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**TOWN OF ENFIELD
CS-334167-07 SEWER IMPROVEMENTS**

ADDENDUM #1

November 21, 2024
Project: 220236

To all plan holders,

This ADDENDUM #1 shall become part of the Bidding Documents, Contract Documents and Technical Specifications (Documents) for the above-mentioned project. BIDDERS, please acknowledge receipt of this ADDENDUM #1 on the BID FORM (Page 1). This ADDENDUM #1 consists of 31 pages in total.

We are pleased to submit this response to plan holder questions/comments. Please see below for our response in *italics*.

- 1) Will steam cured CIPP be allowed in place of UV or as an equal?

Response: Yes, as an equal. The Project specs have been updated, see section 33 01 30.71 (Cured in Place UV & Cured in Place Steam).

- 2) Please clarify what work is expected for the “Minor MH Repairs”.

Response: Minor Manhole Repairs include sewer manholes that require the following: (With the goal of reducing Infiltration)

- *Brick Replacements*
- *Manhole Root Removal*
- *Riser Rehab*
- *Blockage Removal*
- *Inspections*
- *Infiltration Reduction with Flex-seal 2.0 or equivalent*
- *Does not require excavation, internal rehab only*

The bid item for Sewer Manhole Minor Repairs (Bid Item #2) has been split into two separate items:

- *Bid Item #2 - Sewer Manhole Minor Repairs (See Above)*
- *Bid Item #6 – Sewer Manhole Raised to Grade*

- 3) Will the contractor be required to purchase water, and what will the cost be?

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Response: Yes, the price for water is \$4.00 per 1,000 gal.

4) Can you please provide CCTV inspection logs and videos for the contractor's review?

Response: 2023 Videos and CCTV Logs will be provided to the winning Bidder.

5) The spec offers email and hardcopy as methods of bid submission. Will both be allowed? Please clarify.

Response: Yes, bids may be submitted to jhalikas@horizonsengineering.com or delivered to The Horizons Engineering Littleton Office at 34 School St, Littleton NH before 4:00PM December 4.

6) Owners Protective Liability insurance (GC 27.8) can be costly to acquire and can substantially increase bid prices. Will the Owner accept a \$10M Excess Liability Policy and a \$5M Pollution Policy in its place?

Response: No, this insurance is required as part of the NHDES General Conditions.

7) Is Flow data available to develop bypass plan

Response: Flow Data is not Available currently.

8) Are videos available for bidders to review?

Response: 2023 Videos and CCTV Logs will be provided to the winning Bidder.

9) PDF Page 207 Sewer Inspection Cleaning and Flow Control – Would it make sense to have pay items for Heavy Cleaning (requires more than 3 passes with a jet) & Mechanical / Root Removal rather than leave these tasks incidental to the Clean & CCTV Item?

Response: The following Bid Items have been added:

- *Bid Item #7 – Sewer Main Heavy Cleaning (More than 3 Passes Required, per Engineer's discretion)*
- *Bid Item #8 – Sewer Main Root/Obstruction Removal (per Engineer's discretion)*

10) PDF Page 213 3.4 D 1. Please confirm that this item is applicable, and that the bidder will pay for water usage.

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Response: Yes, the price for water is \$4.00 per 1,000 gal.

- 11) PDF Page 217 3.2 C “Removal of Debris: Flush debris downstream and do not remove. In the event that debris removal is necessary, Engineer will coordinate requirements with a Waste Management Liaison” **I think conflicts with PDF page 213 E. 2.** “Passing of debris to a downstream manhole section will not be allowed.” **Either way could you confirm that any disposal of debris will be paid independent of this RFB?**

Response: The contractor shall collect and dispose of any necessary debris removal. The following Bid Item has been added:

- *Bid Item # 9 – Sewer Debris Disposal*

- 12) Are there depths available for the CIPP Lining and the point repairs?

Response: The Town has 1986 As-Builts that contain pipe & structure inverts that will be made available to the winning bidder.

- 13) PDF Page 223 CIPP Spec Item 2.1 D **Should we assume that this part of the CIPP spec is NA?** “2. PVC Saddle Tees: Solvent welded type for 8-inch CIPP sewer main connections. Tee shall fit the existing pipe and have an integral 6-inch branch connection with gasket. The saddle shall include two stainless steel straps. Saddle tees shall meet the requirements of ASTM D3034 and ASMT F477. 3. Connections to CIPP mains greater than 8 inches in diameter shall be with a minimum 6-inch “Inserta-Tee” manufactured by Inserta Fittings Company and specifically designed for the thickness of the installed CIPP liner.”

Response: Yes, this is not applicable to this project and has been removed from the spec.

- 14) Page 224 CIPP Spec

1. Item 3.2A - **Should we expect that dye testing is NA or can be added as a separate pay item if required?** “3. Dye Testing: Where sewer line segments may contain abandoned services, the Contractor shall be responsible for performing dye testing to determine if the services are live and require re-installment.”
2. Item 3.2A – 5. UV Liners are “Pull In” vs. Inversion, **it might be best to separate this item from the CIPP Item add pay items for heavy cleaning, removing obstructions, and one for point repairs rather than have them incidental to the CIPP Item?** 5. Line Obstructions: If pre-insertion video CCTV inspection reveals an obstruction in the existing pipe (such as heavy solids, dropped joints, protruding service taps or collapsed pipe which may prevent completion of the inversion process), that is not identified in the Drawings and cannot be removed by sewer cleaning equipment, then a point repair using a shielded coupling may be made with the approval of the Owner and/or Engineer.
3. Item 3.2A – **A benefit of UV Liners is that they are encapsulated in a plastic bag and do not rely on heat to cure them so infiltration will be controlled when the**

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- liner is inflated and cured without risk to quality. Can we ignore “6. Remove active infiltration prior to the installation of the liner.”**
4. Item 3.2B – **Ours will be pull thru** “3. Insert wet out tube through an existing manhole or approved access point by means of an inversion method and application of sufficient hydrostatic head to extend the tube to the next designated termination point.”

Response:

1. *Dye Testing is not applicable to this project and has been removed from the spec.*
2. *Bid Item #8 – Sewer Main Root/Obstruction Removal has been added to the Bid Items.*
3. *Yes, 3.2 A - 6 has been removed.*
4. *Yes, 3.2 B – 3 has been removed*

- 15) PDF Page 226 3.6 Service Laterals C. Permanent Service Connections – **is the intent of this RFB to excavate each service and install a new service connection? We typically reinstate existing services with a robotic cutter no excavation.**

Response: *Bypass service laterals are not required on this project. This has been removed from the spec.*

- 16) PDF Page 228 3.7 H. – Leakage testing refers to 33 31 13 Sanitary Sewers etc. low pressure air test. **Should we ignore this or should we plan to air test the liners (obviously prior to any reinstatement of laterals). This isn't a typical practice for gravity lines.**

Response: *Leakage testing of the liners is not required for this project. This has been removed from the spec.*

SECTION 33 01 30.72

ULTRAVIOLET CURED-IN-PLACE PIPE LINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and DIVISION 01 specifications sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cured-in-Place Pipe
- B. Related Requirements:
 - 1. Section 30 01 30.51 – Sewer Inspection, Cleaning, and Flow Control
 - 3. Section 33 31 30 – Sanitary Sewer Services

1.3 COORDINATION

- A. Coordinate Work of this Section with users connected to system.

1.4 DESIGN CRITERIA

- A. Design liner thickness in accordance with ASTM F1216, F1743, or F2019 (as appropriate for the proposed liner product) using the following criteria:
 - 1. Pipe Diameters: Per Project Drawings
 - 2. Ovality: 2 percent, or as shown on plans.
 - 3. Pipe Condition: Assume fully deteriorated.
 - 4. External Water: Ground Surface
 - 5. Short-Term Tensile Strength (ASTM D638):
 - a. Unreinforced: 3,000 psi
 - b. Reinforced: 9,000 psi
 - 6. Tensile Strength Reduction Factor: 50 percent
 - 7. Long-Term Tensile Strength:
 - a. Unreinforced: 1,500 psi
 - b. Reinforced: 4,500 psi
 - 8. Flexural Strength (ASTM D790):
 - a. Unreinforced: 4,500 psi
 - b. Reinforced: 6,500 psi
 - 9. Short-Term Flexural Modulus (ASTM D790):
 - a. Unreinforced: 250,000 psi, or as shown on plans
 - b. Reinforced: 700,000 psi, or as shown on plans
 - 10. Flexural Modulus and Flexural Strength Reduction Factor:

- a. Unreinforced: 50 percent
 - b. Reinforced: 35 percent, contingent upon approval of Owner after review of submittal with long-term test data, otherwise 50 percent shall be used.
11. Long Term Flexural Strength:
- a. Unreinforced: 2,250 psi
 - b. Reinforced: 3,250 psi
12. Long-Term Flexural Modulus:
- a. Unreinforced: 125,000 psi, or as shown on plans
 - b. Reinforced: 455,000 psi, or as shown on plans
13. k Enhancement Factor: 7
14. Soil Modulus: 1,000 psi, or as shown on plans.
15. Soil Density: 120 pcf, or as shown on plans.
16. Highway Live Load: AASHTO HS20-44
17. Safety Factor: 2 minimum
18. Minimum Thickness: Based on design per ASTM F1216
19. Poisson's Ratio: 0.3
20. Liner shall be watertight.

1.5 SUBMITTALS

A. Action Submittals

- 1. Resin
- 2. Annular Space Sealant
- 3. Service Connection Fittings
- 4. In Line Curing Temperature Monitoring System

B. Informational Submittals

- 1. Design Calculations
 - a. Manufacturer's certification of material to values utilized in calculations.
 - b. If reinforced liners are proposed, submit long-term ASTM D790 and ASTM D2990 test data supporting reduction factor used in design
- 2. Manufacturer's installation instructions and procedures, including:
 - a. Wet Out
 - b. Insertion
 - c. Curing
 - d. Cool Down
 - e. Finished Pipe
- 3. Wet out and curing schedule.
- 4. Process control sheets for temperature/time during curing
- 5. Installer's and accredited testing laboratory statement of qualifications
- 6. Manufacturer's Certificate of Compliance certifying compliance with the applicable specifications and standards
- 7. Warranty and/or Special Guarantee
- 8. Manufacturer's instructions for material shipping, storage, and handling requirements
- 9. Certified copies of test reports of factory tests required by the applicable standards and this section.

10. Dye testing results

11. External hard drive of both pre- and post CCTV inspections in accordance with Section 33 01 30 – Sewer Inspection, Cleaning, and Flow Control

1.6 QUALITY ASSURANCE

- A. Installer shall have a minimum of 3 years' experience with the selected liner product and method of curing.
- B. Superintendent shall have a minimum of 3 years of onsite experience with the selected liner product and method of curing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as recommended by the manufacturer to prevent damage. Materials shall be made safe from theft, vandalism, and damage.
- B. All products and materials specified herein shall be inspected at the request of the Owner or Engineer. All materials that fail to conform to these specifications shall be rejected. After delivery to the Site, any materials that have been damaged in transit or are otherwise unsuitable for use in the Work shall be rejected and removed from the Site by the Contractor at no cost to the Owner.
- C. Ship resin directly to wet out facility from manufacturer.
- D. Maintain resin-impregnated tubes in refrigerated truck trailers at a temperature below 45° F to prevent premature curing. Prior to beginning inversion, no portion of the resin-impregnated liner shall be subjected to sunlight or ultraviolet radiation. Resin-impregnated tubes with signs of premature curing shall not be installed and shall be removed from the Site at no cost to the Owner.

1.8 SPECIAL GUARANTEE

- A. Provide manufacturer's extended guarantee or warranty, with the Owner named as the beneficiary, in writing, as a special guarantee. The special guarantee shall provide for correction, or at the option of the Owner, removal and replacement of Work specified in this section found to be defective, due to material or workmanship failure, during a period of 5 years after the date of Substantial Completion. A warranty inspection can be completed by the Owner up to 5 years after final acceptance.

2.1 CURED-IN-PLACE PIPE

A. Resin:

1. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester, epoxy, isophthalic neopentyl glycol, or ~~thermosetting vinyl ester resin~~, catalyst system, initiators, or hardeners that provide specified cured physical strengths and properties, and compatible with reconstruction inversion process.
2. Resistant to municipal wastewater environment and immersion in septic sewage at temperatures up to 75° F.
3. Curing:
 - a. Designed to cure properly within selected curing method.
 - b. ~~Initiation temperature: 180° F, maximum for water cure.~~
4. Resins shall be chemical resistant and tested and manufactured in accordance with ASTM F1216 and ASTM D543.
5. For lines smaller than 24 inches, PET resins, resin fillers, resin additives, and resin enhancement agents are prohibited. ~~Only neat resins are acceptable.~~
6. For lines 24 inches and larger, any resin additives are contingent upon Owner approval. All enhanced resins shall be submitted as a part of the action submittal process.
7. For reinforced liners, only neat resins are acceptable.
8. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.
9. Produce a cured tube resistant to shrinkage that will not corrode or oxidize and is resistant to abrasion from solids, grit, and sand in wastewater.
10. Bond between tube layers shall be strong and uniform. Layers, after cure, shall be saturated with resin.
11. Styrenated resins are prohibited for pipes that will discharge directly to the environment such as treatment plant effluent lines.
12. Manufacturers and Products:
 - a. Reichhold
 - b. Interplastic Corporation
 - c. Ashland Specialty Chemical Company
 - d. AOC

B. Catalysts:

1. Primary catalyst shall not exceed 1% of the resin by volume.
2. Secondary catalyst shall not exceed 0.5% of the resin by volume.
3. Catalysts shall be as required to meet the performance requirements of the liner.

C. Tube:

1. Consist of layers of flexible nonwoven and absorbent polyester felt manufactured under quality-controlled conditions set by manufacturer and applicable requirements set forth in ASTM F1216 and ASTM F1743 that, when cured, will be chemically resistant to reagents as defined in ASTM D543.
2. Lining shall be correct diameter; after installation, there shall be no wrinkles or form permanent fins. Tube shall be capable of stretching to fit irregular pipe sections and fabricated and sized for each section to ensure snug and firm fit inside existing sewer; produce required thickness after resin is cured.

3. Wastewater-contact inside layer of tube shall be coated with an impermeable material compatible with resin and felt and shall not be a dark or non-reflective nature that inhibits proper CCTV inspection.
4. For lines 24 inches and larger: if reinforcement is utilized it shall consist of impregnated flexible fiberglass. Each lot of fiberglass liner shall be inspected for defects and tested in accordance with ASTM F2019.
5. Manufacturers: **(Or Equivalent)**
 - a. Applied Felt
 - b. Insituform Technologies
 - c. Liner Products
 - d. National Liner
 - e. Layne Inliner
 - f. Mississippi Textile

D. Accessories:

1. Hydrophilic Rubber Joint Seal:
 - a. Greenstreak, Inc.
 - b. Hydrotite, LMK, Insignia
 - c. Adeka, KM-String

~~2. PVC Saddle Tees: Solvent welded type for 8 inch CIPP sewer main connections. Tee shall fit the existing pipe and have an integral 6-inch branch connection with gasket. The saddle shall include two stainless steel straps. Saddle tees shall meet the requirements of ASTM D3034 and ASMT F477.~~

3. Connections to CIPP mains greater than 8 inches in diameter shall be with a minimum 6-inch "Inserta-Tee" manufactured by Inserta Fittings Company and specifically designed for the thickness of the installed CIPP liner.
4. Curing Temperature Monitoring System: **(Only as Required by Owner)**
 - a. ZIA Systems
 - b. Pipeline Renewal Technologies, VeriCure

PART 3 - EXECUTION

3.1 WORKER SAFETY

- A. Contractor shall implement all current recommendations, guidelines, and regulations of the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Health and Safety Administration (OSHA) for the safety of workers and the public affected by the CIPP installation.
- B. Records of any complaints or incidents shall be provided to the Owner and/or Engineer.

3.2 PREPARATION

- A. Complete the following activities, unless otherwise approved by the Owner and/or Engineer.
1. Pre-Insertion Cleaning: Rewash, re-clean and ready existing sewer pipe immediately before the pre-insertion television inspection.
 2. Pre-Insertion CCTV Inspection: Inspect sewer pipe before insertion of resin impregnated tube to ensure pipe is clean and existing pipe conditions are acceptable for lining. Provide a digital file or link of the CCTV inspection.
 3. Dye Testing: Where sewer line segments may contain abandoned services, the Contractor shall be responsible for performing dye testing to determine if the services are live and require re-instatement.
 4. Bypassing Wastewater: Contractor shall make provisions for dewatering/bypass of sewage flows during the prosecution of the work.
 5. Line Obstructions: If pre-insertion video CCTV inspection reveals an obstruction in the existing pipe (such as heavy solids, dropped joints, protruding service taps or collapsed pipe which may prevent completion of the inversion process), that is not identified in the Drawings and cannot be removed by sewer cleaning equipment, then a point repair using a shielded coupling may be made with the approval of the Owner and/or Engineer.
 6. Remove active infiltration prior to the installation of the liner.

3.3 INSTALLATION

- A. Wet Out:
1. Verify lengths in the field before cutting liner to length.
 2. Wet out shall be vacuum impregnated with resin under controlled conditions.
 3. Use roller system to uniformly distribute resin throughout the tube.
 4. Resin shall fill all voids in the tube material with no air spaces or pockets.
 5. Handle resin impregnated tube to retard or prevent settling until it is ready for insertion.
 6. Use of alternative methods of resin impregnation shall be approved by the Owner and/or Engineer prior to implementation.
- B. Insertion:
1. Install CIPP in accordance with ASTM F1216 (direct inversion) or ASMT F1743 (pull installations) or F2019 (reinforced liners) as appropriate for the liner product being used.
 2. Dewater existing host pipe prior to installation.
 3. Insert **or pull** wet out tube through an existing manhole or approved access point by means of an inversion method **or another method approved by owner** and application of sufficient hydrostatic head to extend the tube to the next designated termination point.
 4. A pull in method using a bladder to expand the tube may be employed if approved by the Owner.
 5. After insertion, maintain sufficient pressure to hold tube tight against the host pipe.
- C. Curing:
1. Complete a curing process control sheet for every lining completed.
 2. UV Curing - Material shall be a polyester needle felt or fiberglass based CIPP liner impregnated with an isophthalic neopentyl glycol resin.

3. Curing parameters, such as curing speed, inner air pressure, and wattage, per the manufacturer.
4. Optimal curing speed or travel speed of energized UV light sources is determined for each length of liner based on liner diameter, liner thickness, and exothermic reaction temperature.
5. Invert liner into pipe with standard pressure drum or pull into pipe using a slip sheet.
6. After completion of inversion process introduce light chain in liner and close ends with couplings.
7. Remove and discard inner film material after curing to provide optimal quality of final product.
8. Control panel operating UV curing unit light chain may be pulled on a trailer attached to UV unit.

D. The finished CIPP shall:

1. Be continuous over entire length from manhole to manhole and be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, pinholes, wrinkles, and other deformities.
2. For lines 24 inches or larger the CIPP shall have no radially positioned (perpendicular to flow) wrinkles, fins or other discontinuities in the lower third of the pipe which exceed more than 3% of the host pipe inside diameter. Have no radial wrinkles, fins or other discontinuities in the upper 2/3rds of the pipe having a height of 5% or more of the host pipe inside diameter, unless approved.
3. When passing through or terminating in a manhole shall be carefully cut out in a shape and manner approved by OWNER.
4. Annular space between existing pipe and the CIPP shall be sealed with a hydrophilic rubber joint seal per manufacturer's instructions.
5. Meet leakage requirements of pressure test as specified in Section 33 31 13 Sanitary Sewers, Manholes, and Appurtenances.

3.4 SEALING AND BENCHES IN MANHOLE

- A. CIPP shall make a tight-fitting seal with existing pipe(s) in manhole. For CIPP that is installed continuous through manhole, the top half of the pipe shall be neatly cut off and not broken or sheared off at least 2 inches away from wall. The channel in the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other pipes or channels, if any.
- B. At each pipe opening into manhole, hydrophilic rubber joint seal shall be bonded with adhesive to the host sewer pipe or to the opening in the manhole barrel to hold it in place during inversion and creating a water-tight seal after curing.
- C. Seal CIPP and existing pipe in manhole as stated above before proceeding on to next manhole section. Manholes shall be individually inspected for liner cut-offs, benches, and sealing of liner annular space.

3.5 MANHOLE DROP CONNECTIONS

- A. Drop connections on existing sewer mains shall be abandoned prior to the installation of CIPP by plugging the manhole to pipe connection with a bulkhead and filling the drop assembly with flowable fill.
- B. Use of internal manhole drop connections shall be indicated on the Drawings or directed and approved by the Owner and/or Engineer.

3.6 SERVICE LATERALS

A. Shutdown

1. Notify Owner and/or Engineer at least one week prior to the shutdown when it is necessary to shut down a private service line while Work is in progress and before the service lines are reconnected. Notify building occupants with an Owner approved door hanger not less than 36 hours prior to shut down.

~~2. No service is to remain shut down without sewer flow control or a leak free temporary connection. Commercial sewer services shall be maintained when businesses are open.~~

B. Temporary Service Reinstatements:

- 1. The exact location and number of service connections shall be determined from a pre-CCTV inspection and field located by marking existing service connections. Contractor shall determine and identify all active services. Contractor shall perform temporary service cut outs at active service connections immediately after liner has cured. Initial internal service cut outs shall be made to the lesser of a 6-inch diameter opening or 90 percent of the original diameter of the connection. Do not damage liner pipe and allow to normalize to ambient temperature before 6-inch diameter hole is drilled out.
- 2. If the service cannot be replaced through excavation, then internally reinstate the service to 100% of original opening, and provide a smooth opening with no ragged edges. The Owner must approve all permanent lateral cut outs.
- 3. Services shall not be reconnected from abandoned or vacant lots, unless directed otherwise by the Owner and/or Engineer. Restore and correct missed or faulty reconnections as well as damage caused to property owners for not reconnecting the services soon enough or for not giving notice to the owners.

C. Permanent Service Connection by Excavation:

- 1. Excavate existing active service connections. Disconnect at joints and existing sewer (now the carrier pipe for the liner) and remove to expose the liner to the extent necessary. Coat cut out hole in liner with approved resin/epoxy that will cure at the ambient temperature.
- 2. Install PVC saddle tee for the new sewer service lateral over the cut out. Saddle shall be a one-piece saddle attached to the liner with epoxy so that a complete seal is accomplished when the strap-on saddle is tightened with two stainless steel bands; one on each side. The stub-out attached to the saddle shall protrude into liner a distance equal to the wall thickness of liner.

3. All permanent lateral re-instatements shall be completed within 30 days of the initial temporary cut out.
4. Services which are reconnected to rehabilitated liner shall be shown on the record drawings with the distance from the nearest downstream manhole, depth at clean out, and the cleanout distant from mainline.
5. Replace sewer service laterals per Section 33 31 13 – Sanitary Sewers, Manholes, and Appurtenances.

3.7 TESTING FOR ACCEPTANCE

- A. Sampling and Measuring: Two minimum 12-inch long samples shall be cut from the cured liner installation; sample shall be collected and prepared in accordance with restrained sample method described in ASTM F1216 or ASTM F2019. Samples removed for testing shall be individually labeled and logged to record the following:
 1. Owner's project number and title.
 2. Sample number.
 3. Segment number of line as noted on supplements.
 4. Date and time of sample.
 5. Name of Contractor.
 6. Location and by whom tested.
 7. Street name and address.
 8. Test results
- B. Field Thickness testing shall be in accordance with ASTM D2122. The average thickness, calculated from four measurements on each specimen, shall be equal to or greater than the required design thickness. Plate samples may be used in lieu of restrained samples for pipes greater than 18 inches in diameter and in accordance with ASTM F1216.
- C. Send samples to an independent accredited laboratory and test for modulus of elasticity and flexural strength in accordance with ASTM D790, as directed by Owner. Failure of any test can be grounds for rejection of the CIPP liner. At the direction of Owner, the second sample shall be tested. Testing results shall be provided to the Owner within 7 days of receipt.
- D. Destructive Testing: In cases where test results of samples from the 12-inch long pipe section are lower than required values, at the direction of Owner and/or Engineer, Contractor shall cut samples from liner along length of pipe. The size and shape of the samples shall be determined by Owner and/or Engineer. The Contractor shall repair the CIPP liner and host pipe at no additional cost to Owner. Failure of the thickness test shall be grounds for rejection for the CIPP liner.
- E. Resin Sampling: "Wet-out" facility resin mixing equipment shall have a valve downstream of the mixing functions and immediately upstream of the application of the mixed resin to the tube where Owner and/or Engineer can draw resin samples.

- F. Contractor's batch mix facilities, if any, shall provide for sampling of the mixed batch. Submitted "wet-out" schedule cannot be modified without 24-hour notice to Owner and/or Engineer. Resin samples shall be drawn at times determined by Owner and/or Engineer. The Owner and/or Engineer drawing the samples will arrive unannounced and shall be afforded immediate access to the equipment.
- G. CCTV televising shall be done after service connections have been made, unless required earlier by Owner and/or Engineer. Provide CCTV digital files or link within two weeks after permanent lateral reinstatements have been completed.
- ~~H. Lines shall be leakage tested as specified in Section 33 31 13 — Sanitary Sewers, Manholes, and Appurtenances.~~
- I. No visible leak around liner at manhole connections will be allowed.
- J. Correct failed liner or liner deemed unacceptable by Owner and/or Engineer as a result of the post-video inspection or test reports for structural values and thickness.

END OF SECTION

SECTION 33 01 30.72

STEAM CURED-IN-PLACE PIPE LINING

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 formed to the original conduit by use a hydrostatic head or air pressure. The resin is cured using either ~~hot water under hydrostatic pressure~~ or steam within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting.

2. REFERENCED DOCUMENTS

- 2.1 This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of non-reinforced 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, CONTRACTOR 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 trench-less rehabilitation products and installers must be pre-approved prior to receiving bid documents.

Products and Contractors seeking approval must meet all of the following criteria to be deemed Commercially Acceptable:

- 3.1.1 For a Product to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 100,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.
- 3.1.2 For a Contractor to be considered as Commercially Proven, the Contractor must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least 3 (three) years active experience in the commercial installation of the product bid. In addition, the Contractor must have successfully installed at least 1,000,000 feet of the same product bid in wastewater collection systems and a minimum of 50,000 of thirty (30) inch or greater in diameter. Field Supervisor/Foreman: Minimum three (3) years as a foreman/superintendent for a cured-in-place lining crew (installing actual product included

with this bid/project), and a minimum of 100,000 lineal feet of cured-in-place lining, diameters up to, and including, twenty-three (23) inch (*Engineer shall select appropriate experience requirement based upon work included with project. If work includes work in both diameter ranges please include both clauses*) **or** Minimum of five (5) years as a foreman/superintendent for a cured-in-place lining crew, a minimum of 50,000 lineal feet of cured-in-place lining of twenty-four (24) inch or greater, installed under his/her supervision. Such experience shall include the actual product, by trade name, CONTRACTOR proposes to install. Acceptable documentation of these minimum installations must be submitted to the Owner.

- 3.1.3 For a product and installer to be Commercially Proven, the installer must own and operate a legally permitted permanent facility to impregnate the CIPP tubes. To ensure the Owner all installed products will meet the minimum product quality control standards set forth by the manufacture, all CIPP liners shall be impregnated by the approved product's licensed installer that is performing the work. No pre-impregnated CIPP products will be accepted from a third-party vendor without written pre-approval from the owner. Please provide a copy of your permits for this facility with the bid.
- 3.1.4 Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be approved without independent third party testing verification.
- 3.1.5 Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9001. Proof of certification shall be required for approval.
- 3.1.6 Proposals must be labeled clearly on the outside of the proposal envelope, listing the product name and Contractor being proposed. Only proposals using pre-approved products and Contractors will be opened and read. Proposals submitted on products and/or from Contractors that have not been pre-approved will be returned unopened.

Documentation for products and Contractors seeking pre-approved status must be submitted no less than 2 weeks prior to proposal due date to allow time for adequate consideration. The Owner will advise of acceptance or rejection a minimum of 1 week prior to the due date. All required submittals must be satisfactory to the Owner.

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 or ASTM F1743, Section 5, reinforcing fibers may be included. 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 uniform thickness that when compressed at installation pressures will meet or exceed the design thickness, per section 5.6.
 - 4.1.2 The Tube shall be sewn 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 inner or outer layer of the Tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.
 - 4.1.4 The Tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination 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 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.
 - 4.1.7 The outside of 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 and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP which 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 submit long-term testing for flexural creep in accordance with ASTM D2990 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. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by the ASTM D2990 testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. 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 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 separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.
- 5.5 The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

MINIMUM PHYSICAL PROPERTIES

<u>Property</u>	<u>Test Method</u>	<u>Cured Composite min. per ASTM F1216</u>	<u>Cured Composite (400,000 psi Resin)</u>
Modulus of Elasticity	ASTM D-790 (short term)	250,000 psi	400,000 psi
Flexural Stress	ASTM D-790	4,500 psi	4,500 psi

- 5.6 The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in Section 5.5 and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor	=	<u>2.0</u>
Retention Factor for Long-Term Flexural Modulus to be used in Design (as determined by Long-Term tests described in paragraph 5.2)	=	<u>50% - 75%</u>
Ovality*	=	<u>2%</u>
Enhancement Factor, k	=	<u>7</u>
Groundwater Depth (above invert)*	=	<u>ft.</u>
Soil Depth (above crown)*	=	<u>ft.</u>
Soil Modulus**	=	<u>psi</u>
Soil Density**	=	<u>120 pcf</u>
Live Load**	=	<u>H20 Highway</u>
Design Condition (partially or fully deteriorated)***	=	<u>***</u>

* Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.

** Denotes information required only for fully deteriorated design conditions.

*** Based on review of video logs, conditions of pipeline can be fully or partially deteriorated.

(See ASTM F1216 Appendix) The Owner will be sole judge as to pipe conditions and parameters utilized in Design.

5.7

5.8 Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

6. TESTING REQUIREMENTS

- 6.1 Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.
- 6.2 Hydraulic Capacity - Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.
- 6.3 CIPP Field Samples - When requested by the Owner, the Contractor shall submit test results from past field installations in North America of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 5.5 have been achieved in previous field applications.

7. INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

- 7.1 It shall be the responsibility of the Owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.
- 7.2 Cleaning of Sewer Lines - The Contractor, when required, shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Owner shall also provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment facility to which the debris would have arrived in absence of the cleaning operation. If any hazardous or toxic materials are encountered during this project, the Owner will be responsible for the removal and disposal of the materials.
- 7.3 Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The Owner may require a detail of the bypass plan to be submitted.
- 7.4 Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these

conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Owner.

- 7.5 Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion or pull-in installation, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.
- 7.6 Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:
- A. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.
 - B. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.
- 7.7 The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

8. INSTALLATION

- 8.1 CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:
- 8.1.1 Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction.

After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

- 8.1.2 Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.
- 8.1.3 Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.
- 8.1.4 Curing shall be accomplished by utilizing either hot water under hydrostatic pressure or steam in accordance with the manufacturer’s recommended cure schedule.

9. REINSTATEMENT OF BRANCH CONNECTIONS

- 9.1 It is the intent of these specifications that branch connections to buildings be reopened without excavation, utilizing a remote controlled cutting device, monitored by a video TV camera. The Contractor shall certify he has a minimum of 2 complete working cutters plus spare key components on the site before each inversion. Unless otherwise directed by the owner or his authorized representative, all laterals will be reinstated. No additional payment will be made for excavations for the purpose of reopening connections and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work.

10. INSPECTION

- 10.1 For each work order released, one CIPP sample for each diameter shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in Table 1 of the applicable ASTM.
- 10.2 Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as calculated in paragraph 5.6 of this document.
- 10.3 Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

11. CLEAN-UP

- 11.1 Upon acceptance of the installation work and testing, the Contractor shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

12. PAYMENT

- 12.1 Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed.

SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for the measurement and payment of Contract pay items.

1.2 SUBMITTALS

- A. Provide the following submittals in accordance with Section 01 33 23.
 - 1. Field notes of all measurements for payment purposes.

1.3 SCHEDULING

- A. Notify Engineer as far in advance as possible of pay item measurements a minimum of three days prior to submission of the application for payment.
- B. Allow for and afford Engineer ample time, space, and equipment to observe and verify measurements.

1.4 DESCRIPTION

- A. For unit price items, the Contractor shall be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made, the Engineer shall make final measurements to determine the quantities of the various items of work accepted as the basis for final payment.
- B. For lump sum items, the Contractor shall be paid on the basis of actual work accepted until the work item is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the General Conditions or Supplemental Conditions.
- C. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.

1.5 MEASUREMENT REQUIREMENTS

- A. Where payments are to be made on a unit price or adjustment item unit price basis, notify Engineer so that they may observe existing conditions and the status of work-in-place and may witness measurements being made. Where Engineer has not witnessed required

measurements and cannot verify or substantiate quantities, they may not recommend payment for same.

- B.** Maintain complete and legible field notes for all measured items. Notes shall contain spaces for Contractor's and Engineer's signatures plus additional space for comments. An original and copy shall be made for all notes with the copy being submitted to Engineer. The Engineer's signature shall not be construed as an acceptance of the Work or the measurements made but shall mean the Engineer was present when the measurements were made.
- C.** The Owner reserves the right to reject the Contractor's measurement of work-in-place and to have this Work measured by the Engineer or independent party acceptable to the Contractor at the Owner's expense.

1.6 LIMITS OF PAYMENT

- A.** Payments will be made for the quantities installed and accepted in accordance with the Contract. Upon completion of construction, if actual quantities are different than the quantities estimated in the Bid, the Contract unit prices will still prevail, except as follows. When alterations in the quantities of work not requiring Change Orders are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving Change Orders will be paid for as stipulated in such Change Orders.
- B.** The Contractor shall accept as full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work and for performing all work; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work. No extra payment shall be made to the Contractor for any delays caused by defective workmanship or rescheduling of work by others.

1.7 WORK ELIMINATED FROM CONTRACT

- A.** Should any work be deleted from the Contract a Change Order shall be issued as stipulated in the General Conditions.

1.8 PARTIAL PAYMENTS

- A.** Partial payments shall be made monthly as the work progresses. All partial invoices and payments shall be subject to correction in the final quantity invoice and payment. No monthly payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract.

- B. No partial payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.
- C. Each subsequent Application for Payment shall include an affidavit of the Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of the Contractor's obligations reflected in prior Applications for Payment. The Owner shall have the right to deduct from the next progress payment an amount equal to payment for said material and/or equipment if reasonable and adequate proof is not submitted.

1.9 FINAL PAYMENT

- A. The Contractor will prepare a final payment requisition for review by the Engineer for the work performed. Upon approval by the Engineer, the Owner will pay the entire sum found to be due less any retainage provided for in the General Conditions and any previous payments.

1.11 PAYMENT FOR MATERIALS DELIVERED

- A. Payment may be made for all or part of the value of materials stored on site. The application for payment shall be accompanied by a summary of materials stored on site that will establish the Owner's title to the materials and protect the Owner's interest therein, including insurance. The amount thus paid by the Owner shall reduce the estimated amounts due the Contractor as the material is incorporated into the Work. Materials stored on site, that have been paid for by the Owner, shall become the property of the Owner and, in the event of default on the part of the Contractor, the Owner may use these materials in the construction of the Work. The Contractor shall be responsible for any damage to, or loss of, any materials.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Provide all labor, materials, facilities, measuring devices and all other equipment necessary to perform all measurements for payment purposes.

PART 3 – EXECUTION

3.1 GENERAL

- A. Perform all measuring required by this Section.
- B. No separate payments will be made for Work under this Contract except for the pay items stipulated in this Part 3. All costs in connection with the Work shall be included in one or more of the pay items as appropriate.

- C. The names of pay items in this Section, the Schedule of Values, or the Bid Form may be abbreviated or non-comprehensive and are for general identification purposes of the item only. The names shall not be construed to represent a complete description of all the Work included under each pay item. Refer to the subsequent paragraphs of this Section for more complete descriptions of Work to be included under each Contract pay item.

3.2 LUMP SUM PRICE PAY ITEMS

- A. Measurement - no measurements will be made.
- B. Payment shall be on a lump sum basis, based on the percentage of work completed and accepted by the engineer for each lump sum pay item.

3.3 UNIT PRICE PAY ITEMS

- A. Measurement and payment shall be made by the unit.

3.4 DESCRIPTION OF PAY ITEMS

The following pay items describe the measurement of and payment for the work to be done under the items listed in the Bid.

Item 1 – General Conditions and Miscellaneous Work

- A. Measurement: General Conditions and Miscellaneous Work shall consist of preparatory work and operations including but not limited to, the following items:

1. Project Management
2. Mobilization/demobilization
3. Submittals
4. Testing not paid for by the Owner
5. Equipment delivery
6. Sanitary facilities
7. Furnishing of insurance
8. Permits and permit conditions
9. Clean-up
10. Coordination with utilities, other contractors, and other project-related entities
11. Installation and removal of temporary facilities
12. Traffic Control and Flaggers
13. The purchase of water from The Town of Enfield
14. Project Closeout
15. Project record drawings

- B. Payments:

1. Payment shall be made at the contract lump sum price, which price shall be full compensation for all costs incurred in furnishing labor, tools, materials an equipment and incidental work item costs for the preparatory work and operations described in the above measurement section for this item.
2. For the purpose of computing payments, the adjusted contract price shall include all contract unit price and lump sum items except the contract lump sum price for the item General Conditions, Mobilization, and Demobilization.
3. Payments shall be made as follows:
 - a. First payment of fifty percent (50%) of the contract lump sum price for Mobilization or 2.5 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of five percent (5%) of the total contract price.
 - b. Second payment of twenty five percent (25%) of the contract lump sum price for Mobilization or 1.2 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of fifty percent (50%) of the total contract price.
 - c. Upon substantial completion of all work on the project, payment of the remainder of the contract lump sum price for Mobilization will be paid.

Item No. 2 – Sewer Manhole Minor Repairs

- A.** Measurement – Actual number of manholes repaired as specified for manholes.
- B.** Payment – Payment for manhole repair shall be made for the quantity repaired at the unit bid price each as stated in the bid schedule. Payment shall be full compensation for completing the manhole repair, traffic control/flagging, restoring the surface around the sewer manhole, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 3 – Sewer Main Cleaning and CCTV Scan

- A.** Measurement – Actual length in feet of sewer main cleaned and videoed as specified. Measurement shall be made along the centerline of the pipe.
- B.** Payment – Payment for cleaning and videoing pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the bid schedule.

Item 4 –Sewer Main Cured in Place Pipe Lining

- A.** Measurement – Actual length in feet of sewer main lined as specified. Measurement shall be made along the centerline of the pipe.
- B.** Payment – Payment for the lining of pipe shall be made for the quantity installed at the unit bid price per linear foot as stated in the bid schedule.

Item 5 –Open Cut 8” Pipe replacement

- A.** Measurement – Actual length in feet of sewer main replaced as specified. Measurement shall be made along the centerline of the pipe.
- B.** Payment – Payment for replacement of pipe shall be made for the quantity installed at the unit bid price per linear foot as stated in the bid. Payment shall be full compensation for trenching, clearing tree branch trimming, holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, trench dams, pipe, polyethylene wrap if required, bedding, jointing, connections to existing, select backfill around and over pipe, warning tape, tracer wire (for PVC pipe), in-kind soil backfilling, compaction, restoring the trench surface to grade, in-kind gravel backfill, testing, traffic control and erosion control and all work incidental to the satisfactory completion of the item for which payment is not provided under other items. Payment will be made for ninety (90) percent of the price upon completion of installation; the remaining ten (10) percent upon completing satisfactory testing subject to other retainages set forth in the contract documents. Payment for this item may be withheld if the record drawings do not reflect the work for which payment is requested.

Item No. 6 – Sewer Manhole Raised to Grade

- C.** Measurement – Actual number of manholes repaired as specified for manholes.
- D.** Payment – Payment for raising the manhole to grade shall be made for the quantity raised manholes at the unit bid price each as stated in the bid schedule. Payment shall be full compensation for raising the manhole to grade, traffic control/flagging, restoring the surface around the sewer manhole, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 7 – Sewer Main Heavy Cleaning (Per Engineer/Owner Discretion)

- A.** Measurement – Actual length in feet of sewer main requiring more than 3 passes. Measurement shall be made along the centerline of the pipe.
- B.** Payment – Payment for heavy cleaning pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the bid schedule.

Item No. 8 – Sewer Main Root/Obstruction Removal (Per Engineer/Owner Discretion)

- A.** Measurement – Actual number of obstructions removed that could not be removed by heavy cleaning.
- B.** Payment – Payment for obstruction removal shall be made for the quantity obstructions removed at the unit bid price each as stated in the bid schedule. Payment shall be full compensation for the removal, traffic control/flagging, restoring the surface around the sewer manhole, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 9 – Sewer Debris Disposal

- C.** Measurement – Tons of sewer debris to be disposed of. Measurement shall be made in tons.
- D.** Payment – Payment for debris disposal shall be made for the quantity disposed of as stated in the bid schedule.

End of Section

Bid Schedule

BASE BID

Item No.	Brief Description; Unit or Lump Sum Price (both words and numbers)	Quantity and Units	Item Price

1.	General Conditions and Miscellaneous Work, Per Lump Sum: _____ Dollars And _____ Cents (\$_____)	1 LS	\$ _____
2.	Sewer Manhole Minor Repairs, Per Each: _____ Dollars And _____ Cents (\$_____)	10 EA	\$ _____
3.	Sewer Main Clean & CCTV Scan (8" & 12" Piping), Per Linear Foot: _____ Dollars And _____ Cents (\$_____)	1,005 LF	\$ _____
4.	Sewer Main Cured in Place Piping (8" to 18" Piping), Per Linear Foot:		
4A.	(18" Ductile Iron Piping) _____ Dollars And _____ Cents (\$_____)	325 LF	\$ _____
4B.	(15" Ductile Iron Piping) _____ Dollars And _____ Cents (\$_____)	450 LF	\$ _____
4C.	(12" Ductile Iron Piping) _____ Dollars And _____ Cents (\$_____)	445 LF	\$ _____
4D.	(10" PVC Piping) _____ Dollars And _____ Cents (\$_____)	240 LF	\$ _____
4E.	(8" PVC Piping) _____ Dollars And _____ Cents (\$_____)	795 LF	\$ _____

4F. (8" Ductile Iron Piping)

_____ Dollars
And _____ Cents (\$ _____) 160 LF \$ _____

5. Open-Cut 8" Pipe Repair/Replacement (2 Separate Repairs on a single run),
Per Linear Foot:

_____ Dollars
And _____ Cents (\$ _____) 20 LF \$ _____

6. Sewer Manhole Raised to Grade,
Per Each:

_____ Dollars
And _____ Cents (\$ _____) 13 EA \$ _____

7. Sewer Main Heavy Cleaning (8" & 12" Piping),
Per Linear Foot:

_____ Dollars
And _____ Cents (\$ _____) 50 LF \$ _____

8. Sewer Main Root/Obstruction Removal,
Per Each:

_____ Dollars
And _____ Cents (\$ _____) 5 EA \$ _____

9. Sewer Debris Disposal,
Per Ton:

_____ Dollars
And _____ Cents (\$ _____) 1 Ton \$ _____

Total Base Bid Price in Words

Add the following for projects using CWSRF and/or DWSRF funding (not necessary for ARPA Only funded projects):

The BIDDER hereby certifies, by checking the boxes below, that the following documents are included with this bid proposal:

- [DBE Subcontractor Utilization Form NHDES Form #NHDES-W-09-059.](#)
- [DBE Subcontractor Performance Forms NHDES-09-NHDES-W-09-058](#) Submit one form for each DBE subcontractor.
- Bidder's American Iron and Steel acknowledgement.

All of these forms are in the SRF Federal Provisions: [Section D](#) of the front-end documents.

End of Addendum #1

Horizons Engineering, Inc.

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