

SECTION 02765

CIPP – GRAVITY LINES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. It is the intent of this specification to provide for the reconstruction of pipelines by the installation of a resin impregnated flexible tube which is formed to the original conduit and cured to produce a continuous and tight fitting Cured-In-Place Pipe (CIPP). Cured-In-Place Pipe shall be designed for gravity wastewater application.
- B. The Contractor shall furnish all labor, materials, accessories, equipment and tools necessary to install and test CIPP lining as shown on the Drawings and as specified herein. These services include, but are not limited to, cleaning and pre- and post-installation Closed Circuit Television Inspection (CCTV) of the sewers to be lined, diversion of flow, sewer grouting, removal of manhole frame, cover and steps for larger diameter installations; safe support and stabilization of CIPP installation platforms and devices; liner installation, end sealing, site restoration, quality controls, providing samples for performance testing, samples, the reinstatement of existing connections, warranty, etc.
 - 1. The cost of pre-CCTV inspection and cleaning (light or heavy) for CIPP work shall be paid for under separate items. See Section 01200 Measurement and Payment.
 - 2. Chemical grouting of sewers shall be paid for under separate items. See Section 01200 Measurement and Payment.
- C. Cured-in-place pipe lining is specified as an acceptable product for lining all sewers specified on the Drawings.

1.02 RELATED WORK

- A. Specification 02400 – Sewer Bypass Pumping
- B. Specification 02650 - Sewer Line Cleaning.
- C. Specification 02651- CCTV Inspection.
- D. Specification 02766 – Hydrophilic End Seals

1.03 SUBMITTALS

- A. Contractor shall make submittals as described herein
- B. After contract award, the following submittals are required:
 - 1. Documentation as outlined herein under paragraph 1.05 A, including installation references of projects that are similar in size and scope to this project. The submittal shall include, at a minimum, the client contacts name, phone number,

and the diameter and footage of pipe rehabilitated. Documentation for product and installation experience must be satisfactory to the Engineer.

2. The Contractor shall submit design calculations, design data and specification data sheets listing all parameters used in the CIPP design and thickness calculations based on ASTM F1216 for "fully deteriorated gravity pipe conditions." All CIPP liner design calculations shall be sealed and signed by a registered professional Engineer in the State of Virginia. Submit P.E. certification form for all CIPP design data.
3. Submit detailed installation plan and schedule to be coordinated and approved by Owner and Engineer. This plan shall describe all preparation work, cleaning operations, pre-CCTV inspections, control and diversion of sanitary sewer flows, lining production schedule and location, shipping and storage requirements, liner curing procedures including method and heat-up/cool-down rates, curing temperature and duration, final CCTV inspection, and testing procedures. Detailed design calculations are specified herein under paragraph 2.01.K.
4. A detailed description of the proposed procedures for removal of any existing blockages in the pipeline that may be encountered during the cleaning process.
5. Product data on fabric tube, fiberglass laminate, end seal, flexible membrane, resin, etc.

C. After installation of the liner, the flowing submittals are required:

1. Curing log, including temperatures, pressures, and times during the curing process to document that a proper cure has been achieved. Curing log is to be submitted immediately after the curing is complete for each line segment that is rehabilitated.
 - a. Documentation as specified herein for the Cure Report under Paragraph 3.01 Q.
2. Various test results as specified herein under paragraph 3.01 R.
3. Documentation as specified herein for the Television Survey under Paragraph 3.01 B and 3.03 B.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D638 – Test Methods for Tensile Properties of Plastics.
2. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
3. ASTM D2412- Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
4. ASTM D2990 – Standard Test Methods for Tensile, Compressive and Flexural Creep and Creep Rupture of Plastics.

5. ASTM D5813 – Standard Specifications for Cured-in-Place Thermosetting Resin Sewer Piping Systems.
6. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
7. ASTM F1743 –Rehabilitation of Pipelines by Pulled-in-Place Installation of a Cured-In-Place Thermosetting Resin Pipe.
8. ASTM F2019 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

A. The Contractor performing the CIPP lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer. Only commercially proven products and installers with substantial track records will be approved. In addition, the Contractor shall verify they meet the following requirements:

1. The Contractor, as a firm, shall have successfully installed a minimum of 200,000 feet of the proposed liner, using the methods and materials proposed for this work, as documented by verifiable references.
2. The Contractor, as a firm, shall have successfully installed a minimum of 5,000 feet of similar diameter (up to 24") and using the specific method of installation and curing used.
3. The Contractor's proposed Superintendent shall have a minimum 3 years of experience and have successfully installed a minimum of 50,000 feet of the proposed liner using the methods and materials proposed for this work as supported by Engineer references.
4. The Contractor shall submit the number of years of experience in installing CIPP lining.
5. The Contractor shall submit the name of the CIPP lining manufacturer and supplier for this work and previous work listed below.
6. The Contractor shall submit a certified statement from the manufacturer that he/she is a certified and/or licensed installer of the CIPP lining.
7. The Contractor shall submit a minimum of three municipal clients that the Contractor has performed this type of work for, including names, phone numbers, linear footage, and a description of the actual work performed.

- B. The Contractor shall also be capable of providing crews as needed to complete the work without undue delay.
- C. The Engineer or Owner shall approve or disapprove the Contractor and/or manufacturer based on the submitted information and a follow up interview, if warranted.
- D. Inspection of the liner may be made by the representative of the Owner after delivery. The liner shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.06 GUARANTEE

- A. All CIPP lining placed shall be guaranteed by the Contractor and manufacturer for a period of one (1) year from the date of final acceptance. During this period, defects discovered which affect the integrity or strength of the pipe shall be repaired in a manner mutually agreed upon by the Owner and Contractor at no cost to the Owner. The Owner may conduct an independent television inspection, at his own expense, of the lining work prior to the completion of the one-year guarantee period.
- B. Any repair work completed by the Contractor to replace a defective or failed lining shall be warranted for an additional one (1) year from the date of acceptance of repaired work. Repair work shall be completed as specified in paragraph 3.02.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and storage to avoid damaging the liner. Extra care shall be taken during cold weather construction. The liner shall be accompanied by test reports certifying that the material conforms to the ASTM standards listed herein.
- B. Any liner damaged in shipment shall be replaced as directed by the Inspector. Damages include, but are not limited to, splits or tears, gouging, abrasions, flattening, ultra-violet (UV) degradation, and puncturing. Liners which have received damage shall be marked as rejected and removed at once from the job site.
- C. The liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. The liner shall be protected from UV light prior to installation. Any liner showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

PART 2 -- PRODUCTS

2.01 CIPP LINING

- A. CIPP lining shall be Insituform by Insituform Technologies, Inliner by Inliner Technologies, Premier Pipe by JWM Environmental, Invert-a-pipe by Improved Technologies Group (Jones Brothers), or an approved equal.
- B. The liner shall be composed of tubing material consisting of one or more layers of flexible non-woven polyester with or without additives such as woven fiberglass or other fibers. The

felt tubing shall be impregnated with a thermosetting polyester resin and catalyst, vinyl ester and catalyst or epoxy resin and hardener. The liner material and resin shall be completely compatible. The outside layer of the tube (before wetout) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wetout) procedure.

- C. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe within a pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit, eliminating infiltration or exfiltration.
- D. All dimensions shall be field verified by the Contractor by CCTV video observation and direct measurement of pipes prior to ordering the liner to ensure adequate sizing requirements for each individual pipe segment. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized. The tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 feet. Such marking shall include the Manufacturer's name or identifying symbol. The tubes shall be manufactured in the USA.
- E. The wetout tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness. 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. The liner shall be able to cure in the presence of water at a temperature of 180 degrees F or less. Steam curing of liners shall be allowed.
- F. The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
- G. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 or ASTM F2019 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.
- H. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin shall be used in non-industrial areas.
- I. The length of the liner shall be the length deemed necessary by the Contractor to effectively carry out the insertion of the liner and sealing of the liner at the outlet and inlet manholes.

The required length of liner shall be verified in the field by the Contractor prior to fabrication and preparation for installation.

J. All CIPP liners shall be provided with hydrophilic end seals, as specified in Specification 02766, installed at both the manhole interfaces.

K. The CIPP shall be designed in accordance with the applicable provisions of ASTM F1216 and D2412 for “fully deteriorated gravity pipe conditions” and shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life, which shall meet the following design conditions:

1. Have a minimum design life of fifty (50) years.
2. AASHTO H-20 Live Load with two trucks passing for CIPP in streets.
3. A soil modulus of elasticity of 700 psi shall be used. A soil weight of 120 pounds per cubic foot and a coefficient of friction of $Ku \sim 0.130r$ shall be used for the installed depths.
4. The long-term flexural modulus used in the design calculations shall be estimated by multiplying the short-term flexural modulus specified in the ASTM standards by a reduction factor of 0.50.
5. Safety factor of 2.0 shall be used.
6. Groundwater levels shall be estimated to be at the ground surface.
7. Depth of soil shall be above crown of pipe to surface.
8. Service temperature range shall be 40 to 150 degrees F.
9. Maximum long-term deflection shall be 5 percent.
10. The liner shall be watertight.
11. The existing pipe conditions shall be reflected in the design of the liner thickness. In particular, the ovality of the existing pipe and, thus, the liner pipe shall be accurately estimated and reflected in the design calculations.
12. The thickness to be used for the liner shall be the largest thickness as determined by calculations for deflection, bending, buckling, and minimum stiffness.
13. The cured liner shall have the following minimum structural properties:

Property	Test Method	Minimum Standard
Flexural Strength	ASTM D790	4,500 psi
Flexural Modulus	ASTM D790	250,000 psi

- L. Chemical seal grout of sewers shall have the following properties:
 - 1. Chemical seal grout shall react quickly to form a permanent watertight seal.
 - 2. Grout shall have controllably reaction times from 10 seconds to 1 hour.
 - 3. Resultant seal shall be flexible and immune to the effects of wet/dry cycles.
 - 4. Chemical seal grout shall be non-biodegradable and immune to the effects of acids, alkalis, and organics in sewage.
 - 5. Extraneous sealant left inside pipe shall be readily removable.
 - 6. Chemical seal grout shall be compatible with the CIPP liner resin system utilized.
 - 7. Sealing grout shall be furnished in liquid form in manufacturer's standard containers. Sealing grout shall be manufactured by De Neef, Avanti, or Engineer-approved equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Submittals: All requisite pre-installation submittals shall be accepted or approved prior to scheduling materials delivery or installation.
- B. Sewage flow shall be removed from each pipe to be rehabilitated via bypass. Maintenance of sewage flow shall occur in accordance with 3.01C. Each length of pipe to be lined shall be cleaned prior to liner installation, with material to be disposed of in a manner approved by the Owner. Cleaning and disposal shall occur as specified in Section 02650 – Sewer Line Cleaning.
- B. In the presence of the Engineer, the Contractor shall conduct a television inspection and physical measurement of each length of pipe, as specified in section 2.01D. Contractor shall also conduct a CCTV inspection immediately prior to inserting the liner to confirm that conditions are acceptable for lining. Contractor shall obtain Engineer approval of the acceptability of the existing pipe condition prior to installation of CIPP.
- C. The Contractor shall maintain bypass of sewage flows as required to prevent sewage overflows, ensure that no flowing sewage comes into contact with sections of the sewer under repair, and to prevent damage to upstream facilities due to the pipe rehabilitation work. The Contractor is responsible for accommodating all existing wastewater flows during lining operations. All bypass pumping shall be in accordance with specification section 02400 Sewer Bypass Pumping.
- D. The Contractor shall present to the Owner, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner

stopped by snagging within the pipe. This information shall be rendered to the Owner in a timely fashion prior to the preconstruction conference.

- E. The Contractor shall immediately notify the Owner of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the Owner's discretion. The cost of such test shall be borne by the Contractor and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the Owner's discretion.
- F. The Contractor shall submit construction schedules for advance approval by the Owner to coordinate necessary plant operations.
- G. The materials and processes must be reasonably available for pre installation, installation and post installation inspections. Areas which require inspection include, but are not limited to, the following:
 - 1. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.
 - 2. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.
- H. Furnish and install the liner in the full length of sewer as shown on the Drawings. The installation of the liner shall be in complete accordance with the applicable provisions herein and the manufacturers' installation requirements.
- I. The Contractor shall submit "wet out" and "cure" reports documenting the specific details of the liner's vacuum impregnation and saturation with resin and the CIPP installation of the liner. A report shall be generated for each liner installation. A copy of all "wet out" and "cure" records shall be made available to the Owner upon request and shall be turned over to the Owner on a weekly basis and prior to request for payment. If the "wet out" and "cure" reports are not presented prior to a payment request for a repair work order, payment for the work will not be made and the request will be rejected. At a minimum, this report shall include, in addition to Contractor and Contract identification:
 - 1. Line identification and location
 - 2. Wet-out date
 - 3. Sample identification(s) and technician
 - 4. Installation (in sewer) date
 - 5. Host sewer pipe inside diameter
 - 6. Liner thickness
 - 7. Liner length

8. Liner and resin batch numbers
 9. Resin type
 10. Wet out length
 11. Roller spacing
 12. Vacuum setting
 13. Quantity of resin and catalyst utilized
 14. Wet out technicians
 15. Time wet out started and completed
 16. Applicable remarks
 17. (Heat cure) Boiler and liner heating fluid pressure and temperature versus time log during cure period
- J. 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, resin bath, or approved equal 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.
- K. Tube Insertion: The wetout 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.
- L. Temperature gauges shall be placed inside the tube at the invert level of each end, or throughout its length, to monitor the temperatures during the cure cycle.
- M. Curing shall be accomplished by utilizing the appropriate medium in accordance with the manufacturer's recommended cure schedule. The curing source or in and output temperatures shall be monitored and logged during the cure cycles if applicable. The manufacturer's recommended cure method and schedule shall be used for each line segment installed, and the liner wall thickness and the existing ground conditions with regard to temperature, moisture level, and thermal conductivity of soil, per ASTM as applicable, shall be taken into account by the Contractor.

- N. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard and sound and the temperature sensor indicates that the temperature is of a magnitude to realize exothermic reaction. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The Contractor shall have on hand at all times, for use by his personnel and the Owner, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.
- O. Cool down: The Contractor shall cool the hardened pipe to a temperature below 100 F before relieving the hydrostatic head. Cool down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.
- P. Finish: The new pipe shall be cut off in the manhole at a suitable location. All CIPP liners shall be provided with hydrophilic end seals, as specified in Specification 02766, installed at both the manhole interfaces. End seals shall be installed per manufacturer's instructions. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination and lifts. Pipe entries and exits shall be smooth, free of irregularities, and watertight. No visible leaks shall be present, and the Contractor shall be responsible for grouting to remove leaks or fill voids between the host pipe and the liner. During the warranty period, any defects which will affect the integrity or strength of the product shall be repaired at the Contractor's expense, in a manner mutually agreed upon by the Owner and the Contractor.
- Q. For every segment of liner installed, the Contractor shall generate a report that documents installation, including sewer identification, date, time, weather conditions, boiler and liner heating fluid pressure and temperature versus time log during cure period, cool down report, etc. The reports shall be submitted to the Engineer prior to requesting payment.
- R. Testing of samples shall be the responsibility of the Contractor. Where the diameter is greater than 15-inches, a plate sample shall be prepared. The test sample shall be fabricated from the material taken from the liner and cured in a clamped mold with the resin used in the liner construction placed in the down tube. Representative specimens from all installed liners are to be tested by an independent, ASTM certified laboratory. All test samples shall be clearly identified with the location, date of installation, and project name. The extraction and labeling of test specimens shall be done in the presence of the Owner. The Owner and Contractor shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.

Each sample shall be large enough to provide at least five total specimens for testing of thickness and for flexural properties specified in Paragraph 2.01L per the following standards and procedures:

Thickness	ASTM D5813
Initial Flexural Strength	ASTM D790 Procedure A

All samples shall be prepared in accordance with ASTM F1216.

Results of the tests for each liner shall be mailed directly to the Owner within 30 days after the liner is installed.

3.02 REPAIR AND REPLACEMENT

- A. The Contractor shall outline specific repair or replacement procedures for potential defects that may occur in the installed CIPP. Repair and/or replacement procedures shall be as recommended by the CIPP system manufacturer.
- B. Defects in the installed CIPP that will not affect the operation and long-term life of the product shall be identified, defined, and submitted to the Owner for review and acceptance.
- C. Repairable defects shall be clearly defined and presented to the Owner by the Contractor along with a detailed step-by-step repair procedure, based on manufacturer's recommendations, resulting in a finished product meeting the requirements specified herein.
- D. Unrepairable defects shall be clearly defined and presented to the Owner by the Contractor, including a recommended procedure for the removal and replacement of the CIPP, based on the manufacturer's recommendations.

3.03 FIELD TESTING AND PRELIMINARY ACCEPTANCE

- A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, etc. No pinholes, cracks, thin spots, dry spots, or other defects in the liner will be permitted. There shall be no visible infiltration through the liner or from behind the liner at manholes and service connections.
- B. Following installation of the liner, the Contractor shall conduct a final digitally recorded color television inspection of the completed work. Copies of these post-installation digital recordings, as well as the digital recordings made prior to the liner installation shall be submitted to the Engineer for approval and shall be retained by the Engineer. Payment will not be made for any CIPP lining until the Engineer has reviewed and approved these digital recordings. The Contractor shall submit the CD or DVD disks a minimum of two weeks in advance of any payment request to provide the Engineer ample time to review the recordings.
- C. There shall be no dry spots, lifts, ridges, splits, cracks, uncured resin, delaminations or other defects in the CIPP lining. Wrinkles in the finished liner that cause significant backwater, reduce the pipe's hydraulic capacity or structural stability or that create voids between the liner and pipe wall will be unacceptable. Defective lining will be removed and the pipe re-lined at no additional cost to the Engineer. If during the removal process, the host pipe is damaged, Contractor will perform a point repair at Contractor's own expense.
- D. Groundwater infiltration through the liner shall be zero. Leakage testing of the CIPP liner shall be accomplished during cure while under a positive head.
 - 1. Leakage shall be confirmed by three methods.

- a. After the line has been lined, but before the services have been reinstated, perform exfiltration testing in accordance with section 8.2 of ASTM F 1216.
 - b. After the sewers have been lined, CCTV shall confirm leakage free around the laterals.
 - c. A visual inspection shall be performed around the liner to manhole interface to confirm no leakage between the CIPP liner and host pipe.
- E. Preliminary acceptance of CIPP lining shall be based on the Engineer's evaluation of the installation and curing data, results of air testing where required, and review of the TV digital recordings.

3.04 FINAL ACCEPTANCE

- A. Final acceptance of the liner shall be based on the preliminary acceptance of the liner by the Engineer in Section 3.03 and on the results of the certified laboratory tests on the liner specimens in Section 3.01.
- B. Liners meeting or exceeding the certified thicknesses and specified strengths, as evidenced by the certified laboratory testing results, shall be paid for in full according to the contract unit rate for the finished diameter per linear foot.
- C. The Owner reserves the right to perform a follow up CCTV inspection one year following the installation of a CIPP repair. Should any defect be found with the repair, the defect shall be corrected as specified by the Owner. Correction may include complete removal and renewal of the previously installed repair and re-inspection one year later. Correction of failed CIPP or CIPP deemed defective from in-warranty internal condition inspection or test reports for structural values, thickness, etc., shall be repaired or replaced at no extra cost to the Owner.

3.05 CLEANUP

- A. After the liner installation has been completed and accepted, the Contractor shall cleanup the entire project area and return the ground cover to the original or better condition. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor.

- END OF SECTION