

UTILITIES COMMISSION
CITY OF NEW SMYRNA BEACH, FLORIDA

ITB #02-21
MISCELLANEOUS SEWER IMPROVEMENTS

**SECTION 2760 – CURED-IN-PLACE PIPE (CIPP)
LATERAL LINER SPECIFICATION**

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A. DESCRIPTION OF WORK

- 1) This specification covers all work necessary to furnish and install CIPP 4” or 6” lateral liner to rehabilitate sanitary sewer laterals. The Contractor shall provide all labor, materials and equipment necessary, including but not limited to, pipe cleaning, pipe preparation, root removal, removal & disposal of material(s) generated from pipe cleaning/preparation/root removal, pre-lining video (after pipe is cleaned/prepped), post-lining video (after lining and lateral reinstatements), testing and clean-up.
- 2) It is the intent of this specification to provide for the structural re-construction of 4” thru 6” diameter service laterals and a water tight interface connection seals in 6-inch through 27-inch sewer main, without excavation, by the installation of a one piece resin impregnated, flexible, non-woven felt liner installed into the existing lateral connection utilizing a pressure apparatus positioned in the main pipe. Curing shall be accomplished by use of ambient cure resin or other approved methods to cure the resin into a hard impermeable Cured-In-Place-Pipe (CIPP). When cured, the liner shall have a watertight connection seal at the main pipe and extend over the length of the service lateral in a structural pipe-within-a-pipe.
- 3) The CIPP Lateral Lining system used for each specific project must be provided, verifying compliance with these qualifications and each project will include the name of the Contractor’s site Superintendent that completed the work. These references must satisfy the minimum requirements of:
 - A five (5) year history of satisfactory performance in the CIPP industry
 - A minimum of five (5) years continuous experience installing CIPP Lateral Lining in pipe of similar size, length and configuration as proposed in this project
 - License or Certification that the proposed installer is approved to install the proposed project
- 4) The Contractor shall provide necessary Maintenance of Traffic and By-Pass Pumping per the Contract Bid Tabulation.

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- 5) The Contractor shall provide necessary warranty and documentation of required experience per the Contract Bid Submittal Requirements and as specified herein.
- 6) The **COMMISSION** requires all Customers to be notified a minimum of 5 calendar days of any anticipated flow interruptions. It is the Contractor's responsibility to make said Customer notifications.
- 7) The CIPP shall be continuous, jointless and structurally sound liner from the sewer main to the property/easement line.
- 8) The **COMMISSION** will pay for installed materials only per the Contract Bid Tabulation Bid Item Unit Cost.
- 9) All work shall adhere to Occupational Health and Safety Administration (OSHA) standards, current edition.
- 10) Maintenance of Traffic shall adhere to FDOT Design Standards, Index 600, current edition.

B. REFERENCE & MATERIALS

- 1) ASTM F1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
- 2) ASTM F1743 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe
- 3) ASTM D5813 – Standard Specification for Cured-in-Place Thermosetting Resin Sewer Piping Systems
- 4) Resin
 - Long term creep test data confirming the resin system's 50 year design life in accordance with ASTM D2990
 - Chemical Resistance in accordance with ASTM F1216
 - Certificate of Compliance in accordance with ASTM F1216
 - Material Safety Data Sheets (MSDS)
- 5) Liner
 - Certificate of Compliance in accordance with ASTM 1216
 - Certificate of Compliance in accordance with ASTM 1743 for pull in place tubes
 - CIPP wall thickness design calculations in accordance with ASTM F1216.
 - 4" thru 6" diameter lateral liner

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- 6) The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit with a minimum length of 5-inches on either side of the connection or a length as specified by the Owner. Allowance shall be made for circumferential stretching during insertion. The liner shall be a joint-less polyester felt “tube” with sewn seams and/or a semi-rigid collar at the connection that will create a watertight seal at the main pipe interface.
- 7) The length shall be a distance to effectively span from the lateral connection at the main pipe or to the desired termination location in the service lateral pipe. For the purpose of this specification, the termination point shall be a distance within 18-inches of the intersection of a cleanout or property line. When required, an overlap method is performed with a pull-in-process installation from a cleanout or access point back to the main pipe. In either case, the lateral liner must provide a watertight seal at the main pipe and a structural repair of the lateral over the specified length. The installer shall verify the lengths in the field before impregnation of the resin.
- 8) Unless otherwise specified, this Installer shall furnish a specially designed, unsaturated, Polyester or Vinylester resin and catalyst system compatible with the cured-in-place process that provides cured physical strengths specified herein.
- 9) The structural performance of the finished cured-in-place-pipe must be adequate to accommodate all anticipated loads throughout its design life. No cured-in-place- pipe reconstruction technology will be allowed that requires bonding to the existing pipe for any part of its structural strength. Only resin saturation using vacuum impregnation will be allowed.
- 10) Design methods are to be derived from traditionally accepted pipe formulas for various loading parameters and modes of failure. All equations will be modified to include ovality as a design parameter. The design method shall be submitted to the Engineer for approval.
- 11) The CIPP lateral pipe shall conform to the minimum structural standards as listed below:

<u>Property</u>	<u>ASTM Standard</u>	<u>Result</u>
Flexural Stress	ASTM D790	4,500 psi
Flexural Modulus	ASTM D790	250,000 psi

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C. CONSTRUCTION

- 1) Contractor shall perform pre-video inspection of the pipe to be lined. The Contractor shall provide the **COMMISSION** a copy of the video in digital format for review and approval.
- 2) The pre-video shall be after the pipe is cleaned.
- 3) The Contractor is responsible to clear the pipe of obstructions that will interfere with the installation and long-term performance of the CIPP.
- 4) If the pre-video inspection reveals an obstruction, misalignment, broken or collapsed section or sag that was not identified as part of the original scope of work and will prohibit proper installation of the CIPP, the Contractor may be directed by the **COMMISSION** to correct the problem(s) prior to lining by utilizing open cut repair methods. The Contractor shall be compensated for this work under a Contract Bid Alternate Bid Item.
- 5) The Contractor shall be responsible for confirming the locations of all lateral connections prior to installing and curing the CIPP.
- 6) In the event the status of a lateral connection cannot be adequately defined, the **COMMISSION** will make the final decision, prior to installation and curing of the liner, as to the status.
- 7) BY-PASS PUMPING - See Specification 02730.
- 8) Cleaning of Sewer Line – The intent of this specification is for cleaning of the lateral to be accomplished from the main pipe via lateral launching equipment. If the lateral cannot be cleaned using industry standard cleaning heads that can be launched from the main pipe, then a cleanout or access point will be required. The laterals shall be cleaned a sufficient length to ensure the specified length of sewer is ready for lining. It shall be the responsibility of the Installer to verify, prior to installation, that all internal debris has been removed from the sewer line. Internal debris consists of broken pipe sections, roots, loose gravel, etc.
- 9) Inspection of Pipelines – It is the intent of this specification for inspection of the lateral to be accomplished from the main pipe via lateral launching equipment. If the lateral cannot be inspected using industry standard inspection equipment that can be launched from the main pipe, then a cleanout or access point will be required. Inspection of pipelines shall be performed by experienced personnel trained (PACP Certification) in locating breaks and obstacles by closed circuit television (CCTV). The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of the lateral liner into the pipelines, and it shall be noted so that these conditions can be corrected. A DVD and suitable log shall be kept for later reference by the Owner.

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- 10) It is required that the service lateral be inactive during the time of installation. This is normally accomplished by turning off the homeowner's services or requesting that the homeowner relinquish using his services during the period of installation. Notification will be distributed to impacted residents 24 hours in advance of the lateral liner installation.
- 11) Line Obstructions – If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, as in solids, dropped joints or collapsed pipe, then the Installer 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.
- 12) In case of lined main pipes, the lateral connection specified for rehabilitation shall be reinstated to 100% of its original size.
- 13) The Installer shall designate a location where the liner will be vacuum impregnated prior to installation. The Installer shall allow the Owner to inspect the materials and resin saturation (wet-out) procedure. A catalyst system compatible with the resin and liner shall be used.
- 14) The wet-out liner shall be loaded inside a pressure apparatus above ground, utilizing a hydrophilic sealant (or equivalent) on the backside of the connection applied in a one half to one inch wide bead to enhance a watertight seal. Also, a Silicate Resin or a two- part 100% solid epoxy (reference ASTM C-881) shall be applied at a volume no less than 6oz to the lateral interface to enhance adhesion against the host pipe. The pressure apparatus, with an end attached to a robotic device, shall be winched through the main pipe to the service connection. The robotic device, together with a television camera, will be used to position the pressure apparatus' inversion elbow at the service connection opening. Air pressure, supplied to the pressure apparatus through an inversion hose, shall be used to invert the wet-out liner through the lateral pipe to the cleanout/access point or "Right of Way" point. The inversion head will be adjusted to be of sufficient pressure to cause the impregnated liner to invert completely in the lateral pipe and hold the liner tight to the pipe wall. Care shall be taken during the curing process so as not to overstress the liner.
- 15) Curing – Unless otherwise approved by the engineer, an ambient-temperature curing resin system will be utilized.
- 16) Initial cure shall be deemed to be completed when inspection of the exposed portions of the CIPP appear to be hard and sound. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the installation process.

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- 17) Cool-down – The Installer shall cool the hardened CIPP to a temperature to approximately 1000 F before relieving the pressure in the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.
- 18) Finish – The finished CIPP shall be a watertight connection seal at the main pipe and extend continuous over the entire length of the service lateral and be free of dry spots, lifts, and delamination. This continuous one piece structural pipe-within-a-pipe shall not inhibit the closed circuit television (CCTV) post video inspection of the main or service lateral pipes.
- 19) Testing – For every 10 laterals, one flat plate sample shall be taken and sent to a 3rd party test laboratory for confirmation of short term flexural modulus and strength properties in accordance with ASTM F1216. The test results shall meet or exceed the values used in the design of the CIPP lateral liner.
- 20) During the warranty period, any defects which will affect the integrity or strength of the CIPP liner shall be repaired at the Installer’s expense in a manner mutually agreed upon by the Owner and the Installer.
- 21) After the work is completed, the Installer will provide the Owner with a digital video showing the completed work including the restored conditions.
- 22) After the work is completed, the Installer shall reinstate the project area affected by his operations. The Contractor or Subcontractor will only be required to reinstate the area equivalent to the condition of the area as it was prior to commencing work.

D. INSPECTIONS

- 1) Contractor shall perform a post-video inspection of the lined pipe. The Contractor shall provide the **COMMISSION** a copy of the video in digital format for review and approval.
- 2) Immediately prior to conducting the post-video, the Contractor shall thoroughly clean the newly installed liner removing all debris and buildup that may have accumulated.
- 3) The post-video shall be after the installation of the CIPP and all laterals are reinstated.
- 4) The post-video shall visual inspect the finished liner to be continuous over the entire length of the installation and shall be free of significant visual defects, damage, deflection, holes, leaks and other defects and maintain the overall hydraulic capacity of the original pipe diameter.

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- 5) The post-video shall be submitted to the **COMMISSION** within ten (10) working days of the liner installation. The data shall note the inspection date, location of all reconnected side sewers, debris, as well as any other defects in the liner, including, but not limited to, gouges, cracks, bumps, or bulges.
- 6) If post installation inspection documentation is not submitted within Ten (10) working days of the liner installation, the **COMMISSION** may at its discretion suspend any further installation of CIPP until the post-installation documentation is submitted. As a result of this suspension, no additional working days will be added to the contract, nor will any adjustment be made for increase in cost.
- 7) Bypass pumping or plugging from the upstream manhole shall be utilized to minimize sewer from entering the pipe during the post-video inspection. In the case of bellies in the line, the pipe shall be cleared of any standing water to provide continuous visibility during the inspection.
- 8) Where leakage is observed through the wall of the pipe, the Contractor shall institute additional testing including but not limited to air testing, localized testing and any other testing that will verify the leak-proof integrity of the installed liner to the satisfaction of the **COMMISSION**.

E. WARRANTY

- 1) The Contractor shall provide necessary warranty and documentation of required experience per the Contract Bid Submittal Requirements and as specified herein.
- 2) The CIPP lateral liner manufacturer shall warrant the liner to be free from defects in raw materials for a minimum of five (5) years from the date of installation and Final Completion by the **COMMISSION**.
- 3) The Contractor shall warrant the CIPP lateral liner installation (workmanship) for a minimum of five (5) years from the date of installation and Final Completion by the **COMMISSION**.
- 4) During the CIPP manufacturer and Contractor warranty period, any defect found that may materially affect the integrity, strength, function and/or operation of the pipe shall be repaired at the Contractor's expense at no cost to the **COMMISSION**.
- 5) The **COMMISSION** may inspect all or portions of the lined pipe during the warranty period and if found that any of the liners have developed abnormalities since the time of Final Completion, the abnormalities shall be repaired and/or replaced at no cost to the **COMMISSION**.

END OF SECTION