

**TECHNICAL SPECIFICATIONS FOR SEWER DRAIN LINE REPAIRS:  
CURED-IN-PLACE PIPE (CIPP) LINER INSTALLATIONS  
WORCESTER PUBLIC SCHOOLS – DEPT. OF FACILITIES MGMT.**

**BID #: 8193-M4**

**1. INTENT**

1.1 It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the installation of a resin- impregnated flexible tube, which is tightly formed to the original conduit. The resin is cured using either hot water under hydrostatic pressure or steam pressure within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting.

1.2 A Pre-bid walk-through will be held on May 14, 2024, at 11:00 am, starting at Burncoat Elementary School, with a site visit to the Durkin Administration Building to follow. All bidders are encouraged to attend.

**2. REFERENCED DOCUMENTS**

2.1 This specification references standards from the American Society for Testing and Materials, such as:

- ASTM F1216 (Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube)
- ASTM F1743 (Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP))
- ASTM D5813 (Cured-in-Place Thermosetting Resin Sewer Pipe)
- ASTM D790 (Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials)
- D2990 (Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof.

In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

**3. PRODUCT, MANUFACTURER/INSTALLER QUALIFICATION REQUIREMENTS**

3.1 Since sewer products are intended to have a 50-year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long-term track records will be approved. All trenchless rehabilitation products and installers must be pre-approved prior to the formal opening of proposals. Products and Installers seeking approval must meet all the following criteria to be deemed "Commercially Proven."

3.1.1 For a Product to be considered Commercially Proven, a minimum of five successful wastewater collection system projects of a similar size and scope of work shall be performed in the U.S. and documented to the satisfaction of the Owner to assure commercial viability.

3.1.2 For an Installer to be considered as Commercially Proven, the Installer must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least 5 (five) years active experience in the commercial installation. Acceptable documentation of these minimum installations must be submitted to the Owner. Installer's project manager/clerk of the works must have a minimum of two (2) years of CIPP installation experience and must be on- site during the site preparation and installation of the CIPP products.

3.1.3 The owner authorizes the use of proven materials that serve to enhance the pipe performance specified herein. Proven materials have passed independent laboratory testing, not excluding long-term (10,000 hour) structural behavior testing and have been successfully installed to repair failing host pipes in the U. S. for at least 4 years. In addition to the aforementioned, the owner may require that the contractor demonstrate that the enhancements proposed exceed the specifications herein, prior to the installation of the enhanced material systems. This section in no way shall be interpreted as authorization to deviate from the minimum standard practices set forth herein.

#### **4. MATERIALS**

4.1 Tube - The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216, Section 5.1 or ASTM F1743, Section 5.2.1 or ASTM D 5813, Sections 5 and 6. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

4.1.1 The wet-out Tube shall have a relatively uniform thickness that when compressed at installation pressures will equal or exceed the calculated minimum design CIPP wall thickness.

4.1.2 The Tube shall be manufactured to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during installation.

4.1.3 The outside layer of the Tube shall be coated with an impermeable, flexible membrane that will contain the resin and allow the resin impregnation (wet out) procedure to be monitored.

4.1.4 The Tube shall contain no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause de-lamination in the cured CIPP. No dry or unsaturated layers shall be evident.

4.1.5 The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

4.1.6 Seams in the Tube shall be stronger than the non-seamed felt material.

4.1.7 The Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

4.2 Resin - The resin system shall be a corrosion resistant polyester or vinyl ester system including all required catalysts, initiators that when cured within the tube create a composite that satisfies the requirements of ASTM F1216, ASTM D5813 and ASTM F1743, the physical properties herein, and those which are to be utilized in the submitted and approved design of the CIPP for this project. The resin shall produce a CIPP that will comply with the structural and chemical resistance requirements of this specification.

## **5. STRUCTURAL REQUIREMENTS**

5.1 The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.

5.2 The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing as defined within the relevant ASTM standard. A percentage of the instantaneous flexural modulus value (as measured by ASTM D790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Retention values exceeding 50% of the short-term test results shall not be applied unless substantiated by qualified third party test data to the Owner's satisfaction. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

5.3 The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7.

5.4 The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If the layers separate during field sample testing, new samples will be required to be obtained from the installed pipe. Any reoccurrence may cause rejection of the work.

5.5 The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

## **6. MINIMUM CIPP PHYSICAL PROPERTIES**

6.1 - Properties Table:

<b><i>Cured Polyester Composite</i></b> Property	Test Method	min. per ASTM F1216	Enhanced Resin
Modulus of Elasticity	ASTM D790	250,000 psi	400,000 psi
Flexural Stress	ASTM D790	4,500 psi	4,500 psi

## **7. CAMERA INSPECTIONS & CLEANING**

7.1 The awarded contractor shall, prior to installation of any pipe lining, provide video camera inspections of the full length of drains to be lined. If determined necessary, via video camera inspections of such lines, initial cleaning shall be included before any CIPP lining is placed to ensure the CIPP lining is installed in accordance with manufacturer's specifications.

7.2 Upon completion of the CIPP lining process, the contractor shall provide a video camera Warranty Inspection of the installation for review by the Owner.

## **8. WARRANTY**

8.1 Contractor warranties and guarantees to Owner that all work will be in accordance with manufacturers specifications and will not be defective. All CIPP lining work shall be fully guaranteed by the contractor for a period of 3 years from the date of final acceptance unless otherwise stipulated in writing by the Owner. During this 3-year period, any defects discovered by the Owner shall be addressed by the Contractor in a satisfactory manner, at no cost to the Owner.

8.2 In addition to the Warranty Inspection specified under Section 7, the Owner may conduct independent inspections, at its own expense, of the lining Work at any time prior to the completion of the guarantee period.

**SITE INFORMATION AND DIAGRAMS FOR SEWER DRAIN LINE  
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**1. SITE LOCUS SUMMARY**

1.1 - Location Summary:

<b>Location Name</b>	<b>Length of pipe</b>	<b>Diameter of pipe</b>	<b>Notes</b>
<b>Burncoat St. Preparatory</b>	Approx. 176'	8" line	
<b>Durkin Administration Bldg.</b>	Approx. 150'	8" line/field verify	Two separate 75' lines

1.2 - Location Addresses:

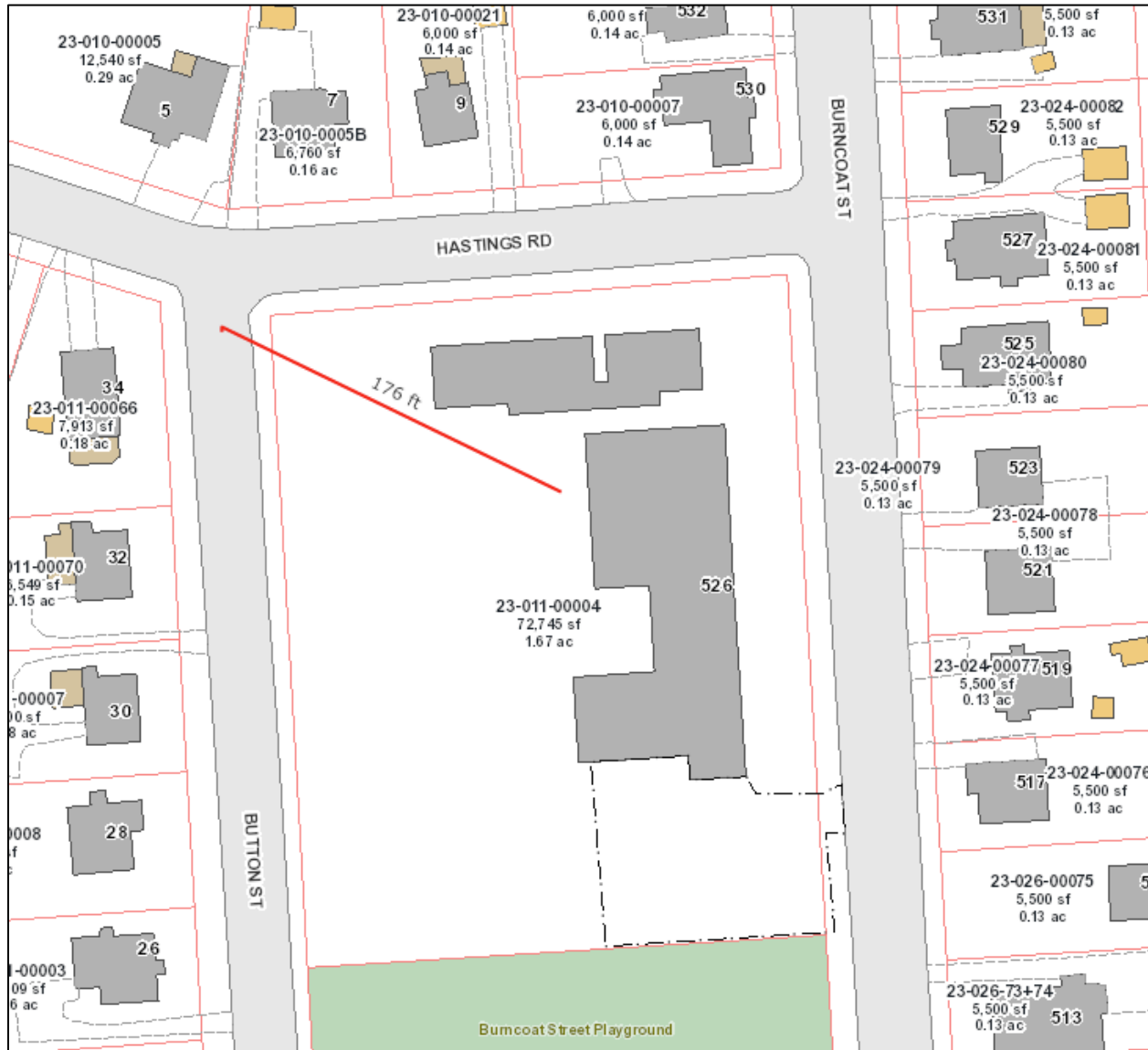
- Burncoat Street Preparatory School - 526 Burncoat St, Worcester, MA 01606
- John E. Durkin Administration Building - 20 Irving Street, Worcester, MA 01609

## **2.0 SITE DIAGRAMS**

### 2.1 Burncoat Street Preparatory School:



## 2.2 Burncoat Street Preparatory School Plan View:





## 2.4 Durkin Administration Building:





## 2.5 Durkin Administration Building Plan View:

