NOTICE OF ADDENDUM NO. 2

Sanitary Sewer Collection System Lining Project No. 26-450
City of Fridley

Attention Planholders:

This addendum shall be attached to the Project Manual and shall be included as part of said Project Manual. Addendum No. 2 consists of Notice of Addendum No. 2 (2 pages). This addendum consists of 11 pages (total).

Additional Information

1. Bidders shall acknowledge the following supplementary information:

    a. The distinction between steam cure and circulated heated water cure is made based upon existing conditions in the project area, however, curing method for individual segments is not specified. Curing method for individual segments will be recommended by the Contractor and approved by the Engineer during construction.

    b. In accordance with Article 11 of Instructions to Bidders in the Project Manual, unit prices per lineal foot for CIPP installation shall be made for the curing method specified. "Or-equal" or substitute methods will not be considered during bidding and any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at the Bidder's sole risk.

    c. Schedules A and B as identified in the Project Manual are permitted to be completed concurrently provided the completion milestones for each schedule are achieved.

Revised Project Manual

1. Changes to the Sanitary Sewer Collection System Lining Project No. 26-450 Project Manual

    a. Remove and Replace Section 02532 CURED-IN-PLACE-PIPE (CIPP) - GRAVITY

        i. Update pre-qualified Products and Installers to include the following:

            1. Municipal Pipe Tool Company
            515 5th Street, Hudson, IA 50643, Telephone: 319-988-4205

            2. National Power Rodding Corporation
            2500 West Arthington Street, Chicago, IL 60612, Telephone: 312-666-7700

Addendum Acknowledgement

1. The bidder shall acknowledge revised page(s) to replace original page(s) as amended by Addendum No. 2 and added pages.

2. The bidder shall acknowledge receipt of Addendum No. 2 on the bid proposal or in writing (hand deliver to City Engineer) prior to the time set for opening the bid proposals. The bidder also understands that failure to acknowledge addenda as set forth here may be considered sufficient cause for disqualification of the bidder and rejection of their Proposal.

Certification

I hereby certify that this addendum was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Brandon Brodhag

Brandon Brodhag, P.E.

Date: 11/24/25 License No. 59297

SECTION 02532R - CURED-IN-PLACE-PIPE (CIPP) - GRAVITY

PART 1 -- GENERAL

1.1 SUMMARY

A. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to the installation of a resin-impregnated flexible liner which is inserted into the original conduit by use of a hydrostatic head. Methods that are pulled in and inflated (rather than inverted) may be considered, providing the method meets the other provisions of this specification. When cured, the finished pipe (CIPP) shall be continuous and tight fitting. In all circumstances, the new CIPP shall be designed as a fully structural pipe, not relying on the remaining strength or water tightness of the host pipe to withstand long-term external loading and internal pressure.

1.2 METHOD OF MEASUREMENT AND PAYMENT

A. Measurement and compensation for the following items shall be paid according to the referenced specification or as modified below.

1. The contract unit price bid per LINEAR FOOT (LF) for CIPP shall be compensation in full for all equipment, materials, and labor required to complete the CIPP installation per the specified method. Payment shall be based on the actual measurement of liner installed.

2. The contract unit price bid per EACH (EA) for Lateral Reinstatement (any size) shall be compensation in full for all labor, materials, and equipment required to determine which are active, and complete the lateral reinstatements of all lateral lines conveying sewage in accordance with these specifications

B. The furnishing and installing of specific items and /or the performance of work under certain circumstances shall not be individually paid in the absence of a specific bid item for the work. The costs shall be included in the unit price bid for the CIPP, as indicated. Such items of work include, but are not limited to:

1. Coordination with City to coordinate access to the sanitary sewer systems.

2. Securing and withdrawing from a water source.

3. Furnishing, installing and maintaining traffic control devices where necessary not already provided for by bid items.

4. Pre-installation and post-installation cleaning and televising.

5. Removal and disposal of internal debris from the sewer mainline and services prior to installation.

6. Bypass pumping unless otherwise specified and included in the bid form.

7. Providing all required notifications of restricted sewer service periods to the Owner and residents affected by the work as well as coordination of resident relocations and reimbursements, if applicable.

8. Installation of pipe pre-liners or grouting if required to install CIPP in areas of excess infiltration.

9. Dye testing as required to determine active laterals (where needed).

10. Installation of hydrophilic end seals at the ends of the liner in each manhole.

11. Removal of liner in manholes if pulling/inverting through manholes (unless manhole is being abandoned).

12. Excavation and restoration required to reinstate sewer services if the Contractor is unable to reinstate services via trenchless methods.

13. General project-related restoration where not already provided by bid items.

14. Any required permits and incidental requirements.

1.3 SPECIFICATION REFERENCES

A. The specification references below 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 the ASTM referenced sections, this specification will govern.

1. ASTM F2019 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastics (GRP) Cured-In-Place Pipe (CIPP)
2. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
3. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pull in and inflate and Curing of a Resin-Impregnated Tube.
4. ASTM F2561 – Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One-Piece Main and Lateral Cured-in-Place Liner.
5. ASTM D543 Test Method for Resistance of Plastics to Chemical Reagents
6. ASTM D578 Standard Specification Glass Fiber Strands
7. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
8. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
9. ASTM D2122 Standard 1 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
10. ASTM D2990 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
11. ASTM D3567 Standard Practice for Determining Dimensions of ‘‘Fiberglass’’ (Glass-Fiber Reinforced Thermosetting Resin) Pipe and Fittings
12. ASTM D5813 Standard Specification for Cured-in Place Thermosetting Resin Sewer Pipe

B. Unless noted otherwise, the provisions in this section are in addition to the referenced specification.

1.4 SUBMITTALS

A. A minimum of five (5) working days prior to CIPP installation, the following shall be submitted to the Engineer for review and approval:

1. Certified test results from the manufacturers which indicate that all materials conform to the applicable requirements.
2. A copy of the license or certificate verifying the manufacturer's or licensor's approval of the INSTALLER.
3. Chemical resistance submittals --- The Contractor shall submit test results of the resin proposed that meet the chemical resistance requirements of ASTM F2019, Section 5.2.6. The chemical resistance tests will be completed in accordance with Test Method D543.
4. CIPP Field Samples ---Field sampling procedure shall be in accordance with ASTM 2019 and in accordance with ASTM D5813.
5. SDS Sheets --- The Contractor shall submit Safety Data Sheets for all resins, and other additives such as accelerants, colorants, and lubricants utilized in the pipe liner/lining process.
6. Manufacturer Protocols - The Contractor shall submit manufacturer information that describes the materials, curing speeds/schedule, curing installation processes, installation pressures, temperature limitations, and recommended post curing documentation.

7. Residential Informational Handout - The Contractor shall submit an informational hand out that describes the materials, processes, installation, pressures, temperature limitations, and odors associated with the lining process that shall be provided at the request of concerned residents.
8. Sewer Service Disruption Notice – The Contractor shall submit a construction notice handout that describes upcoming construction-related service restrictions including location, duration, service limitations and emergency contact information for distribution to impacted property owners during construction. A sample service disruption notice may be provided by the City upon request.
9. Liner pipe thickness design for each pipe segment. No liner will be approved for installation until liner thickness calculations have been submitted and reviewed for conformance with the specification.
10. Sanitary Sewer Bypass and Monitoring Plan
11. Traffic Control and Work Zone Signage Plan
12. Proposed construction schedule.
13. Description of cure method(s) proposed by the Contractor.

B. Televising Log

1. All televising and construction logs, or copies thereof, shall become the property of the Owner. This includes the videos made at the beginning of the project just prior to the installation of the liner.
2. Televising logs shall be provided in electronic format.
3. One copy of all televising shall be submitted on a USB flash drive.

PART 2 -- PRODUCTS

2.1 PREQUALIFICATION

A. Only bids for pre-qualified products will be accepted. Bids submitted for products or from Contractors that have not been pre-qualified may be rejected, pending review by the Owner. The Contractor and the proposed method of reconstruction and the product manufacturer's name shall be clearly identified on the bid.

B. Pre-qualified Products and Installers

1. Insituform Technologies USA, LLC.

   1140 Bunker Lake Boulevard NW, Anoka, MN 55303, Telephone: 651-762-1238

2. (National Liner) Visu-Sewer

   3155 104th NE Lane, Blaine, MN 55449, Telephone: 763-252-0004

3. Veit Companies

   14000 Veit Place Rogers MN 55374, Telephone 763-428-2242

4. Granite Construction

   2950 Metro Drive # 200, Bloomington, MN 55425, Telephone 952-853-1252

5. Michels Pipe Service – A Division of Michaels Corporation

   817 West Main Street, P.O. Box 128, Brownsville, WI 53006, Telephone: 920-583-3132

6. SAK Construction

   864 Hoff Road, O'Fallon, MO 63366, Telephone 626-385-1000

7. Municipal Pipe Tool Company

   515 5th Street, Hudson, IA 50643, Telephone 319-988-4205

8. National Power Rodding Corporation

2500 West Arthington Street, Chicago, IL 60612, Telephone 312-666-7700

C. Qualification Process

1. Contractors wishing to qualify for this project must submit a copy of the license or certificate verifying the manufacturer's or licensor's approval, and evidence of the INSTALLER's experience including the number, total length, and locations of inversions installed to date using the proposed materials and methods together with the names and phone numbers of facility owners to the Engineer 5 days prior to the opening of bids to allow time for evaluation. The Contractor must have at least five (5) years of active experience installing the CIPP product.

2. The final decision to accept or reject the applicant lies solely with the Engineer and Owner. All decision will be based upon the long-term best interest of the City.

2.2 MATERIALS

A. Liner - The liner material shall meet the requirements of ASTM F1216 and/or ASTMF2019.

B. Resin - The resin system shall meet the requirements of ASTM F1216 and/or ASTMF2019. Neat resin shall be used for all lining of PVC pipes.

C. Hydrophilic End Seals shall be LMK Insignia End Seal or approved substitution.

2.3 STRUCTURAL REQUIREMENTS

A. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall but a tight, intimate contact is required.

B. The CIPP shall be designed using a Long Term Creep Retention Factor of fifty percent (50%) of the initial design flexural modulus as determine by ASTM D-790 test method. This value shall be used unless the Contractor submits long term test data (ASTM D2990) to substantiate a higher retention factor.

C. 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.

D. 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.

E. The CIPP shall conform to the following properties:

	Standard	**Min Value**	**Enhanced Value**	**UV Value**
Flexural Strength	ASTM - D790	4,500 psi	4,500 psi	6,500 psi
Modulus of Elasticity	ASTM - D790	400,000 psi	400,000 psi	725,000 psi

F. The design parameters for 8” CIPP installations.

Pipe diameter	8	Inches
Maximum depth from finished ground to invert	18	Feet
Minimum depth from finished ground to invert	6	Feet
Groundwater Depth (Below Ground Level)	5	Feet
Cover density (assumed)	120	Lbs/cf
Design Safety Factor (1.5 for pipes 36 inches and larger)	2.0	Value
Ovality	5%	Percent
Enhancement Factor (K)	7.0	Value

Poisson's Ratio	0.3	Value
Level of Deterioration	Fully Deteriorated	Value
Creep Retention Factor	50%	Value
Soil Modulus	1,500	PSI
Host Pipe Loading	H20 Highway	Value

G. **The required structural CIPP wall thickness shall be based as a minimum, on the physical properties listed above and in accordance with the Design Equations in the appendix of ASTM F1216. The finished/cured liner thickness shall exceed minimum thickness requirements set forth by the equations in the appendix of ASTM F1216 in all situations.**

H. **The contractor will bid/install a 6.0 mm nominal (prior to cure) liner on all 8". Finished thickness shall exceed 5.1 mm on all installations.**

2.4 TESTING REQUIREMENT

A. Chemical Resistance - The Contractor shall certify that CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of liner 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.

B. Hydraulic Capacity - The Contractor shall certify that 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. The roughness coefficient of the CIPP shall be verified by third party test data.

C. CIPP Field Samples - When requested by the Owner, the Contractor shall submit test results from previous field installations in the USA of the same resin system and liner materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 2.3.E. have been achieved in previous field applications. Testing samples for this project shall be made and tested as described in Section 3.5.A.

PART 3 -- EXECUTION

3.1 GENERAL

A. Original methods of construction of mains and manholes along with existing conditions of manhole and pipe material, bedding and trench fill should not be assumed to meet current standards. Original constructions are also subject to maintenance and repair modifications. The Contractor should rely solely on their review of field conditions, inspections and experience in determining their materials and methods of construction.

B. CIPP installation shall only commence following review and approval of preliminary cleaning, televising and inspection of the existing host pipe line by the Owner or Engineer.

C. 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 Contractor shall furnish and install all necessary traffic control devices until the street is opened to traffic in conformance with GR-16.

D. The Contractor shall notify the Owner prior to initiating cleaning and flushing and shall coordinate his operations with the Owner.

E. The Contractor shall determine the length and diameter of the pipe to be lined prior to fabrication of the liner. No additional compensation will be paid for measured diameters, which vary from measure indicated on the plans or bid form.

F. The Contractor shall provide all necessary equipment, jigs, pipe pieces, sandbags, labor, etc. to install CIPP tube through the available access locations provided and shown on the plans. The Contractor shall also cut

open, reinstate, and prepare the edges of cut surfaces in a clean and orderly fashion to reopen the pipe within manholes that have been lined through. No additional compensation shall be made for lined through manholes, and such items of work shall be considered incidental to the contract.

G. The Owner/City will have an inspector available daily. The Contractor shall contact the Owner's inspector daily to review pre-CCTV cleaning work and approve each liner for installation.

H. The Contractor shall contact the City of Fridley (763-572-3566) to obtain a water meter with a backflow preventor to be used when getting water from a hydrant. The contractor is responsible for the $1,500.00 returnable deposit for the meter.

I. Sanitary Sewer Service Disruptions – The Contractor shall coordinate all disruptions to regular sanitary sewer service required for CIPP installation with the Engineer prior to beginning work. Sewer service restrictions shall not occur before 7:00 AM and shall be restored by no later than 7:00 PM the same day, unless approved by the Engineer. In the event of extended service disruptions beyond this timeframe, the Contractor shall be responsible for furnishing reasonable accommodations to impacted properties including, but not limited to portable lavatory facilities, temporary relocation and lodging, etc. with no additional compensation.

J. Bypassing Sewage - The Contractor shall provide for the flow of sewage around the section or sections of pipe designated for lining. 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.

3.2 PROTECTION OF EXISTING PUBLIC AND PRIVATE INFRASTRUCTURE

A. During CIPP liner installation, the Contractor shall protect and bear full responsibility for maintaining service for all existing City and private infrastructure, including but not limited to public and private utilities, roadways, stormwater conveyance and pedestrian facilities within the immediate vicinity of work performed. Any damage resulting from Contractor operations shall be remedied by the Contractor immediately with no additional compensation.

3.3 PRELIMINARY CLEANING, TELEVISING AND INSPECTION

A. The Contractor shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Contractor shall secure their own disposal site for all debris removed from the sewers. **The Contractor shall not pre-clean sewer lines more than 4 weeks prior to the installation of CIPP**. The Contractor shall also televise and pre-clean the sewer pipe on the day of the CIPP installation, just prior to the inversion of the liner. Pre-inspection and cleaning work must be reviewed and approved by the City Inspector prior to the installation of any liners.

B. Televising and inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit television. The interior of the pipeline shall be carefully inspected and documented with the location of any conditions that may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected.

C. The Contractor shall notify the Owner or Engineer of any obstructions or other defects (protruding service connection, offset joint, pipe collapse, etc.) unable to be removed by conventional sewer cleaning equipment that may compromise the installation, performance or service life of the CIPP liner. The Engineer will evaluate each defect and determine the required correction methods. The Owner may choose to have the Contractor make a point repair excavation to uncover and remove or repair the defect. Such excavation shall be considered as a separate pay item and will be negotiated once the work is better defined.

3.4 PUBLIC NOTIFICATION

A. Prior to preliminary cleaning and televising operations:

1. The Owner/City shall coordinate and distribute public notices ahead of cleaning and televising operations.

B. At least (7) days before beginning lining operations:

1. The Contractor shall provide a written notice to impacted properties including the following information:

   (a) Proposed lining locations and schedule.

   (b) Description of proposed lining operations including information on anticipated service disruptions and other inconveniences.

   (c) Contact information for City Project Representative and Contractor.

2. Written notice must be given to the adult residents of buildings, and to the owner or administrator of any property directly served by the sewer to be lined.

3. The notice must be mailed or hand delivered to the owner or administrator of a child care building, school building, commercial business, and/or industry.

4. The notice may be put on or under the door of each residence, one notice for each single-family building and one notice for each unit of a multi-unit building.

5. The Owner/City shall receive a copy of any written notices prior to distribution to impacted properties

C. At least twenty-four (24) hours prior to CIPP installation:

1. The Contractor shall provide a written reminder notice to impacted properties including the following information:

   (a) Date and estimated timeframe of service disruption

   (b) Emergency contact information of City Project Representative and Contractor

3.5 CONSTRUCTION REQUIREMENTS

A. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F2019, Section 6.4 with the following additional requirements:

1. Resin Impregnation - The quantity of resin used for liner impregnation shall be sufficient to fill the volume of air voids in the liner 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. A roller system shall be used to uniformly distribute the resin throughout the liner.

2. Liner insertion shall be performed in accordance with manufacturer's recommendations and in such a way to fully extend the liner to its termination point, hold the liner tight against the pipe wall, and produce dimples at service connections and flared ends at maintenance holes. Lubricants may be used as necessary. Care shall be taken so as not to overstress the felt fiber.

3. Unless otherwise indicated in the plans or authorized in writing by the Engineer, steam curing and water curing shall be considered as an acceptable cure method for this project.

   (a) Steam Cure

      (1) After inversion is completed, suitable steam-generating equipment is required to distribute steam throughout the pipe.

      (2) The equipment should be capable of delivering steam throughout the section to uniformly raise the temperature within the pipe above the temperature required to effect a cure of the resin.

      (3) The temperature and pressure maintained in the pipe and the duration of the cure period shall be as recommended by the manufacturer.

      (4) The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

(5) Cooling:

1. The new pipe should be cooled to a temperature below 113 degrees Fahrenheit before relieving the internal pressure within the section.
2. Cool-down may be accomplished by the introduction of cool water into the section to replace the mixture of air and steam being drained from a small hole made in the downstream end.
3. Care shall be taken in the release of head so that a vacuum will not be developed that could damage the newly installed pipe.

(b) Circulated Heated Water Cure

(1) After inversion is completed, suitable heat source and water recirculation equipment are required to circulate heated water throughout the pipe.

(2) The equipment should be capable of delivering hot water throughout the section to uniformly raise the water temperature above the temperature required to effect a cure of the resin.

(3) The heat source should be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge should be placed between the impregnated tube and the pipe invert at the termination to determine the temperatures during cure.

(4) The temperature and pressure maintained in the pipe and the duration of the cure period shall be as recommended by the manufacturer.

(5) The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

(6) Cooling:

1. The new pipe should be cooled to a temperature below 100 degrees Fahrenheit before relieving the static head in the inversion stand pipe.
2. Cool-down may be accomplished by the introduction of cool water into the inversion stand pipe water to replace hot water being drained from a small hole made in the down-stream end.
3. Care shall be taken in the release of head so that a vacuum will not be developed that could damage the newly installed pipe.

B. The liner pipe shall be continuous, without joints over the entire length of the pipe. The liner shall be free of all visual and material defects, including but not limited to foreign inclusions, dry spots, pinholes, and delaminations. The surface shall be smooth and free of waviness throughout the pipe.

C. Any defects that will affect the structural integrity or hydraulic capacity of the reconstructed pipe shall be repaired or the liner shall be replaced at the Contractor's expense, including large radial or longitudinal wrinkles that occur in such a size as to reduce the thickness or nominal diameter of the finished CIPP product.

D. Hydrophilic end seals are required to seal the ends of each CIPP liner as it connects to the manhole. These seals will be installed prior to CIPP to prevent water tracking between the CIPP product and the existing host pipe.

E. CIPP Installation Temperature - The Contractor shall not install CIPP liner when air temperatures are below 0° F (-18° C) during working hours.

3.6 REINSTATEMENT OF SEWER SERVICE LATERALS

A. The Contractor shall certify possession of a minimum of two complete working cutter units plus spare key components on the site before each inversion.

B. Prior to installing the sewer liner (during the television process), the Contractor shall locate, dye-test and record the location of all sewer lateral connections that are in question. The Contractor shall immediately submit this information to the Owner. The Owner may assist in determining which, if any, sewer services are to be abandoned. Those services designated to be abandoned will not be reinstated.

C. After the sewer lining is complete, the Contractor shall re-establish all service connections except those designated by the Owner to be abandoned. This shall be done without excavation from the interior of the pipe by means of a television camera and a remotely controlled cutting device.

1. If the Contractor is unable to re-establish the service connection from inside the pipe and excavation is necessary, 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.

2. Reestablished service connections shall be clean and smooth, free of jagged edges and conform as closely as possible to the dimension of the existing service.

3. Brush style cutters or similar device will be required to ensure that the laterals are smooth for potential CIPP lateral lining.

D. Drop manhole assemblies as identified in the Plans or during construction shall be re-established by the Contractor following the completion of sewer lining in accordance with the methods described in this section. Measurement and payment of drop manhole assembly reinstatements shall be in accordance with the Lateral Reinstatement (per EACH) Bid Item.

E. The sewer main shall be lined prior to lining service laterals, unless approved otherwise by the Engineer.

3.7 INSPECTION

A. CIPP samples shall be prepared and tested in accordance with ASTM F1216, Section 8.1 using either method proposed.

B. Leakage testing of the CIPP shall be accomplished during cure while under a positive head. CIPP products in which the pipe wall is cured while not in direct contact with the pressurizing fluid (e.g., a removable bladder) must be tested by an alternative method approved by the Owner.

C. Visual observation of the CIPP shall be in accordance with ASTM F1216, Section 8.4.

3.8 CLEAN-UP

A. Upon acceptance of the installation work and testing, the Contractor shall clean-up the project area affected by the operations.

3.9 WARRANTY

A. All lining work shall be fully guaranteed by the Contractor for a period of 2 years from the date of Final Acceptance. During this period, all serious defects discovered by the Owner or Engineer shall be removed and replaced by the Contractor in a satisfactory manner at no cost to the Owner. In addition, the Owner may conduct independent televised inspections, at its own expense, of the lining work at any time prior to completion of the guarantee period.

******END OF SECTION******