Town Engineer that backing up the road edge is required; additional material will be placed at the required width. The Town will provide the material, trucking, placement and compaction before the start of the CIR.

ITEM C-7

VERTICAL GRANITE CURBING

Scope of Work

The work shall consist of the furnishing of all labor, materials, equipment and to install new vertical, flush and transition granite curb and reset of existing vertical granite curb and shall conform to Mass Highway Standard Specifications dated 1988, Section 501 and Town of Ludlow DPW Standard Specification. Work shall be done by a Contractor experienced in installing granite curb of this type.

C-7.1 Install New Vertical Granite Curb

C-7.3 Remove & Reset existing Vertical Granite Curb

C-7.2 Install Used Vertical Granite Curb

ITEM C-8

SANITARY SEWER LINE CHEMICAL ROOT CONTROL

Scope of Work

The work shall consist of the application of chemical root control agent to sanitary sewer lines, in order to kill the root growth present in the lines and to inhibit re-growth, without permanently damaging the vegetation producing the roots.

C-8.1A	6 Inch Line	C-8.1 D	12 Inch Line
C-8.1B	8 Inch Line	C-8.1 E	18 Inch Line
C-8.1C	10 Inch Line	C-8.1 F	20 Inch Line

The chemical agent used shall be Razorooter II™ or equivalent products approved by the Town of Ludlow. The chemical root control agent shall be registered with the EPA and the Massachusetts Department of Food and Agriculture, **prior to the bid opening**, and shall be labeled for use in sewers to control tree roots. The chemical root control agent shall contain an active ingredient for controlling sewer roots and deterring their re-growth. There shall also be a surfactant system to deliver the active ingredient (herbicide) to the target root tissue.

Active ingredient:

1. Shall be a Category “E” compound, the most favorable rating attainable on the U.S. EPA’s chronic exposure toxicological rating scale.
2. Shall **not** be considered carcinogen, teratogen, mutagen, or oncogene, based on laboratory testing.
3. Shall be non-volatile in order to minimize exposure to collections system workers, treatment plant operators and homeowners through inhalation.
4. Products containing the active ingredient(s) meta-sodium or copper sulfate are not allowed.

Surfactant system:

1. Shall produce a dense, small bubble, clinging foam, which sustains its shape for a minimum of one hour.
2. Shall enhance the penetration of herbicide into root masses.
3. Shall contain an Alkylpolyglucoside (formulations of vegetable oil and carbohydrate from agricultural products).
4. Surfactants designed to foam chemically, upon contact with water shall not be accepted.

The Contractor must be licensed with the Massachusetts Department of Food and Agriculture prior to the bid date. The Contractor must have a minimum level of pesticide application experience and employ a State Certified pesticide applicator on the job site at all times.

The Contractor shall demonstrate a minimum level of five (5) years direct experience in applying chemical sewer root control agents. The Contractor must have performed at least 10 other jobs similar in size and scope to the work specified herein and have treated in excess of 500,000 linear feet of sanitary sewer with its own personnel within the last 24 months.

All work shall be performed by Certified Pesticide Applicators licensed with the Massachusetts Department of Food and Agriculture. Certified Pesticide Applicators shall have a minimum three years’ experience in performing the type of work specified and shall each have personally performed a minimum of 500,000 linear feet of treatments in the last three years as a Certified Pesticide Applicator. A minimum of three Certified Pesticide Applicators that are registered with the Massachusetts Department of Food and Agriculture, prior to the bid, is required. License numbers for these three applicators and years of experience shall be submitted with the bid. These shall be submitted on a separate sheet with the bid. Additional proof of applicator experience may be requested by the Town of Ludlow.

The Contractor is directed to ensure compliance with all Federal, State and Local ordinances pertaining to the type of work specified herein. Particular attention shall be paid to those laws and ordinances relating to transportation of material (DOT), the application of sewer root control herbicides (US EPA), and traffic safety regulations. The Contractor's Federal DOT number and material EPA registration number must be submitted with bid.

Contractor shall provide Pollution Liability Insurance; in addition to all other insurance and bonds specified herein.

The Contractor shall submit written evidence that he has obtained pollution liability coverage. This coverage shall protect the Contractor, the Town of Ludlow, and the Town's officers, agents and employees from claims for damages for bodily or personal injury, sickness or disease, including death, and from claims for damages to property and/or the environment, which may arise directly out of the use of chemicals and/or pollution. The minimum amount of such insurance shall be \$5,000,000 total loss. An "A" rated insurance company shall provide the Contractor's Pollution Liability insurance. In addition, the Contractor's commercial general liability limits must be not less than \$10,000,000 total occurrence limit and include pesticide or herbicide applicator coverage.

All work shall be performed according to label instructions and in accordance with the best recommended practice for conditions present in the line under treatment. All applications shall be done by foaming or other methods as provided on the product label.

The application of material shall be performed in such a way as to contact roots within the primary main line sewer to be treated. Effort will also be made to penetrate secondary lateral sewers in order to contact roots residing in the "wye" connections. The foam shall be generated through the use of air injection equipment, and the foam shall be pumped into the sewer under pressure as foam. Foam quality shall be sufficient to penetrate "wye" connections and effectively treat large diameter pipe. Therefore, applications of chemicals designed to generate foam "chemically" on contact with water shall not be accepted.

The Contractor shall take all steps necessary and appropriate to prevent adverse effects on wastewater treatment plant processes during the application process. Notwithstanding the requirement that the active ingredient shall not adversely affect wastewater treatment plant processes in the event that a wastewater treatment plant experiences any reduction in operating efficiency during the execution of the contract, the Contractor shall immediately suspend all applications, at the direction of the Town. The Contractor shall continue operations only after problems at the wastewater treatment plant have been corrected satisfactorily to the Springfield Water & Sewer Wastewater Treatment Plant Operator.

The Contractor shall use a reduced-pressure-zone backflow prevention device approved by Springfield Water & Sewer or air gap whenever accessing fresh water for mixing chemical.

The Contractor shall return every 12 months throughout the life of the guarantee and furnish a report on the status of the work in writing to the DPW in order to evaluate the success of the work and to arrange any free guarantee work that may arise.

GUARANTEE: For each sewer section (manhole-to-manhole) that is treated under the Contract, the Contractor shall guarantee the work as follows: at the option of the Town of Ludlow, the Contractor shall, at his own expense, **re-treat a sewer section, or refund 100% of the payment received to treat that section**, in the event that:

- (1) Live roots are found in the section within six months after the application; or
- (2) The section plugs up and floods due to tree root obstructions within a period of two years, beginning on the date of treatment, and ending two years after the date of treatment. Re-treatments, performed at no charge in honor of the guarantee, do not extend the expiration date of the guarantee.

ITEM C-9**FRAMES, COVERS & GRATES****Scope of Work**

The section consists of the supply and or delivery of cast iron frames, grates and covers to the Department of Public Works at 198 Sportsmen's Road, Ludlow, MA 01056.

C-9.1 8" Catch Basin Frame & Grate	C-9.4 8" Manhole Frame & Grate 26"
C-9.2 6" Catch Basin Frame & Grate	C-9.5 6" Manhole Frame & Grate 26"
C-9.3 4" Catch Basin Frame & Grate	C-9.6 4" Manhole Frame & Grate 26"

All cast iron frames, grates and covers shall be as manufactured by East Jordan Foundry, Inc. or approved equal.

1. Catch Basin Frames & Grates: shall consist of furnishing a cast iron catch basin frame with a minimum 33-inch x 33-inch size, and a grate meeting the Massachusetts Standard Specification for a 24-inch x 24-inch with 2-inch square openings. The frame and grate shall have four flanges and shall have an H-20 load rating. The unit shall be furnished in 8-inch, 6-inch and 4-inch height per the item number referenced.
2. Manhole: shall consist of furnishing a round cast iron frame minimum 34-inch base diameter, with a **26-inch** round cover (nominal dimension). The covers shall be available in either a "plain" design, or with the words "DRAIN" or "SEWER" at the Town's option. The frames shall be furnished in 8-inch, 6-inch or 4-inch height. The 8-inch height shall meet the standard Massachusetts Standard Specifications with an H-20 load rating.

ITEM C-10**TRAFFIC LINE PAINTING****Scope of Work**

The work shall consist of the placement of traffic striping and markings at various locations within the town including line striping, crosswalk striping, directional and safety markings and informational notations. Contractor shall begin work within 7 days of notification to proceed with painting and marking work and continue to work on a daily basis during regular working hours or off-peak hours until work is complete.

C-10.1	Single 4-inch White, Oil Based Paint
C-10.2	Single 4-inch Yellow, Oil Based Paint
C-10.3	Double (4-inch – Space – 4-inch) Yellow, Oil Based Paint
C-10.4	10-foot/40-foot Skip Line 4-inch Yellow, Oil Based Paint
C-10.5	Single 4-inch White Thermoplastic
C-10.6	Single 4-inch Yellow Thermoplastic
C-10.7	Double (4-inch – Space – 4-inch) Yellow Thermoplastic
C-10.8	12-inch Crosswalk Thermoplastic
C-10.9	12-inch Crosswalk Yellow, Oil Based Paint
C-10.10	12-inch Crosswalk White, Oil Based Paint
C-10.11	12-inch Stop Bar Thermoplastic
C-10.12	12-inch Stop Bar White, Oil Based Paint
C-10.13	Straight Arrow, Oil based paint
C-10.14	Straight Arrow, Thermoplastic
C-10.15	Curved Arrow, Oil based paint
C-10.16	Curved Arrow, Thermoplastic
C-10.17	8" word "ONLY", Oil based paint
C-10.18	8" word "ONLY", Thermoplastic

Specifications

Traffic Line Striping and Markings bids shall include all materials, labor, equipment and operating costs, and all incidental costs to place various striping and markings. All material, work practices, procedures, application rates, glass bead content, and application methods must conform with the applicable Mass. Highway Standard Specifications for Highways and Bridges, specifically Section 860 and Materials Specification Sections M7.00.00-M7.01.21.

Traffic control shall be provided by the Police Department and **costs** for said service shall be by the Town.

White thermoplastic reflectorized pavement marking shall conform to the specification M7.01.03 White Thermoplastic Reflectorized Pavement Markings.

Yellow Thermoplastic reflectorized pavement markings will conform to the specification M7.01.03 Yellow Thermoplastic Reflectorized Pavement Markings.

ITEM C-11

METAL BEAM RAILING INSTALLATION

Scope of Work

The work shall consist of the installation of used metal beam at various locations within the town. The Contractor shall furnish all labor and equipment necessary for installation of the posts, blocks and railing including all bolts, nuts and appurtenances required for installation and comply with Mass Highway Standard Specifications dated 1988 Section 601 and Town of Ludlow DPW Standard Specifications.

C-11.1 Used Metal Beam Installed

C-11.1A Railing End Caps

This item shall consist of the installation of **used** metal beam railing, posts, and offset blocks.

The Town shall furnish the railing, blocks and posts in good, clean, straight condition, and shall deliver these materials to the job site. The Town shall also remove, as required, any old railing to be replaced. The Town shall also furnish any backhoe work required to provide "buried end" installation as required.

The Contractor shall provide a separate bid price to furnish railing end caps, as required. The cost of installation of the end caps shall be included in the "per foot" bid for the used metal beam railing installation described above.

C-11.2 New Metal Beam

This item shall consist of the installation of **new** metal beam railing, posts, end caps, buried ends, offset blocks and appurtenances. The Contractor shall furnish all labor, material, and equipment necessary for the removal of old railing and the installation of the new posts, caps, buried ends, blocks and railing.

The Contractor shall also remove, as required, any old railing to be replaced and backhoe work required to install new "buried end" as required.

ITEM C-12**STREET SWEEPING SERVICES****Scope of Work**

The work shall consist of the furnishing of all equipment and experienced operator(s), fuel, and all incidentals, to provide street sweeping services for the removal of sand, dirt, and other debris from various streets in the Town of Ludlow. Within 30 days of notification by Town to begin street sweeping operations, the **Contractor shall start work on a designated start date and continue with the street sweeping operations on a daily basis (excluding weekends and legal holidays) until all work is complete.**

The Contractor shall provide information with his bid that all operators of equipment have a minimum of three (3) years of experience operating street sweeping equipment. The Contractor shall also furnish, with his bid, a list of municipalities, contact persons, and telephone numbers of clients for whom street sweeping services have been done within the twelve months preceding the bid date.

The street sweeping operation shall remove at least 95 percent of the sand, dirt, and debris that had collected on the roadway prior to the cleaning operation, with no more than 5 percent remaining on the street after cleaning is completed. All sweeping operations are to be done to the satisfaction of the Board of Public Works or its designee. Any areas rejected by the Town shall be re-swept at no additional charge to the Town.

The Contractor shall furnish the necessary equipment to provide sufficient water to be sprayed on the roadway and accumulated sand, dirt and debris to minimize the generation of dust in the sweeping operation. Dust clouds shall not be evident at any time during the sweeping operation for any distance in excess of 25 feet from the actual sweeping operation. No sweeping shall be done without the application of water to the roadway.

The Town shall furnish water for use by the Contractor to be obtained at a municipal fire hydrant location to be determined by the Operations Supervisor. The Contractor shall furnish a shut-off valve and a backflow preventer device as required and approved by the Town for the use on a municipal fire hydrant.

The Town shall furnish the list of streets and the order in which they shall be swept.

The Town has approximately 130 miles of roadway (260 miles of directional roadway). It is currently the intention to have, at a minimum, one-half of all streets swept at least once during the term of this contract.

The basis of payment shall be "per mile" of directional roadway swept. A section of roadway swept in both directions of travel would be calculated on a "per mile" basis for each direction of travel.

ITEM C-13**TREE TRIMMING AND REMOVAL****Scope of Work**

The work shall consist of the required resources to provide all supervision, labor and equipment required to carry out tree maintenance work in the Town of Ludlow as directed by the Town Engineer or its designee. All services and equipment must be in full compliance with the most current revisions of American National Standards Institute Standards-133.1 and Mass Highway Standard Specifications. All aerial lift equipment must have proof of dielectric testing by a certified inspector during this calendar year, in accordance with ANSI Standards A92.2 Article 5.3.

Qualifications of Bidders:

Bidder shall provide a statement of experience, competence, and financial capability to perform the terms of this contract. The bidder shall possess a minimum of the following equipment, vehicles, and personnel to fulfill the needs

of the Town of Ludlow in case of emergency. Bidder shall understand that bid price will include all equipment, labor, vehicle operators and appurtenances necessary to accomplish the work.

Equipment:

C-13.1	2 Aerial Lift Trucks (Minimum 55' Height)
C-13.2	1 Aerial Lift 75'
C-13.3	1 Log loader (25' boom w/50 CY body and 70K GVW)
C-13.4	1 Chipper
C-13.5	1 Stumper

Personnel:

Bidder shall provide evidence that all employees are OSHA 1910.269 CFR certified and are in full compliance with the provisions of the Federal Occupational Safety and Health Act of 1970 and any rules or regulations pursuant of the Act.

Tree Trimming:

Tree pruning and trimming shall conform to recognized tree surgery practices, and particular note should be made that painting with an approved tree dressing or paint, will be required of all cuts 2 inches or over in diameter. The dressing or paint shall be applied no later than two days after the cut has been made. The recognized tree surgery practices include, the fact that all limbs and branches which require removal and all stubs regardless of age must be cut flush either to a union with the next larger sound limb or branch or flush to the trunk of the tree. Experienced woodsmen shall perform the cutting. Trained tree climbers are required for pruning of tall growth. Care shall be exercised by the Contractor to prevent injury to trees and shrubs designed to be preserved. Any injury to limbs, bark or roots of such plants shall be repaired by the Contractor, as directed, or the plants replaced without additional compensation for such repair or replacement.

Tree Removal:

All trees to be cleared shall become the property of the Contractor and the disposal of the wood shall become his responsibility. The trees, including cuttings and slash, shall be disposed after cutting as soon as practicable and in such a manner as not to detract from the appearance of the roadside or impede the safety of the community.

ITEM C-14

EQUIPMENT RENTAL

C-14.1A	Bulldozer and Operator	(Cat D3/D4 or Equivalent)
C-14.1B	Bulldozer and Operator	(Cat D5/D6 or Equivalent)
C-14.2A	Track Excavator and Operator	40,000#-50,000# Class
C-14.2B	Track Excavator and Operator	50,000#-60,000# Class
C-14.2C	Track Excavator and Operator	15,000#-20,000# Class (mini exc.)
C-14.3	Rubber Tire Excavator and Operator	20,000#-40,000# Class
C-14.4	Front End Loader	3 C.Y.- 4 C.Y. Bucket
C-14.5A	Skid Loader	1/4 CY – 3/8 CY Bucket
C-14.5B	Skid Loader w/Bucket and Backhoe	1/4 CY – 3/8 CY Bucket & 6-8 Ft digging depth
C-14.6A	Trailer platform style w/ flush deck	2 axle, 10 ton capacity
C-14.6B	Trailer platform style w/ flush deck	2 axle, 25 ton capacity
C-14.6C	Trailer platform style w/ flush deck	3 axle, 40 ton capacity
C-14.7	Jet Vacuum Truck and Operator	
C-14.8A	Tri-Axle and Operator	18 CY capacity
C-14.8B	Trailer Dump and Operator	24 CY capacity
C-14.9	Asphalt Paver and Operator	5 Ton capacity

Bids shall be for furnishing Bulldozer, Excavator and Truck Services to be utilized on an "as needed" basis for various town projects. All items shall include both the equipment and the operator and shall be bid on a "per hour" basis.

Fuel, maintenance, repairs, equipment transportation, and all other operating expenses shall be the responsibility of the Contractor. The items bid shall include, in the space provided, the Make and the Model of the equipment being bid.

ITEM C-14A

EQUIPMENT RENTAL & SERVICE CEMETERY

Scope of Work

C-14.10 Backhoe/Loader Rubber tire, 18-24-inch bucket

Bids shall be for furnishing Backhoe/Loader and Operator Service to be utilized on an “as needed” basis for various cemetery projects including grave site openings and backfilling. The item shall include both the equipment and the operator and shall be bid on a “per hour” basis. Fuel, maintenance, repairs, equipment transportation, and all other operating expenses shall be the responsibility of the Contractor. The item bid shall include, in the space provided, the Make and the Model of the equipment to be used.

C-14.11 Grave Site Excavation/Backfill

Bids shall be to excavate one grave site to the specification set by the Town. It shall also include the backfilling of the site upon completion of the service including hand raking. Work shall be completed under the supervision of the Ludlow DPW.

ITEM C-15

CRACK SEALING AND PENETRATING SURFACE TREATMENTS

Scope of Work

C-15.1 CRACK SEALING: Work under this contract item shall consist of cleaning and filling cracks in existing asphalt pavements or asphalt concrete overlays with fiber reinforced asphalt cement.

MATERIALS

a. Asphalt Cement

The asphalt cement shall be paving grade AC-10 or AC-20 asphalt with a penetration of 60-120

b. Fibers

The fibers shall be composed of short length polyester having the following properties:

Length	7mm
Diameter	0.0008 inch +/-0.0001 inch
Specific Gravity	1.32 – 1.40
Melt Temperature	400 Degrees F. minimum
Ignition Temperature	1000 degrees F. minimum
Tensile Strength	75,000 PSI +/- 5,000 PSI
Break Elongation	3% - 9% (fully drawn)

c. Composition of Sealant Mixture

The following asphalt cement and fiber proportions shall apply:

Asphalt Grade Minimum % Polyester by Weight of Asphalt AC 10 or AC 5.0

d. Mixing Temperatures

The sealant shall be mixed at the temperatures recommended by the fiber manufacturer but shall not exceed 325 degrees Fahrenheit. No crack sealing shall be done if the ambient temperature is below 55 degrees or surface temperature is below 45 degrees. The area to be sealed must be dry and free of all organic material.

C-15.2 LOCALIZED THERMAL SURFACE RESTORATION: This work consists of cleaning and heating the designated work area(s), proper disintegration of the heated areas as needed, placement of specified admixed material(s), and compaction by approved methods. This portion of the work relates to localized areas and will be used to address discontinuous pavement conditions that have impacted the overall smoothness of the surface, or where thermal plasticizing and bonding of the surface is warranted.

This work shall be performed in the following manner:

1. Using appropriate methods prior to the commencement of any thermal surface restoration work, the Contractor shall thoroughly clean the area to be repaired to eliminate all potential contaminants.
2. The Contractor shall then heat the entire section to be repaired in conjunction with the immediately adjacent area by carefully positioning a pre-approved thermostatically controlled pavement heater of site appropriate dimensions, capable of achieving a consistent plasticized surface condition. Excessive heating of the pavement shall be avoided. All unsuitable or excessively oxidized bituminous materials must be removed immediately. Replacement mixes shall consist of the specified patching material admixtures as outlined in SPECIFICATION (B) consistent with the existing pavement as needed.
3. Based on prior experience and the general condition of the existing pavement, the Contractor will determine if a compensatory liquid additive is necessary to restore the properties of the bituminous materials in the softened area(s). This material will be selected from the emulsions provided in SPECIFICATION (B) and introduced to each heated section in an appropriate amount required to sufficiently, but not overly, increase ductility and/or asphalt content as needed. When in use, the emulsion selected will be immediately dispersed into the heated area to prevent any further heat loss. Scarification will then be performed uniformly from the outermost edges in straight lines, working inwardly to produce a workable mix condition consistently incorporating the emulsion as necessary.
4. For this phase of the work the use of admixtures will be restricted to patching material(s) with the particular warm mix characteristics detailed in SPECIFICATION (B). Specified patching materials shall be furnished in the quantities and gradations as directed by the Town, consistent with the particular application and uniformly heated to a minimum temperature of two hundred degrees Fahrenheit (200°F). Patching material(s) shall be supplied to all jobsites in thermostatically controlled heated containers with sufficient capacities to satisfy the jobsite requirements without any delay or interruption of the workday. The Contractor will be compensated for all specified materials as required by the Town for use in conjunction with the thermal surface restoration process.
5. After the proper consistency of the plasticized pavement, together with the appropriate emulsion and patching material has been achieved, the newly combined homogeneous mixture shall be hand raked to the desired grade and compacted. Compaction shall be accomplished by use of a static and/or vibratory steel wheeled roller as required to establish a uniform density and grade comparable to that of the adjacent surface within the work area. The finished thermally integrated section(s) shall be smooth and even with the surrounding pavement and shall not retain any water on the surface.
6. The modified asphalt emulsion, as per SPECIFICATION (B), will be applied by an appropriate soft bristled hand brush to the edges of the entire perimeter of the finished area to fill and seal any excess surface voids and to develop a stronger, more durable bond.
7. The emulsified petroleum resin, as per SPECIFICATION (B), shall then be distributed uniformly over the entire surface as needed. Concentration and rate of application will be determined by individual site conditions and the amount of admixed patching material used in the repair. Mineral filler shall then be broadcast over the entire repaired area(s), including the edges, to absorb any excess liquid and prevent tracking as necessary.

**SPECIFICATION (B)
MODIFIED ASPHALT EMULSION**

TEST ON MATERIAL PROPERTIES	TEST METHOD ASTM	REQUIREMENTS MIN./MAX.
Viscosity @ 25° C, SES	D-244	25 - 150
Sieve Test, %w	D-244 (Mod) ¹	0.1 max
Particle Charge Test	D-244	Positive
Cement Mixing Test, %w	D-244	2.0 max
Pumping Stability	_____ (Mod) ²	Pass
5-day Settlement Test, %w	D-244	5.0 max
Residue, %w	D-244 (Mod) ³	64 min.
TEST ON RESIDUE FROM DISTILLATION		
Viscosity @ 60°C, cSt	D-2170	1,000 – 4,000
Maltene Distribution Ratio	D-2006-70	0.7 – 1.1
PC + A ₁ ⁴		
S + A ₂		
PC/S Ratio	D-2006-70	0.5 min.
Asphaltenes, %w	D-2006-70	11.0 max

¹ Test procedure identical with ASTM D-244 except that distilled water shall be used in place of two percent sodium oleate solution.

² Pumping stability is determined by charging 450 m. of emulsion into one-liter beaker and circulating the emulsion through a gear pump (Roper 29. B22621) having ¼ inch inlet and outlet. The emulsion passes if there is no significant oil separation after circulating ten minutes.

³ ASTM D-244 Evaporation Test for percent of residue is modified by heating 50-gram sample to 149°C (300°F) until foaming ceases, then cooling immediately and calculating results.

⁴ In the Maltene Distribution Ratio Test by ASTM Method D-2006-70:

PC= Polar Compounds A₁= First Acidaffins
A₂= Second Acidaffins S= Saturated Hydrocarbons

Modified asphalt emulsion shall be freeze stabilized and if freezing has occurred a homogeneous mixture shall be obtained when the material has thawed and been thoroughly mixed.

Note: For gal/ton conversion use 242 gal/ton.

**SPECIFICATION (B)
EMULSIFIED PETROLEUM RESIN**

TEST ON MATERIAL PROPERTIES	TEST METHOD ASTM	REQUIREMENTS MIN./MAX.
Viscosity @ 25°C, SFS	D244	15 40
Residue, %W ¹	D244 (Mod)	60 65
Miscibility ²	D244 (Mod)	No coagulation
Sieve analysis %W ³	D244 (Mod)	0 . 1
Particle Charge	D244	Positive
TEST ON RESIDUE FROM DISTILLATION		
Flash point, COC, °C	D92	196 --
Viscosity @ 60°C, cSt	D445	100 200
Asphaltenes, %W	D2006-70	-- 0.75

Maltene distribution ratio PC + A ₁ ⁴ S + A ₂	D2006-70	0.3	0.6
PC/S ratio ⁴	D2006-70	0.5	--
Saturated hydrocarbons	D2006-70	21	28

¹ ASTM D 244 Modified Evaporation Test for percent of residue is made by heating a 50- gram sample to 149°C (300°F) until foaming ceases, then cooling immediately and calculating results.

² Test procedure identical with ASTM D 244-60, except that 0.02 Normal Calcium Chloride solution shall be used in place of distilled water.

³ Test procedure identical with ASTM D 244, except that distilled water shall be used in place of two percent sodium oleate solution.

⁴ Chemical composition by ASTM D-2006-70: PC = polar compounds, A₁ = First acidaffins, A₂ = second acidaffins and S = saturated hydrocarbons.

Note: For gallon conversion use 242 gal/ton

This material shall have a documented performance history for the intended use described herein, such satisfactory service being based on the capability of the materials to increase the ductility and penetration of the asphalt binder in the pavement surface.

C-15.3 FILLING AND BONDING OF RANDOM PAVEMENT BREACHES: This work consists of cleaning, filling and bonding random pavement breaches caused by natural oxidation, thermal movement and/or disintegrated utility cuts. This phase of the work will be utilized to address random or alligator cracking, together with de-laminated areas, small potholes, and the like.

This work shall be performed in the following manner:

1. PREPARATION: Cleaning of voids, joints, cracks and/or other pavement discontinuities shall be achieved by means of a suitable air compressor, and is required only when necessary to remove entrapped organic matter or in instances where the surface opening is less than half of the depth of the pavement. For excessively deep or wide openings in the pavement, the bottom must first be plugged with an approved foundational gradation of mineral aggregate(s) consisting of a particle size of approximately 3/8" minus and penetrated with the modified emulsion sufficiently and in repeated layers, as necessary, to within approximately one half (1/2") inch of the surface. The remaining application(s) required to complete the filling process to the surface of the pavement will utilize additional mineral filler(s) in approved gradations.

Mineral filler(s) and/or cover material(s) will consist of separate and approved sieve sizes as required to address individual site conditions and may be pre-heated to remove excess moisture and to assist in accelerating the set of the modified emulsion. A minimum capacity of ten (10) tons of various aggregates will be required for these procedures on a daily basis. Individual amount(s) of each cover material will be determined by the Town for use each day, predicated on individual job-site conditions. Heated mineral aggregates and fillers will be obtained from thermostatically controlled storage containers with appropriate individual capacities to accommodate the multiple cover material(s), as required on a daily basis.

2. APPLICATION: The modified asphalt emulsion, as per SPECIFICATION (B) shall be dispensed into and on top of pavement breaches under pressure by means of an approved sealer/applicator with a three hundred (300) gallon minimum capacity. Applicator must be free of all contaminants and capable of agitation or circulation of emulsion. Extruder shall be equipped with a flow control valve with a "recessed nozzle" at the discharge. These features are required to assist in eliminating entrapped air voids and facilitate surface bridging and to promote the desired "healing" effect. No application of the modified asphalt emulsion shall exceed one and one-half inches (1.5") beyond any side of the outermost extremities of the pavement opening on the surface. Immediately after each

application of the emulsion, approved mineral aggregate(s) and filler(s), heated as necessary, will be used distending the emulsion to adequately fill and bond small pavement breaches. All applications of the modified asphalt emulsion must include cover material(s) to promote integration with the emulsion and prevent excessive tracking.

3. **INSTALLATION:** All materials must be approved prior to installation and applied at temperatures as directed by the Town. These combined materials as described above must be well bonded and result in a homogeneous filler capable of fusing to the existing pavement and retarding further moisture intrusion. All pavement voids and surface breaches shall be filled to refusal. Repeated future applications may be necessary.

With Contractor input, the Town will furnish the Contractor with mineral aggregates and fillers as required by this Item.

C-15.4 PENETRATING SURFACE TREATMENTS: This work consists of furnishing and applying the emulsified petroleum resin and/or the modified asphalt emulsion, as per SPECIFICATION (B) to increase the ductility and penetration value of the asphalt binder on the surface; to offset the effects of oxidation by restoring the chemical composition of the asphalt; and to seal the pavement from intrusion of air and water, returning the surface properties to substantially original condition.

Individual site evaluations together with actual physical material field tests will be conducted with Contractor assistance, at the direction of the Town Engineer. A material sample for each jobsite will be submitted by the Contractor for approval prior to application.

This work shall be performed in the following manner:

1. **PREPARATION:** The Contractor, together with the Town Engineer, shall visit each site to determine the appropriate material and application rate. Emulsions stored in rail cars or tanks shall be circulated at least forty-five minutes before withdrawing any material for scheduled applications. The solids content of these reconditioning materials may be appropriately adjusted to suit individual site conditions as directed and approved by the Town Engineer. The ambient temperature must be 50° F and rising for all of the surface treatments described in this section and they may only be applied when the existing surface is sufficiently dry and when the weather is not foggy or raining.

The Town will sweep and/or clean the streets prior to, and after sealing treatments when necessary.

2. **APPLICATION EQUIPMENT:** The Contractor must demonstrate that the application equipment and/or distributor truck(s) to be used for this phase of the work must have a dedicated history of use with these specific emulsions to ensure that no prior contamination of these material(s) has occurred. The condition and cleanliness and of the distribution equipment shall be subject to the satisfaction and approval of the Town Engineer as well.

The distributor for spreading these emulsions shall be self-propelled and have a minimum capacity of 2,000 gallons. Said distributor shall be designed and equipped to apply the sealant uniformly on variable widths of surface, at predetermined approximate rates ranging from 0.006 to 0.056 gallons per square foot. The final application rate will be determined on a site by site basis and shall not vary by more than five (5%) percent of the site-specific rate intended. Application rate accuracy and uniformity of distribution shall be verified and accurately adjusted as directed by the Town. The distributor shall be equipped to circulate and agitate the emulsion within the tank and include full circulation spray bars, pump tachometer, volume measuring device and a hand hose attachment suitable for manual application of the emulsion as necessary.

All cover materials will be provided by the Town with contractor input regarding particle characteristics. When cover materials are required a sufficient number of spreader trucks, equipped with a mechanism that allows for suitable, compatible mineral filler(s) to be uniformly distributed onto the pavement will be furnished by the Town to insure the best possible results. These spreaders shall be capable of applying the cover material at a rate of 0.05 pounds to 0.33 pounds per square foot in a single pass and adjustable to prevent over-broadcasting any excess material beyond the curb line, or outside the intended area to be treated.

When indigenous mineral fillers do not possess appropriate particle characteristics, the Contractor shall assist the Town in locating a suitable source. The Contractor may also be required to conduct small field tests to determine

the effectiveness of the cover materials. Any cover material that contains excessive moisture or other undesirable characteristics may be rejected from the job site.

All equipment must be maintained in efficient working order, operationally functional to obtain optimal results prescribed, herein. Inoperable and/or nonconforming equipment shall be immediately repaired or replaced at the direction of the Town.

3. APPLICATION: The specified emulsion(s) shall be applied by the distribution equipment at a suitable temperature and at a sufficient pressure required to achieve proper coverage. The emulsion shall be applied so that uniform distribution is achieved on all similar surface conditions being treated. Distribution shall commence with a running start to insure an even, full rate of spread. Inaccessible areas inadvertently omitted shall receive additional treatment(s) by hand sprayer/applicator as necessary.

Unless otherwise directed by the Town Engineer, application passes of emulsion(s) shall not exceed twelve (12) feet in width or extend beyond the center of the pavement at one time, to allow for traffic relief whenever possible. If a second pass is required, the distributor nozzle nearest the outside edge of the previous application shall be overlapped by at least one-half the normal width of the nozzle spray pattern. In any event, the adjoining border of the previously treated pavement section shall be resealed with each subsequent application pass of the distributor truck.

The emulsion to be utilized shall be of a final solids content determined by appropriate field testing and/or as stipulated by the Town Engineer. This final mixture shall be spread at an approximate rate of 0.006 to 0.02 gallons per square foot, based on field absorption tests conducted on site and/or as directed by the Town Engineer.

Extreme grades or super evaluations of pavements may require two or more treatments with a diminished application rate to prevent excessive runoff. Where more than one application is necessary, succeeding treatments shall be performed as soon as possible, allowing for maximum absorption of the previous application of the emulsion. Multiple applications must be approved the Town Engineer.

When the modified asphalt emulsion is used, immediately after the final application has sufficiently penetrated, a suitable mineral filler shall be spread sufficiently and uniformly in an amount to adequately cover all treated areas as described above. A drag broom may be required to break the surface tension of the emulsion, and/or spread the emulsion or the mineral filler more evenly over the treated surface as necessary. Only after the mineral filler has been applied shall the finished area(s) be opened to traffic.

When directed by the Town Engineer, the Contractor shall submit representative samples of each and all material(s) which may be subject to testing, before, during, or after applications. If any sample is found to not meet the Town Engineer's requirements as specified or directed for use, the resultant contract may be cancelled and the Contractor may be banned from bidding similar projects in the future.

Special care must be exercised by the Contractor during the operation of this work to protect from damage, any structure, public or private, situated above or below the surface lying within the scope of work. If during the execution of the work, the Contractor, through willfulness or carelessness, permits or causes damage to the aforementioned structure(s), the cost of satisfactory cleaning, repair or replacement shall be the financial responsibility of the Contractor.

ITEM C-16**Springfield Water and Sewer Commission
Water Valve Box Adjustment and/or Replacement****Contractor Work Requirements**

1. All safety rules and regulations pertaining to this type of work shall be adhered to by the Contractor.
2. Inspections: All the work shall be subject to the Springfield Water and Sewer Commission's (Commission) inspection and approval prior to payment.
3. The Contractor shall supply all labor, materials and equipment required to perform the described work unless otherwise specified in this section.
4. The Contractor shall supply three (3) sets of certified shop drawings for all materials to be used. The Commission will mark one (1) set "Approved", "Approved as Noted", or "Rejected-Resubmit" and return to the Contractor.
 - (a) Approved means the Contractor can supply the material as shown on the drawing(s).
 - (b) Approved as Noted means the Contractor can supply the material as shown on the drawing(s), but with the changes as noted.
 - (c) Rejected – Resubmit means the Contractor must resubmit three (3) sets of new shop drawings for correct materials to be used.
5. The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Commission's standards and be paid for under an extra work order. The Contractor, the Ludlow Department of Public Works (Department of Public Works), and Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment except for such items that already have an existing unit cost for extra work as defined below:
 - (a) The Contractor shall notify the Commission in writing within seven (7) days of noticing the potential extra work. No extra work shall be performed unless authorized by the Commission in writing.
 - (b) The Commission shall notify the Contractor in writing in a timely fashion of receiving the notice for the potential extra work.
 - (c) When there is an existing unit cost for an extra work item the Contractor shall be paid the unit cost amount.
 - (d) When no unit cost exists for an extra work item the Contractor shall be paid the actual direct labor, materials, and use of equipment charge for this work.
6. If during the course of normal contractual work, the Contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Commission's Guidelines and Policies and Material Specifications at the Contractor's expense. The Contractor, Department of Public Works, and Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

7. The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Commission property.
8. The Contractor is required to notify all underground utilities as part of the Dig Safe requirements. The Commission is not part of Dig Safe. The Contractor shall notify the Commission in writing for field location of water mains, valves, water services, sewer mains, sewer manhole frame and covers, and appurtenances. All notifications shall be at least 72 hours prior to any work beginning.
9. All gate and service boxes are the property of the Commission. All water valves shall be operated by Commission employees only.
10. The Commission shall identify all structures, which are to remain, be raised or lowered, removed and reset, or removed and replaced with new structure.
11. Work done by the Contractor shall include the locating and recording in a field book of all Commission valve boxes, service boxes, lowered, removed, replaced, and/or adjusted during construction. This book shall be available to the Resident Engineer or Project Representative and become property of the Commission.
12. The Contractor shall be held responsible for the protection of all castings while performing work on these Price Agreement items. The Contractor at his expense shall replace any water boxes damaged during the progress of construction with new castings.
13. No water box shall remain exposed above grade at any time without suitable protection for the safety of the traveling public.
14. Payment: The Contractor shall submit to the Commission the Work Completed Form, attached in 0 of this Bid Form. The Commission personnel shall inspect all work on water mains, valve boxes, and appurtenances. All water boxes shall be centered over the appurtenance that they supply access to, and be installed straight and clean. Final payment will be made by the Commission to the Contractor after the Commission Representative authorizes payment and signs the submitted form.

STRUCTURE ADJUSTMENT AND/OR REPLACEMENT

Water Valve Box and Service Box Adjustment and Replacement Requirements

- | | | |
|--|---|-----------|
| ITEM 1 | GATE BOX REMOVED AND STACKED | EA |
| <p>Cost of this item shall be inclusive, but not be limited to, removing the existing gate box top, gate box bottom, and gate box cover by excavating to expose the structures, and carefully removing the structures.</p> <p>All removed and stacked gate boxes shall be brought to a location determined by the Commission. If the Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.</p> | | |
| ITEM 2 | GATE BOX TOP REMOVED AND STACKED | EA |
| <p>Cost of this item shall be inclusive, but not be limited to, removing the existing gate box top, and gate box cover by excavating to expose the structures, and carefully removing the structures. All removed and stacked gate box tops shall be brought to a location determined by the Commission. If the Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.</p> | | |
| ITEM 3 | GATE BOX REMOVED AND RESET | EA |
| <p>Cost of this item shall be inclusive, but not be limited to, removing the existing gate box top, gate box bottom, and gate box cover by excavating to expose the structures, carefully removing the structures, resetting the undamaged structures, and backfilling the structures may be either with excavatable flowable fill when a vac truck is used for excavation or common borrow fill compacted in 12-inch lifts when machine excavation is used to within 6-inches of</p> | | |

the corporation or gate level, and placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Valve Box Detail W-08.1**.

ITEM 4 GATE BOX ADJUST EA

Cost of these items shall include, but not be limited to, removing the existing material around the existing box top to a depth of 6" below the existing grade. Pry up the box top to the proposed finish grade. Pour a concrete collar (4,000 psi minimum mix) around the adjusted box top and up to the flange of the box top and finish the collar to all patch edges, in accordance with **Replace, Raise, or Reset Valve Box Detail W-08.1**.

ITEM 5 GATE BOX ADJUST WITH RISER EA

This Item may be used in Residential streets only and with the Commission's approval. Cost of this item shall be inclusive, but not be limited to, removing the existing cover, install the correct riser, and install a new cover, if required by the Commission. This work shall be performed during the day of the paving operation, in accordance with **Raise Valve Box with Riser Detail W-08.2**.

ITEM 6 NEW GATE BOX INSTALLED EA

Cost of this item shall be inclusive, but not be limited, supplying the valve box that meets the Commission's Specifications. Valve boxes shall be installed concentric to the operating nut and plumb with the vertical plane. The belled base section shall be placed on blocking in such a way that no additional loading is transferred to the valve. Longer valve box bottoms and/or tops will be specified as required for water mains at depths that exceed the limitations of the above specified valve box. Valve boxes located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified. Valve boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. Valves and boxes shall be set with the stem vertical and valve box vertically centered over the operating nut. The valve box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The Valve Box shall be flush with finished grade and backfill for the structures may be either with excavatable flowable fill when a vac truck is used or common borrow fill compacted in 12-inch lifts when machine excavation is used to within 6-inches of the corporation or gate level, and placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Valve Box Detail W-08.1**.

ITEM 7 NEW GATE BOX TOP INSTALLED EA

Cost of this item shall be inclusive, but not be limited to supplying the valve box top that meets the Commission's Specifications. Valve box tops shall be installed concentric to the operating nut and plumb with the vertical plane. Valve boxes located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified. Valve boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. Valves and boxes shall be set with the stem vertical and valve box vertically centered over the operating nut. The valve box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The Valve Box shall be flush with finished grade and backfill the structures may be either with excavatable flowable fill when a vac truck is used or common borrow fill compacted in 12-inch lifts when machine excavation is used from the depth of excavation to the placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Valve Box Detail W-08.1**.

ITEM 8 SERVICE BOX REMOVED AND STACKED EA

Cost of this item shall be inclusive, but not be limited to, removing the existing service box top, service box bottom, and service box cover by excavating to expose the structures, and carefully removing the structures. All removed and stacked service boxes shall be brought to a location determined by the Commission. If the Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.

ITEM 9 SERVICE BOX TOP REMOVED AND STACKED EA

Cost of this item shall be inclusive, but not be limited to, removing the existing service box top and service box cover by excavating to expose the structures, and carefully removing the structures. All removed and stacked service box tops shall be brought to a location determined by the Commission. If the Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.

ITEM 10 SERVICE BOX REMOVED AND RESET EA

Cost of this item shall be inclusive, but not be limited to, removing the existing service box top, service box bottom, and service box cover by excavating to expose the structures, and carefully removing the structures. resetting the undamaged structures and backfilling the structures may be either with excavatable flowable fill when a vac truck is used or common borrow fill compacted in 12-inch lifts when machine excavation is used to within 6-inches of the corporation or gate level, and placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Service Box Detail W-12.2.**

ITEM 11 SERVICE BOX ADJUST EA

Cost of this item shall be inclusive, but not be limited to, removing the existing material around the existing box top to a depth of 6" below the existing grade. Pry up the box top to the proposed finish grade. Pour a concrete collar (4,000 psi minimum mix) around the adjusted box top and up to the flange of the box top and finish the collar to all patch edges, in accordance with **Replace, Raise, or Reset Service Box Detail W-12.2.**

ITEM 12 SERVICE BOX ADJUST WITH RISER EA

Cost of this item shall be inclusive, but not be limited to, removing the existing cover, break off the existing bolt tab, install the correct riser, and install a new cover. This work shall be performed during the day of the paving operation, in accordance with **Raise Service Box with Riser Detail W-12.3.**

ITEM 13 NEW SERVICE BOX INSTALLED EA

Cost of this item shall be inclusive, but not be limited, supplying the service box that meets the Commission's Specifications. Service box bases shall be centered over the curb stop ball valve and shall be plumb and vertical in all directions. The box bottom shall be placed on the same blocking or flat surface as the curb stop. Service boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. The service box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The service box shall be flush with finished grade, and backfill the structures may be either with excavatable flowable fill when a vac truck is used or common borrow fill compacted in 12-inch lifts when machine excavation is used to within 6-inches of the corporation or gate level, and placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Service Box Detail W-12.2.**

ITEM 14 NEW SERVICE BOX TOP INSTALLED EA

Cost of this item shall be inclusive, but not be limited, supplying the service box top that meets the Commission's Specifications. The service box tops shall be centered over the curb stop ball valve and shall be plumb and vertical in all directions. Service boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. The service box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The service box shall be flush with finished grade and backfill the structures may be either with excavatable flowable fill when a vac truck is used or common borrow fill compacted in 12-inch lifts when machine excavation is used to within 6-inches of the corporation or gate level and placing of a 6-inch thick concrete collar (4,000 psi minimum) around the box to all patch edges, in accordance with **Replace, Raise, or Reset Service Box Detail W-12.2.**

VALVE BOX SPECIFICATIONS:

1. Valve Boxes provided to the Commission or installer shall be manufactured, tested, inspected and delivered in full compliance with this Specification
2. Valve Boxes shall have all castings cast and assembled in North America.
 - (a) North America shall mean the United States, Canada, and Mexico.
 - (b) Cast shall mean molten metals poured into a mold to create Casting(s) for a finished product.
 - (c) Incidental parts may be purchased/obtained from other counties to provide a finished product, in accordance with these Material Specifications.
 - (d) Assembled shall mean castings and incidental parts are put together to build a finished product.

3. Valve boxes shall be telescopic in design, Cast Iron, heavy pattern, adjustable type top section, bottom section, and cover.
 4. The total weight of the valve box assembly (top, cover and bottom sections) shall be 105 pounds minimum.
 5. Valve boxes shall be of lengths adapted to five-feet of pipe cover or more and have a minimum of six-inches of overlap in the most extended position
 6. All valve box tops, bottoms, and covers shall be coated with an approved petroleum asphaltic seal coat in accordance with ANSI A21/AWWA C-110, Section 4.3 of latest the revision.
 - C. The manufacturer and/or vendor shall provide the purchaser with three (3) sets of certified shop drawing for the valve box tops, bottoms, and covers. All components shall be provided in accordance to these drawings. The drawings shall show the following:
 - (a) Construction details
 - (b) Overall dimensions
 - (c) Weight of each component and total weight
 - (d) Material specifications for each component
 - (e) Country of origin for each component
 - D. The manufacturer/vendor/shipper must use care in preparing valves boxes for shipment and in handling during shipment and delivery, to ensure that the valves boxes are delivered without damage. Particular attention must be directed at protecting the protective coating from damage. Damaged valves boxes will not be accepted.
 - E. The manufacturer and/or vendor, on request, shall provide the purchaser with an affidavit for each and every delivery of an order, stating that the valve and all materials in its construction exactly conform to the applicable requirements of these specifications to include the applicable AWWA Standards.
7. References
- The Supplier shall provide references, on request, which shall list a minimum of three (3) Municipalities/Utilities that were, supplied this product, in the last two (2) years. The listing is to include:
- (a) Name of Municipality/Utility
 - E. Total amount of product bid on and amount delivered
 - F. Date the bid was accepted and date the product was delivered
 - G. Reference person with address and desk top phone number whom the Commission has authorization to contact regarding the product

Two Piece Valve Boxes and Covers

1. In addition to the General Section above the following shall be provided:
2. The top section shall have:
 - (a) A top flange to increase the stability of the box to remain at the present height

- (b) A smooth cast seat to accept the lid and insure a non-rocking installation.
- 3. The bottom section shall have:
 - (c) A belled base and have an inside diameter of 5- $\frac{1}{4}$ "
 - (d) The belled base shall enclose the valve, the valve stuffing box / seal plate, and operating nut.
 - (e) A bottom flange of sufficient bearing area to prevent settling.
- F. The valve box cover shall have:
 - (a) A 5- $\frac{1}{4}$ " diameter by 2" deep drop lid.
 - (b) The valve box cover shall weigh no less than 13 pounds
 - (c) The valve box cover shall have the word "Water" cast in the top.
 - (a) The valve box cover shall be designed to remain seated when subjected to mobile traffic conditions.
 - (b) The valve box cover shall be close fitting and substantially dirt tight and flush with the top of the box rim.

Three Piece Valve Boxes and Covers

- 1. In addition to the General Section above the following shall be provided:
- 2. The top section shall have:
 - (a) A top flange to increase the stability of the box to remain at the present height.
 - (b) A smooth cast seat to accept the lid and insure a non-rocking installation.
- 3. The bottom section shall have:
 - (a) A belled base and have an inside diameter of 5- $\frac{1}{4}$ ".
 - (b) A bottom flange of sufficient bearing that will fit onto a number six base.
- G. The number six base section shall have:
 - (a) At the top opening a minimum inside diameter of 5- $\frac{1}{4}$ ".
 - (b) The belled base shall enclose the air valve assembly and allow the lever to operate freely.
 - (c) A bottom flange of sufficient bearing area to prevent settling.
- H. The valve box cover shall have:
 - (a) A 5- $\frac{1}{4}$ " diameter by 2" deep drop lid.
 - (b) The valve box cover shall weigh no less than 13 pounds
 - (c) The valve box cover shall have the word "Water" cast in the top.

- (d) The valve box cover shall be designed to remain seated when subjected to mobile traffic conditions.
- (e) The valve box cover shall be close fitting and substantially dirt tight and flush with the top of the box rim.

Valve Box Extension

1. In addition to the General Section above the following shall be provided:
2. The valve box extension shall be;
 - (a) 12 inches to 15 inches in length and,
 - (b) Cast Iron, heavy pattern, and shall fit on the top of the bottom section of the gate box.

SERVICE BOX SPECIFICATIONS

General

1. Service Boxes provided to the Commission or installer shall be manufactured, tested, inspected and delivered in full compliance with this Specification.
2. Service Boxes shall have all castings cast and assembled in North America.
 - (a) North America shall mean the United States, Canada, and Mexico.
 - (b) Cast shall mean molten metals poured into a mold to create Casting(s) for a finished product.
 - (c) Incidental parts may be purchased/obtained from other counties to provide a finished product, in accordance with these Material Specifications.
 - (d) Assembled shall mean castings and incidental parts are put together to build a finished product.
3. All Service Box tops, bottoms, and covers shall be coated with an approved petroleum asphaltic seal coat in accordance with ANSI A21/AWWA C-110, Section 4.3 of latest the revision.
4. The manufacturer and/or vendor shall provide the purchaser with three (3) sets of certified shop drawings for the service box tops, bottoms, and covers. All components shall be provided in accordance to these drawings. The drawings shall show the following:
 - (a) Construction details
 - (b) Overall dimensions
 - (c) Weight of each component and total weight
 - (d) Material specifications for each component
 - (e) Country of origin for each component
- I. The manufacturer/vendor/shipper must use care in preparing valves boxes for shipment and in handling during shipment and delivery, to ensure that the valves boxes are delivered without

damage. Particular attention must be directed at protecting the protective coating from damage. Damaged valves boxes will not be accepted.

- J. The manufacturer and/or vendor, on request, shall provide the purchaser with an affidavit for each and every delivery of an order, stating that the valve and all materials in its construction exactly conform to the applicable requirements of these specifications to include the applicable AWWA Standards.

5. References

The Supplier shall provide references, on request, which shall list a minimum of three (3) Municipalities/Utilities that were, supplied this product, in the last two (2) years. The listing is to include:

- (a) Name of Municipality/Utility

H. Total amount of product bid on and amount delivered

I. Date the bid was accepted and date the product was delivered

J. Reference person with address and desk top phone number whom the Commission has authorization to contact regarding the product

Buffalo Style Service Box (Items # 25, 26, 27, & 27a) for New and Existing Services

1. The Buffalo Style Service Box shall be heavy cast iron extension (adjustable) type, slide style, with arch pattern base and a recessed cover.
 - (a) For installations in the street the service box shall be 3-1/2-feet tall, with a 24-inch top and an approximate 36-inch bottom
 - (b) For installations in the tree belt the service box shall be 5-feet tall, with a 24-inch top and an approximate 48-inch bottom
2. The arch pattern base shall accommodate ¾ to 2-inch ball type corporations and ball type curb stops.
 - (a) For 1-inch inch ball type corporations and ball type curb stops the arch shall be at least 5-inches tall with a 3-inch by 3-inch arch.
 - (b) For 1-1/2-inch to 2-inch ball type corporations and ball type curb stops the arch shall be at least 7-inches tall with a 4-inch by 4-inch arch.
3. The inside diameter of the upper section shall be at least 3-inches. The inside diameter of the bottom section shall be at least 2-1/2-inches.
4. The Buffalo Style Service Box shall be provided with a cast iron cover that has a brass pentagon head nut, and the word "WATER" cast into the cover.

BID FORM

1. The Estimated Quantities listed here are for the duration of the Price Agreement.
 - (a) The Commission makes no guarantee as to the actual quantities that will be required under this Price Agreement.
 - (b) Please provide Unit Cost for each Item and the Amount for each Item to perform the work required as part of this Price Agreement. The Amount shall be computed by multiplying the

Estimated Quantity by the Unit Price. The Total Amount shall be the sum of all fifteen (15) Amounts.

(c) Failure to provide bid prices as required may render the bid Non-responsive.

Work Sheet Form (this page is not the Bid Form)

1. Bid Number _____

2. Street Name _____

(d) Date Started: _____ Date Completed: _____

ITEM #	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	AMOUNT
1	Gate Box Remove and Stacked	EA			
2	Gate Box Top Remove and Stacked	EA			
3	Gate Box Remove and Reset	EA			
4	Gate Box Adjust	EA			
5	Gate Box Adjust with Riser	EA			
6	New Gate Box Installed	EA			
5	New Gate Box Top Installed	EA			
6	Service Box Removed and Stacked	EA			
7	Service Box Top Removed and Stacked	EA			
8	Service Box Removed and Reset	EA			
9	Service Box Adjust	EA			
10	Service Box Adjust with Insert	EA			
11	New Service Box Installed	EA			
12	New Service Box Top Installed	EA			
13	Service Box Adjust	EA			
14	Service Box Adjust with Riser	EA			
Total Amount:					

ITEM C-17

HYDROSEEDING FERTILIZING AND APPLICATION OF HERBICIDE, INSECTICIDES AND LIME

Scope of Work

Furnish all labor, materials, equipment and incidentals required to hydraulically apply seed and mulch and maintain all seeded areas as specified herein. Related work includes site cleanup of disturbed areas arising from work. Submit samples or manufacturer data sheets of all materials for inspection and acceptance.

Materials

Fertilizer shall be commercial mixed free flowing granules or pelleted fertilizer, 10-20-10 (N-P2O5-K2O) grade for lawn and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis conforming to applicable state fertilizer laws. At least 40 percent of the nitrogen in the fertilizer used shall be in slowly available (organic) form.

Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of 6 months prior to commencement of planting operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The seed mixtures shall consist of seed proportioned by weight as follows:

Athletic Field Seed Mix (For all slopes and disturbed areas not otherwise indicated)

Daytona Perennial Ryegrass	50 percent
Action Kentucky Blue Blend	10 percent
Blue Chip Plus Kentucky Bluegrass	10 percent
J-5 Chewings Fescue	10 percent
Aruba Creeping Red Fescue	20 percent

The seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturers for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

Mulch shall be specially processed 100 percent Virgin wood fiber mulch containing no growth or germination inhibiting factors. Wood fiber mulch shall be "Second Nature Regenerated wood fiber as by Central Fiber Corporation, Wellsville, KS or equal. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the wood fiber shall be marked by the manufacturer to show the air-dry weight content and not contain in excess of 10 percent moisture. Tackifier as approved by Engineer.

EXECUTION

APPLICATION

A. For all areas to be seeded:

1. Lime and Fertilizer (10-20-10) shall be applied at the rate of 30 lbs/1,000 sq ft or as determined by the soil test.
2. Seed shall be applied at the rate of 10 lbs/1,000 sq ft.
3. Fiber mulch shall be applied at the rate of 45 lbs/1,000 sq ft.

4. Tackifier shall be installed per manufacturer's instructions and reapplied as necessary to insure the straw mulch is stabilized until reasonable turf growth is established as determined by the Engineer with a minimum rate of 1 gal/1000 sq ft per application.
- B. The application of fertilizer may be performed hydraulically in one operation with hydroseeding and fiber mulching. Clean all structures and paved areas of unwanted deposits of the hydroseeded mixture.
- C. Tackifier shall be applied immediately following seeding operations (same day) unless otherwise approved by the Engineer.

INSTALLATION

- A. Seeding, mulching and conditioning shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the Engineer. Hydro-seed and apply straw mulch only on a calm day
- B. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the work. Seeding as specified herein shall be accomplished between the period of April 1 to June 1 or August 15 to October 1. Seeding during the period from October 2 to March 31 shall only be undertaken upon approval of the Engineer. Seeding during the period from June 1 to August 14 shall only be performed if irrigation is provided.
- C. Seeding shall be done within ten days following soil preparation. Seed shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the mixture is sprayed over an area, the grass seed and mulch shall be equal in quantity to the specified rates. Prior to the start of work, furnish the Engineer with a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydro seeder. Upon completion of seeding operations, furnish the Engineer with a certified statement on the actual quantity of solution applied.

MAINTENANCE AND PROVISIONAL ACCEPTANCE

- A. The Engineer will inspect all work for provisional acceptance at the end of the 10-week maintenance period, upon the written request received at least 10 days before the anticipated date of inspection. The maintenance period must occur during the growing season between March 31 and October 1 and shall include a minimum of three mowings.
- B. A satisfactory turf will be defined as:
 1. No bare spots larger than 3 sq ft.
 2. No more than 10 percent of total area with bare spots larger than 1 sq ft.
 3. Not more than 15 percent of total area with bare spots larger than 6-in square.

GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All seeded areas shall be guaranteed for not less than 1 full year from the time of provisional acceptance.
- B. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted at least 10 days before the anticipated date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

FERTILIZATION AND APPLICATION OF HERBICIDE, INSECTICIDES AND LIME

The work under this section shall consist of the furnishing and installation of fertilizers, herbicide, insecticide, lime and related items as specified herein. The Contractor and all employees shall be in possession of a valid Massachusetts Pesticide License or certification issued by the Massachusetts Department of Agricultural Resources in accordance with the Massachusetts Pesticide Control Act and current pesticide regulations. A copy of all employees’ licenses shall be provided to the Town prior to acceptance of the Bid.

The work to be completed under this section shall require the Contractor to provide all labor, material tools, equipment and transportation necessary for the work as specified herein. The Contractor is responsible for storing and handling all fertilizer and pesticide material provided by the Contractor. The Contractor is required to furnish evidence satisfactory to the Town of Ludlow, that they have the ability and experience in reference to this type of work and that they have sufficient capital to enable them to prosecute the same successfully and to complete it with the specified time and in accordance with the terms thereof.

The Contractor shall assume all liability, financial or otherwise, in connection with the contract and shall protect and save harmless the Town of Ludlow for any damages or claims that may arise. The Contractor shall rebuild, repair, restore and make good all and any damages to any portion of the work area, and shall bear the expense thereof.

The Contractor shall provide proper notification (IPM) when pesticides are applied at schools, day care centers and school age child programs as stated under the **Children’s Protection Act of 2000**.

1. The first application shall be a slow release granular fertilizer with a pre-emergent herbicide and have a minimum guaranteed analysis of available elements as follows. The application shall be applied no sooner than May 27th and no later than June 3, 2019.
Nitrogen 18% . Phosphoric Acid 0% . Potash 3% . 25% XCU . Pre-emergent Herbicide .37 Prodiamine
2. The second application shall be a slow release granular fertilizer with a post emergent herbicide and have a minimum guaranteed analysis of available elements as follow. The application shall be applied no sooner than July 22 and no later than August 5, 2019.
Nitrogen 19% . Phosphoric Acid 0% . Potash 7 % . Post emergent Herbicide Confront
3. The third application shall be a slow release granular fertilizer and have a minimum guaranteed analysis of available elements as follows. The application shall be no sooner than Sept. 16 and no later than Sept. 3, 2019.
Nitrogen 32% . Phosphoric Acid 0% . Potash 5 % . 40% XCU
4. The fourth application shall be a slow release granular fertilizer and have a minimum guaranteed analysis of available elements as follows. No soon than Nov. 11 and no later than Nov. 18, 2019
Nitrogen 32% . Phosphoric Acid 0% . Potash 5 % . 50% XCU
5. One application of Pelletized lime per season at a rate of 2000 lbs per acre per location.
6. A granular application of Aloft, a grub surface insecticide shall be applied no later than July 30, 2019 and be applied at a control rate of 2.3-3.6 lbs /1,000 Sq.Ft. as dependent on target pest based on their stage of development.
7. All applications shall have the Nitrogen applied at a rate of 1lf. Per 1,000 square feet on all fertilizer application
8. The Contractor shall, prior to any application, provide the Town certificates showing the composition and analysis for all fertilizer to be used.
9. The Contractor shall provide to the Town of Ludlow, in writing, a work schedule for the year relevant to fertilizer and pesticide applications for all locations once the Bid has been accepted.

Below is a list of locations on which the work is to be performed. When providing quotes, please individualize each location and each area within the location if applicable. The following are estimated square feet.

C-17.2 CREATIVE PARK/PLAYGROUND:	40,000 Square Feet	Entire grass area
C-17.4 ELECTRIC PARK PLAYGROUND:	30,000 Square Feet	Entire grass area
C-17.5 HUBBARD MEMORIAL LIBRARY:	60,000 Square Feet	Entire grass area
C-17.6 MEMORIAL PARK:	186,000 Square Feet	Entire grass area
C-17.7 NICK SILVA FIELD:	102,500 Square Feet	Football field
C-17.8 WEST STREET PARK:	154,000 Square Feet	Entire grass area
C-17.9 WHITNEY PARK:	390,000 Square Feet	Entire grass area
C-17.10 ISLAND POND CEMETERY:	520,000 Square Feet	Entire grass area

ITEM C-18**TRAFFIC DETECTOR LOOPS****Scope of Work****Vehicle and Bicycle Loop Detectors**

Wire loop detectors shall be installed in the roadway pavement for vehicle and bicycle detection at locations shown on the plans.

The detector lead-in cables shall be labeled, with the street name, phase, detector number and terminal numbers, both in the controller unit and in the pull-box containing the detector lead-in splice. This labeling and attachment shall be of durable materials such as brass or plastic, attached by wire or plastic ties. Adhesive attachment of the label shall not be acceptable.

Loop wire shall be encased in a protected plastic tubing of PVC or polyethylene plastic, IMSA 51-5, 6 mm outside diameter, and the wire may have cross-linked polyethylene insulation or it may have THHN/THWN insulation.

The heat source for soldering shall be electrical, not exceeding 30W capacity.

Splicing insulator shall be an approved re-enterable body splice kit with a non-hardening silicone gel sealing compound compatible with the wire insulation.

Splice and Connection

Splicing and connection shall be made in the pull box nearest the roadway loop sensor but not exceeding four loops per pull box. All loops included in a detector group as shown on the plans shall be spliced in a single pull box. Each lead and lead-in connector shall be stripped back and spliced using a pressure type wire connector applied with a crimping tool. Multiple loop sensors shall be identified as detailed on the plans.

Lead-in splicing shall be staggered to prevent contact with each other. Each crimped splice shall be soldered and insulated. The insulation material shall be heat-shrink polyolefin. The shielded lead-in cable outer jacket and shield shall be stripped back sufficiently to ensure that the shield cannot come into contact with the spliced conductors. Splice hangers shall be provided in each pull box.

Follow the instructions of the kit manufacturer for this procedure when installing the re-enterable splice kit. The above splice shall be done on the day of the loop wire installation to prevent the entrance of any moisture into the plastic tubing.

The lead-in conductors shall be connected to the appropriate terminals in the controller cabinet, by using crimped and soldered terminal ends. The heat source for soldering shall be electrical not exceeding 30W capacity.

Testing of Loops

The following test procedure shall be performed in the presence of the Engineer before and after the loop sensor is sealed in the pavement as detailed below. The cost of equipment, labor, and materials to perform such testing and similar re-testing following repairs, replacement, or adjustment of any detector within the project area shall be included in the price bid for the traffic control signal items.

After installation of wire loop sensors in the roadway and installation of shielded lead-in connecting the loop sensors to the controller cabinet, each loop sensor and lead-in combination shall be tested (at the controller cabinet) for proper installation. The resistance from lead to lead of the same loop shall not exceed three (3) ohms per 100 feet as measured by a high-quality meter suitable for measurements of low resistance in the range of 1 to 6 ohms.

A megohm meter test at 500 volts DC shall be made between the two leads of a loop/lead-in combination temporarily spliced together, but otherwise disconnected from all terminals, and the shield drain wire and the earth ground connection. These resistances shall be at least one hundred (100) megohms.

A megohm meter test at 500 volts DC shall be made between lead-in shield and the earth ground rod. This resistance shall be at least one hundred (100) megohms.

The meter used for these tests shall be checked for calibration each day of use by using a resistor block of 5% resistors simulating loads of 1 megohm, 20 megohm and 100 megohms. The observed meter reading shall be 10% of the nominal resistor load.

If any loop sensor and lead-in combination fail to pass any one of the four (4) tests, it shall be repaired and then re-tested on two occasions at least two (2) weeks apart, and then shall pass on each re-test occasion. If the loop sensor lead-in combination does not pass all these re-tests, a new loop sensor and/or lead-in shall be installed, and shall pass these tests, at no additional cost.

After the above tests have been satisfactorily completed, all loop sensor/shielded lead-in inductances shall be measured and a written report of the results shall be filed with the Engineer and a copy stored with the "box prints" at the intersection.

ITEM C-19

SEWER/DRAIN LINE VIDEO INSPECTION

Scope of Work

The work shall consist of providing the necessary video camera equipment including a qualified operator to inspect sewer laterals or mains as required by the Town.

Sewer or drain sections shall be inspected by means of remote CCTV. If a blockage cannot be removed and hampers the video taping of the sewer in one direction then the Contractor shall attempt to complete the section by televising from the other manhole to complete the section, this reversal must immediately follow the initial direction on the same survey and report.

The recorded video must show the entire circumference of the sewer.

Perform all CCTV inspections in accordance with NASSCO's Pipeline Assessment Certification Program (PACP). CCTV inspections will be conducted entirely in digital format. The entire inspection survey shall be recorded in MPEG-1 format written to DVD and submitted with digital links to the survey. All television inspection reports shall be within +/- 2 (two) feet of the measured linear footage between manholes along the existing sewer centerline from the end of pipe to end of pipe.

The documentation of the work shall consist of PACP CCTV Reports, logs, electronic reports, etc. noting important features encountered during the inspection. The speed of travel shall be slow enough to inspect each pipe joint, tee connection, structural deterioration, infiltration and inflow sources, and deposits, but should not, at any time, be faster than 30 feet per minute. The camera must be centered in the pipe to provide accurate distance measurements to provide exact locations of important features in the sewer and these footage measurements shall be displayed and documented on the video. The completed DVD will become the property of the Town.

Every section of sewer (manhole to manhole) shall be identified by audio and alphanumeric on the video display and shall include: project name, municipality, street name, manhole numbers if available, inspector's name, sewer diameter and length, and date of inspection. Important features shall be identified by audio and on PACP log to include all manholes, active and inactive service connections, structural defects, maintenance problems, grease, roots, infiltration, obvious inflow sources, etc. All video must be continuously metered from manhole to manhole.

**TOWN OF LUDLOW
Department of Public Works
BID FORM**

Estimated quantities are approximate for bidding purposes only. Actual quantities for payment shall be as required and measured during the contract period.

NOTE: ALL ITEMS BID SHALL BE BOTH WORDS AND FIGURES. ANY BID ITEM NOT COMPLETED IN THIS FASHION SHALL BE CONSIDERED INCOMPLETE AND MAY BE REJECTED AT THE DISCRETION OF THE BOARD OF PUBLIC WORKS. IN THE CASE OF A DISCREPANCY BETWEEN THE BID PRICE IN WORDS AND THE BID PRICE IN FIGURES, THE BID PRICE IN WORDS SHALL GOVERN.

LF = Linear Foot, CY = Cubic Yard, SY = Square Yard, GAL = Gallon, EA = Each Item, HR = Per Hour

ITEM C-1

HOT MIX ASPHALT AND BITUMINOUS MATERIALS

	Words	Figures
		<u>Est. Quantity</u>
C-1.1	Hot Mix Asphalt Type I-1 (Various Mixes), No Recycled Materials	1,000 Ton
	Picked Up _____/Ton _____/Ton	
C-1.1	Hot Mix Asphalt Type I-1 (Various Mixes), No Recycled Materials	5,000 Ton
	In Place _____/Ton _____/Ton	
C-1.2	Hot Mix Asphalt Berm, Type A Modified	25 Ton
	Picked Up _____/Ton _____/Ton	
C-1.2	Hot Mix Asphalt Berm, Type A Modified	100 Ton
	In Place _____/Ton _____/Ton	
C-1.3	Hot Mix Asphalt for Walk Surfaces	25 Ton
	Picked Up _____/Ton _____/Ton	
C-1.3	Hot Mix Asphalt for Walk Surfaces	25 Ton
	In Place _____/Ton _____/Ton	
C-1.4	Cold Patch	25 Ton
	Picked Up _____/Ton _____/Ton	
C-1.5	Asphalt Emulsion for Tack Coat	3,000 Gal.
	_____/Gal. _____/Gal.	
C-1.6	Hot Poured Rubberized Asphalt Sealer	4,000 L.F.
	_____/L.F. _____/L.F.	

ITEM C-2

STRUCTURE ADJUSTMENT, REPAIR AND RECONSTRUCTION

Words		Figures
		<u>Est. Quantity</u>
C-2	Adjust Catch Basin	40 EA
_____		/EA _____/EA
C-2A	Adjust Manhole	30 EA
_____		/EA _____/EA
C-2B	Reconstruct Existing Structure	10 FT
_____		/FT _____/FT
C-2C	Adjust Structures During Road Reclamation or CIR	100 FT
_____		/FT _____/FT

ITEM C-3

ROAD MATERIALS

Words		Figures
		<u>Est. Quantity</u>
C-3.1	Washed Concrete Sand	25 C.Y.
Picked Up _____		/C.Y. _____/C.Y.
C-3.1	Washed Concrete Sand	100 C.Y.
Delivered _____		/C.Y. _____/C.Y.
C-3.2	Screened Gravel (1 ½" minus)	25 C.Y.
Picked Up _____		/C.Y. _____/C.Y.
C-3.2	Screened Gravel (1 ½" minus)	25 C.Y.
Delivered _____		/C.Y. _____/C.Y.
C-3.3	Processed Crushed Gravel (1 ½" minus)	25 C.Y.
Picked Up _____		/C.Y. _____/C.Y.
C-3.3	Processed Crushed Gravel (1 ½" minus)	25 C.Y.
Delivered _____		/C.Y. _____/C.Y.

C-3.4	6" Rip Rap Rock	25 C.Y.
	Picked Up _____/C.Y.	_____/C.Y.
C-3.4	6" Rip Rap Rock	25 C.Y.
	Delivered _____/C.Y.	_____/C.Y.
C-3.5	3/8" Dense Graded Crushed Stone	25 C.Y.
	Picked Up _____/C.Y.	_____/C.Y.
C-3.5	3/8" Dense Graded Crushed Stone	25 C.Y.
	Delivered _____/C.Y.	_____/C.Y.
C-3.6	Fill	100 C.Y.
	Picked Up _____/C.Y.	_____/C.Y.
C-3.6	Fill	10 C.Y.
	Delivered _____/C.Y.	_____/C.Y.
C-3.8	Winter Sand	3,000 C.Y.
	Delivered _____/C.Y.	_____/C.Y.

ITEM C-4

CONCRETE SIDEWALK

	Words	Figures
		<u>Est. Quantity</u>
C-4.1	New Concrete Sidewalk	1,500 S.Y.
	_____	_____/S.Y.
C-4.2	New Concrete Sidewalk at Driveways	150 S.Y.
	_____	_____/S.Y.
C-4.3	New Concrete Sidewalk and Poured-In-Place Curbing	500 S.Y.
	_____	_____/S.Y.
C-4.1A	Remove and Replace Concrete Sidewalk	1,500 S.Y.
	_____	_____/S.Y.
C-4.2A	Remove and Replace Concrete Sidewalk at Driveways	150 S.Y.
	_____	_____/S.Y.

C-4.3A	Remove and Replace Concrete Sidewalk and Poured-In-Place Curbing	500 S.Y.
	_____ /S.Y.	_____ /S.Y.
C-4.4	Unclassified Excavation and 8" Processed Gravel	50 C.Y.
	_____ /C.Y.	_____ /C.Y.
C-4.5	Install Bituminous Driveway and Apron	50 Tons
	_____ /Ton	_____ /Ton
C-4.6	Remove and Replace Existing Traffic Signs and Mail Boxes	100 EA
	_____ /EA	_____ /EA

ITEM C-5

BITUMINOUS SIDEWALK

Words		Figures
		<u>Est. Quantity</u>
C-5.1	New Bituminous Sidewalk	500 S.Y.
	_____ /S.Y.	_____ /S.Y.
C-5.1A	Remove and Replace Bituminous Sidewalk	500 S.Y.
	_____ /S.Y.	_____ /S.Y.
C-5.2&3	Unclassified Excavation and 8" Processed Gravel	10 C.Y.
	_____ /C.Y.	_____ /C.Y.
C-5.4	Bituminous Concrete Berm	1,000 L.F.
	_____ /L.F.	_____ /L.F.
C-5.5	Remove & Replace Existing Traffic Signs and Mailboxes	10 Units
	_____ /Each	_____ /Each
C-5.6	Install Bituminous Driveways and Aprons	50 Tons
	_____ /Ton	_____ /Ton
C-5.7	Miscellaneous Removal of Existing Bituminous Driveways and Aprons	100 S.Y.
	_____ /S.Y.	_____ /S.Y.

ITEM C-6

ROADWAY RECLAMATION MILLING AND COLD IN-PLACE RECYCLING

		Words	Figures	
		Roadway Depth Min. Depth of Existing <u>Bit. Surface</u>	Reclaimed Asphalt <u>Stabilized Base</u>	<u>Est. Quantity</u>
C-6.1A	Roadway Reclamation	0" to 2"	8"	1,000 S.Y.
			/S.Y.	/S.Y.
C-6.1B	Roadway Reclamation	2"+ to 5"	12"	5,000 S.Y.
			/S.Y.	/S.Y.
C-6.1C	Roadway Reclamation	5"+TO 8""	18"	5,000 S.Y.
			/S.Y.	/S.Y.
C-6.1D	Roadway Reclamation	8"+ to 12"	18"	2,000 S.Y.
			/S.Y.	/S.Y.
C-6.1E	Grading/Removal Base Material		6" or Greater	2,000 CY
			/C.Y.	/C.Y.
C-6.1F	Miscellaneous Fine Grading			16 Hours
			/Hour	/Hour
C-6.2A	Roadway Milling Major Machine			5,000 S.Y.
			/S.Y.	/S.Y.
C-6.2B	Roadway Milling Minor/Hand Machine			16 Hours
			/Hour	/Hour
C-6.3A	Core Sampling for CIR			6 EA.
			/EA.	/EA.
C-6.3B	Mix Design for CIR			1 LS.
			/Lump Sum	/Lump Sum
C-6.3C	Cold In-Place Recycling (CIR)			12,500 S.Y.
			/S.Y.	/S.Y.
C-6.3D	Stabilizing Agent for (CIR)			12,500 Gal.
			/Gal.	/Gal.

C-6.3E Mineral Filler for (CIR) 20 Tons
 _____/Ton _____/Ton

ITEM C-7

VERTICAL GRANITE CURB

Words	Figures
	<u>Est. Quantity</u>
C-7.1 New Vertical Granite Curb	100 L.F.
_____	_____/L.F. _____/L.F.
C-7.2 Used Vertical Granite Curb	100 L.F.
_____	_____/L.F. _____/L.F.
C-7.3 Remove and Reset Existing Vertical Granite Curb	100 L.F.
_____	_____/L.F. _____/L.F.

ITEM C-8

SANITARY SEWER LINE CHEMICAL ROOT CONTROL

Words	Figures
	<u>Est. Quantity</u>
C-8.1A 6 Inch Diameter Sewer	50 LF.
_____	_____/LF. _____/LF.
C-8.1B 8 Inch Diameter Sewer	1,000 LF.
_____	_____/LF. _____/LF.
C-8.1C 10 Inch Diameter Sewer	50 LF.
_____	_____/LF. _____/LF.
C-8.1D 12 Inch Diameter Sewer	50 LF.
_____	_____/LF. _____/LF.
C-8.1E 18 Inch Diameter Sewer	50 LF.
_____	_____/LF. _____/LF.
C-8.1F 24 Inch Diameter Sewer	50 LF.
_____	_____/LF. _____/LF.

ITEM C-9

FRAMES, COVERS & GRATES

Words	Figures
	<u>Est. Quantity</u>
C-9.1 8" Catch Basin Frame & Grate	1 EA.
_____ /EA.	_____ /EA.
C-9.2 6" Catch Basin Frame & Grate	1 EA.
_____ /EA.	_____ /EA.
C-9.3 4" Catch Basin Frame & Grate	1 EA.
_____ /EA.	_____ /EA.
C-9.4 8" Manhole Frame & Cover 26"	1 EA.
_____ /EA.	_____ /EA.
C-9.5 6" Manhole Frame & Cover 26"	1 EA.
_____ /EA.	_____ /EA.
C-9.6 4" Manhole Frame & Cover 26"	1 EA.
_____ /EA.	_____ /EA.

ITEM C-10

TRAFFIC LINE PAINTING and MARKINGS

Words	Figures
	<u>Est. Quantity</u>
C-10.1 Single 4" White, Oil Based Paints	50 L.F.
_____ /L.F.	_____ /L.F.
C-10.2 Single 4" Yellow, Oil Based Paints	50 L.F.
_____ /L.F.	_____ /L.F.
C-10.3 Double (4" – Space – 4") Yellow, Oil Based Paints	50 L.F.
_____ /L.F.	_____ /L.F.
C-10.4 10'/40' Skip Line 4" Yellow, Oil Based Paints	50 L.F.
_____ /L.F.	_____ /L.F.

C-10.5	Single 4" White Thermoplastic	12,500 L.F.
	_____	/L.F. _____/L.F.
C-10.6	Single 4" Yellow Thermoplastic	12,500 L.F.
	_____	/L.F. _____/L.F.
C-10.7	Double (4" – Space – 4") Yellow Thermoplastic	50 L.F.
	_____	/L.F. _____/L.F.
C-10.8	12" Crosswalk Thermoplastic	1,000 L.F.
	_____	/L.F. _____/L.F.
C-10.9	12" Crosswalk Yellow, Oil Based Paints	50 L.F.
	_____	/L.F. _____/L.F.
C-10.10	12" Crosswalk White, Oil Based Paints	50 L.F.
	_____	/L.F. _____/L.F.
C-10.11	12" Stop Bar Thermoplastic	500 L.F.
	_____	/L.F. _____/L.F.
C-10.12	12" Stop Bar White, Oil Based Paints	50 L.F.
	_____	/L.F. _____/L.F.
C-10.13	Straight Arrow, Oil Based Paint	1 EA.
	_____	/EA. _____/EA.
C-10.14	Straight Arrow, Thermoplastic	10 EA.
	_____	/EA. _____/EA.
C-10.15	Curved Arrow, Oil Based Paint	1 EA.
	_____	/EA. _____/EA.
C-10.16	Curved Arrow, Thermoplastic	10 EA.
	_____	/EA. _____/EA.
C-10.17	8" Word "ONLY", Oil Based Paint	1 EA.
	_____	/EA. _____/EA.
C-10.18	8" Word "ONLY", Thermoplastic	10 EA.
	_____	/EA. _____/EA.

ITEM C-11

METAL BEAM RAILING INSTALLATION

Words	Figures
	<u>Est. Quantity</u>
C-11.1 Used Metal Beam Railing Installation	50 L.F.
_____ /L.F. _____ /L.F.	
C-11.1A Railing End Caps	4 EA.
_____ /EA. _____ /EA.	
C-11.2 New Metal Beam Railing Installation	50 L.F.
_____ /L.F. _____ /L.F.	

ITEM C-12

STREET SWEEPING SERVICES

NOTE: REFERENCE MATERIAL REQUIRED: See Specifications

Words	Figures
	<u>Est. Quantity</u>
C-12 Street Sweeping Services	10 Miles
_____ Per Mile _____ Per Mile	
(directional)	(directional)

ITEM C-13

TREE TRIMMING AND REMOVAL

Words	Figures
	<u>Est. Quantity</u>
C-13.1 Aerial Lift Truck	8 Hr.
_____ /Hr. _____ /Hr.	
(Make and Model) _____	
C-13.2 Aerial Lift 75'	8 Hr.
_____ /Hr. _____ /Hr.	
(Make and Model) _____	

C-13.3 Log Loader 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-13.4 Chipper 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-13.5 Stumper 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

ITEM C-14

EQUIPMENT RENTAL

Words

Figures

Est. Quantity

C-14.1A Bulldozer and Operator, Cat D3/D4 or Equivalent 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-14.1B Bulldozer and Operator, Cat D5/D6 or Equivalent 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-14.2A Track Excavator and Operator, 40,000# - 50,000# Class 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-14.2B Track Excavator and Operator, 50,000# - 60,000# Class 8 Hr.
 _____/Hr. _____/Hr.
 (Make and Model) _____

C-14.2C Track Excavator and Operator, 15,000#-20,000# Class (mini excavator) 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.3 Rubber Tire Excavator and Operator, 20,000# - 40,000# Class 80 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.4 Front End Loader with 3 C.Y.- 4 C.Y. Bucket 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.5A Skid Loader with 1/4 CY – 3/8 CY Bucket 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.5B Skid Loader with 1/4 CY – 3/8 CY Bucket & 6-8 Ft Digging Depth 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.6A Trailer Platform Style w/Flush Deck, 2axle, 10 Ton 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.6B Trailer Platform Style w/Flush Deck, 2axle, 25 Ton 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.6C Trailer Platform Style w/Flush Deck, 3axle, 40 Ton 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.7 Jet Vacuum Truck and Operator 8 Hr.

_____/Hr. _____/Hr.

(Make and Model) _____

C-14.8A Tri-Axle and Operator, 18 CY Capacity 8 Hr.
 _____/Hr. _____/Hr.

(Make and Model) _____

C-14.8B Trailer Dump and Operator, 24 CY Capacity 8 Hr.
 _____/Hr. _____/Hr.

(Make and Model) _____

C-14.9 Asphalt Paver and Operator, 5 Ton Capacity 8 Hr.
 _____/Hr. _____/Hr.

(Make and Model) _____

ITEM C-14A

**EQUIPMENT RENTAL
 CEMETERY**

Words

Figures

Est. Quantity

C-14.10 Backhoe/Loader and Operator - Rubber Tired 18-24 Inch Bucket 8 Hr.
 _____/Hr. _____/Hr.

(Make and Model) _____

C-14.11 Grave Site Excavation/Backfill 50 EA
 _____/EA _____/EA

C-14.12 Mowing Island Pond Cemetery 520,000 Sq. Ft. Per Mowing 20 EA
 _____/EA _____/EA

ITEM C-15

CRACK SEALING AND PENETRATING SURFACE TREATMENTS

Words	Figures
	<u>Est. Quantity</u>
C -15.1 Crack Sealing	6,000 Gal.
_____ /Gal.	_____ /Gal.
C -15.2 Localized Thermal Surface Restoration	8 Hr.
_____ /Hr.	_____ /Hr.
C -15.3 Filling and Bonding of Random Pavement Breaches	1 Day
_____ /Day	_____ /Day
C -15.4 Penetrating Surface Treatments (0.05 Gal./S.Y.)	5,000 S.Y.
_____ /S.Y.	_____ /S.Y.

ITEM C-16

Water Valve Box Adjustment and Replacement

ITEM #	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	AMOUNT
1	Gate Box Remove and Stacked	EA			
2	Gate Box Top Remove and Stacked	EA			
3	Gate Box Remove and Reset	EA			
4	Gate Box Adjust	EA			
5	Gate Box Adjust with Riser	EA			
6	New Gate Box Installed	EA			
7	New Gate Box Top Installed	EA			
8	Service Box Removed and Stacked	EA			
9	Service Box Top Removed and Stacked	EA			
10	Service Box Removed and Reset	EA			
11	Service Box Adjust	EA			
12	Service Box Adjust with Insert	EA			
13	New Service Box Installed	EA			
14	New Service Box Top Installed	EA			
15	Service Box Adjust	EA			
16	Service Box Adjust with Riser	EA			
Total Amount:					

ITEM C-17

HYDROSEEDING FERTILIZING AND APPLICATION OF HERBICIDES, INSECTICIDES AND LIME

Words	Figures
	<u>Est. Quantity</u>
C-17.1 Hydroseeding - 4,840 S.Y. or less	500 S.Y.
_____ /S.Y. _____ /S.Y.	
C-17.2 Hydroseeding - 1 acre or more	1 Acre
_____ /Acre _____ /Acre	
C-17.3 Fertilization Herbicide Insecticide & Lime at Creative Park/Playground	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.4 Fertilization Herbicide Insecticide & Lime at Electric Park/Playground	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.5 Fertilization Herbicide Insecticide & Lime at Hubbard Memorial Library	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.6 Fertilization Herbicide Insecticide & Lime at Memorial Park	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.7 Fertilization Herbicide Insecticide & Lime at Nick Silva Field	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.8 Fertilization Herbicide Insecticide & Lime at West Street Park/Playground	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.9 Fertilization Herbicide Insecticide & Lime at Whitney Park	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	
C-17.10 Fertilization Herbicide Insecticide & Lime at Island Pond Cemetery	1 Lump Sum
_____ /Lump Sum _____ /Lump Sum	

**ITEM C-18
TRAFFIC LOOP DETECTORS**

Words		Figures
		<u>Est. Quantity</u>
C-18	Traffic Loop Detectors	1,000 LF
_____		_____
		/LF _____/LF

**ITEM C-19
SEWER/DRAIN LINE VIDEO INSPECTION**

Words		Figures
		<u>Est. Quantity</u>
C-19	Sewer/Drain Line Video Inspection	80 hours
_____		_____
		/HR _____/HR

LUDLOW DPW 2020 ANNUAL MATERIALS & SERVICES CONTRACT

BID SUBMITTED BY

Notes:

- 1. Bid Bond if required
- 2. Required certified test reports are attached
- 3. A Pre-qualification Certificate must accompany the Bid Documents for the Bid to be considered as complete.

Company: _____

Address: _____

Phone Number: _____ FAX Number: _____

Bid Submitted By: Name _____

Signature _____ Date / / _____

Title _____

DURING THE PERFORMANCE OF THIS CONTRACT, THE CONTRACTOR AGREES AS FOLLOWS:

1. The Contractor will not discriminate against any employee because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this non-discrimination clause.
2. The Contractor will, in all solicitation or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the contract compliance officer advising said labor union or worker's representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and the rules, regulations and relevant orders of the Secretary of Labor.
5. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.
6. In the event of the Contractor's non-compliance with the non-discrimination clauses of this contract or with any of said rules, regulations or orders, this contract may be cancelled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
7. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provision of paragraph (1) through (7) in every sub-contract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontract or purchase order as the department may direct as a means of enforcing such provisions, including sections for noncompliance, provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Department, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clauses with respect to its own employment practices when it participates in federally assisted construction work; provided, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract. The applicant agrees that it will assist and cooperate actively with the Department and the Secretary of Labor in obtaining the compliance of Contractors and sub-Contractors with the equal opportunity clause and the rules, regulations and relevant orders of the Secretary of Labor; that it will furnish the Department and the Secretary of Labor such information as they may require for the supervision of such compliance; and that it will otherwise assist the Department in the Discharge of its primary responsibility for securing compliance. The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a Contractor debarred from, or who has not demonstrated eligibility for Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity and sub-Contractors by the Department of the Secretary of Labor pursuant to Part II: Subpart D of the Executive Order. In addition, the applicant agrees that if it fails to or refuses to

comply with these undertakings, the Department may take any or all of the following actions: cancel, terminate or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refusal occurred until satisfactory assurance of further compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

For the purposes of this contract, "minority" refers to Asian-Americans, Blacks, Spanish Surnamed Americans, North American Indians, and Cape Verdeans; "Commission" refers to the Massachusetts Commission Against Discrimination. "Town" hereinafter refers to the Town of Ludlow.

- I. During the performance of this contract, the Contractor and all of (his) Sub-Contractors (hereinafter collectively referred to as the Contractor), for himself, his assignees, and successors in interest, agree as follows:
 1. In connection with the performance of work under this contract the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: Employment upgrading, promotion or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection of apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment notices to be provided by the Town setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (M.G.L. Chapter 151B).
 2. In connection with the performance of work under this contract, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age, sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion, or transfer, recruitment, layoff, or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal opportunity for all persons, regardless of race, color, religious creed, national origin, age, sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Town public construction projects.
- II.
 1. As part of his obligation of remedial action under the foregoing section, the Contractor shall maintain on this project not less than a 5% ratio of minority employee man hours to total man hours in each job category including but not limited to brick layers, carpenters, cement masons, electricians, ironworkers, operating engineers and those "classes of work" enumerated in Section 44C of Chapter 149 of the Massachusetts General Laws.
 2. In the hiring of minority journeymen, apprentices, trainees, and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Town, traditional referral methods utilized by
 3. the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the Town.
- III.
 1. The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, or workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Town and Liaison Committee.
 2. Records of employment referral orders, prepared by the Contractor shall be available to the Town and to the Liaison Committee on request.
 3. The Contractor shall prepare weekly reports in a form approved by the Town of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each week to the Town and to the Liaison Committee.
- IV. If the Contractor shall use any sub-Contractor of any work performed under this contract, he shall take affirmative action to negotiate with qualified minority sub-Contractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within

the Executive Office of Commerce and Development) or its designee, while bids are in preparation of all products, work or services for which the Contractor intends to negotiate bids.

V. In the employment of journeymen, apprentices, trainees, and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorable discharged there from or released from active duty therein, and who are qualified to perform the work to which the employment relates, and secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

VI. A designee of the Town and a designee of the Liaison Committee shall each have right of access to the construction site.

VII. VII. Compliance with Requirements:

The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 116 dated May 1, 1975, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.

VIII. Non-Discrimination:

The Contractor, in the performance of all work afterward, and prior to completion of the contract work, will not discriminate on grounds of race, color, religious creed, national origin, age, or sex in employment practices, in the selection or retention of Subcontractors, or in the procurement of materials and rentals of equipment.

IX. Solicitations for Sub-Contracts, and for the Procurement of Material and Equipment.

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential sub-contract or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and affirmative action.

X. Contractor's Certification:

The Contractor's certification form must be signed by all bidders prior to award by the contracting agency. (See attachment)

Contractor’s Certification

Name of Project LUDLOW DPW 2021 ANNUAL MATERIALS & SERVICE CONTRACT

A Contractor will not be eligible for award of a contract unless such Contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR’S CERTIFICATION

_____certifies that:

- 1. It tends to use the following listed construction trades in the work under the contract;
- 2. And will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of its Subcontractors and submit to the contracting or administering agency prior to the award of any sub-contract under this contract the sub-Contractor certification required by these bid conditions.

_____Date _____
(Signature of Authorized Representative of Contractor)

A. Sub-Contractor’s Certification

Name of Project: LUDLOW DPW 2020 ANNUAL MATERIALS & SERVICE CONTRACT

Prior to the award of any sub-contract, regardless of tier, the prospective Subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting sub-contract:

SUB-CONTRACTOR’S CERTIFICATION

_____certified that:

- 1. It tends to use the following listed construction trades in the work under the sub-contract;
- 2. And will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of the sub-Contractors prior to the award of any sub-contract under this sub-contract, the sub-Contractor certification required by these bid conditions.

_____Date _____
(Signature of Authorized Representative of Contractor)

In order to ensure that the said sub-Contractor’s certification becomes a part of all sub-contracts under the prime contract, no sub-contract shall be executed until an authorized representative of the Town agency (or agencies) administering this project has determined, in writing, that the said certification has been incorporated in such sub-contract, regardless of tier. Any sub-contract executed without such written approval shall be void.

CERTIFICATE OF NON-COLLUSION

THE UNDERSIGNED CERTIFIES UNDER PENALTIES OF PERJURY THAT THIS BID IS IN ALL RESPECTS BONA FIDE, FAIR AND MADE WITHOUT COLLUSION OR FRAUD WITH ANY OTHER PERSON. AS USED IN THIS PARAGRAPH, THE WORK "PERSON" SHALL MEAN ANY NATURAL PERSON, JOINT VENTURE, PARTNERSHIP, CORPORATION OR OTHER BUSINESS OR LEGAL ENTITY.

(Name of Person Signing Bid)

(Company)

(Date)

APPENDIX A

LIQUID ASPHALT PRICE ADJUSTMENT

Most recent period prices

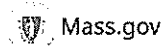
Please Note That This Page Has Been Updated on January 19, 2021

Adjustment Period	Liquid Asphalt (Ton)	Diesel (Gallon)	Gasoline (Gallon)	Portland Cement (Ton)	Steel PPI
January 2021	\$495.00	TBD	TBD	\$142.79	TBD
December 2020	\$495.00	\$1.896	\$1.693	\$136.39	TBD
November 2020	\$495.00	\$1.682	\$1.566	\$136.39	TBD
October 2020	\$500.00	\$1.600	\$1.569	\$136.39	TBD
September 2020	\$490.00	\$1.559	\$1.593	\$135.98	TBD
August 2020	\$490.00	\$1.658	\$1.627	\$135.98	230.5
July 2020	\$485.00	\$1.669	\$1.625	\$134.25	232.7
June 2020	\$505.00	\$1.561	\$1.532	\$134.25	232.9
May 2020	\$525.00	\$1.312	\$1.305	\$134.25	232.0
April 2020	\$540.00	\$1.338	\$0.950	\$133.50	236.6
March 2020	\$552.50	\$1.662	\$1.251	\$133.50	236.7
February 2020	\$552.50	\$2.094	\$1.915	\$130.26	239.3

Sign-up for COVID-19 alerts. Get notified by text, email, or phone in your preferred language. *Dec. 5th, 2020, 5:00 pm* [Read more](#)

For the latest information on COVID-19: Vaccines, Cases, Restrictions *Jan. 24th, 2021, 5:00 pm* [Read more](#)

1/25/2021



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MassDOT current contract price adjustments

Adjusted prices for liquid asphalt, Portland cement, diesel fuel, gasoline, structural steel, and reinforcing steel.

Due to the uncertainty of liquid asphalt, Portland cement, diesel fuel, gasoline, structural steel, and reinforcing steel prices, and in accordance with the requirements of M.G.L. c. 30, sec. 38A, MassDOT Highway Division uses special provisions on selected projects to make contract adjustments to account for the prices in effect at the time the work is performed.

Metric measurements are no longer required but will be listed separately until all projects using metric measurement are complete.

Municipalities are required to include price adjustment clauses for diesel fuel, gasoline, liquid asphalt, Portland cement concrete, structural steel and reinforcing steel in the bid documents of all construction contracts funded by the Chapter 90 Program. For more information please refer to the Price Adjustment Requirements for Cities and Towns.

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Most recent period prices

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Steel Producer Price Index from the Bureau of Labor Statistics website

PPI Commodity data for Metals and metal products - Semifinished steel mill products, not seasonally adjusted

NOTE: PPI is the final published data