



CONTRACT DATA SHEET

Monroe County Division of Purchasing
200 County Office Building, Rochester NY 14614

TITLE: CURED-IN-PLACE PIPELINING TERM
CONSTRUCTION CONTRACT (TCC#7)

CONTRACT #: 1207-20 (7700000049)

CONTRACT DATES: 01/01/2021 – 12/31/2025

BUYER: SEAN WILCOX
PHONE: 585/753-1136
EMAIL: swilcox@monroecounty.gov

VENDOR(S): KENYON PIPELINE INSPECTION, LLC
68 PARK ROAD
QUEENSBURY, NY 12804

CONTRACT RENEWAL

THIS CONTRACT RENEWAL ("Renewal #4"), which shall be deemed to be dated as of the date the last party executed this agreement, by and between the COUNTY OF MONROE, a municipal corporation located at 39 West Main Street, Rochester, New York, 14614, hereinafter referred to as the "COUNTY," and **Kenyon Pipeline Inspection, LLC**, with offices located at 68 Park Road, Queensbury, NY, 12804, hereinafter referred to as the "CONSULTANT."

WITNESSETH:

WHEREAS, the parties hereto previously entered into an Agreement dated as of February 4, 2021 (the "Agreement"), whereby the CONSULTANT agreed to provide the following services or project for the as set forth in the Agreement: **Cured-In-Place Pipelining Term Construction Contract (TCC#7)**; and

WHEREAS, the parties previously renewed the Agreement ("Renewal #1"), dated December 6, 2021, ("Renewal #2"), dated February 1, 2023, and ("Renewal #3"), dated January 31, 2024; and

WHEREAS, the parties wish to renew the Agreement for an additional term in accordance with Article 2 of the Agreement.

NOW, THEREFORE, it is mutually agreed by the parties as follows:

1. The contract shall be renewed for the period of **January 1, 2025** through **December 31, 2025**.
2. The contract amount for the renewed term will be of a sum not to exceed SEVEN HUNDRED AND FIFTY THOUSAND AND 00/100 DOLLARS (**\$750,000.00**).
3. The supplemental Fee Schedule for the renewal period is attached hereto and incorporated herein.
4. All other terms and conditions of the original Agreement shall remain in full force and effect.

IN WITNESS THEREOF, Colleen D. Anderson, Purchasing Manager of the COUNTY OF MONROE, and Jake Kenyon, CEC of Kenyon Pipeline Inspection, LLC, hereto have executed this Renewal #4 as of the day and year appearing opposite their respective signatures below. By electronically approving this Renewal, both parties agree to all terms and conditions listed in the Renewal document, as well as all attachments included with the document.

FORM OF CONTRACT

TERM CONSTRUCTION CONTRACT

THIS CONTRACT which shall be deemed to be dated as of the date the last party executed this Contract, by and between the County of Monroe, a municipal corporation located at 39 West Main Street, Rochester, New York 14614, hereinafter referred to as the "OWNER," acting and by and through its ROCHESTER PURE WATERS, IRONDEQUOIT BAY - SOUTH CENTRAL PURE WATERS, NORTHWEST QUADRANT PURE WATERS, and GATES-CHILI-OGDEN PURE WATERS DISTRICTS hereinafter referred to as the "DISTRICTS", located at 50 W. Main St., Rochester, NY 14614, and **Kenyon Pipeline Inspection, LLC** with offices at 68 Park Road, Queensbury, New York, 12804, hereinafter referred to as the "CONTRACTOR."

WITNESSETH, that the CONTRACTOR and the OWNER, for the considerations hereinafter named, agree as follows:

ARTICLE 1 - REQUIRED STANDARD CLAUSES FOR COUNTY CONTRACTS

Appendix "A" contains the standard clauses for all Monroe County contracts and is attached hereto and is hereby made a part of this Agreement as if set forth fully herein.

ARTICLE 2 - CONTRACT TERM

The Contract shall extend from **January 1, 2021** through **December 31, 2021** with the option to extend for four (4) additional one (1) year periods at the mutual consent of both parties.

ARTICLE 3 - SCOPE OF WORK

The **Cured-In-Place Pipelining Term Construction Contract (TCC#7)** consists principally of the furnishing of all equipment, superintendence, labor, skill and material and all other items necessary for the rehabilitation of sewers and appurtenances using Cured-in-Place Pipelining (CIPP), as defined in the CONTRACTOR's Bid Proposal, attached as Appendix B, at locations directed by the OWNER via Purchase Order(s).

All of the following which were supplied as part of the Bidding Documents, and which Documents are hereby made a part of this Contract, if applicable:

- (a) Drawings.
- (b) Notice to Bidders, Instructions to Bidders, and the Proposal.
- (c) Contract forms consisting of the Contract, Appendix A (Standard Clauses for County Contracts), and the bonds.
- (d) The General Conditions and Special Conditions.
- (e) The Technical Specifications.
- (f) Any supplemental information included with the Bidding Documents.
- (g) Any and all Addenda.

ARTICLE 4 - THE CONTRACT SUM

A. The OWNER shall pay to the CONTRACTOR for the performance of this term Contract, subject to additions and deductions and the adjustment of final quantities as provided herein, an annual amount not to exceed SEVEN HUNDRED AND FIFTY THOUSAND AND 00/100 DOLLARS (**\$750,000.00**) all in accordance with the CONTRACTOR's Proposal attached hereto and made a part hereof.

B. The OWNER is exempt under Section 1116 of the Tax Law and therefore, no sales tax shall be included in the bids.

ARTICLE 5 - PURCHASE ORDERS

A. A PURCHASE ORDER is defined as the written authorization by the OWNER to the CONTRACTOR to perform a defined quantity of work, as defined in Article 3 of this Agreement.

B. No Work shall be performed until a written Purchase Order has been issued by the OWNER to the CONTRACTOR. Any work performed by the CONTRACTOR prior to the receipt of the Purchase Order shall be at the CONTRACTOR's own risk.

C. Work will be authorized through one or more Purchase Orders. Each individual Purchase Order shall not total more than One Hundred Thousand Dollars (\$100,000).

D. Each Purchase Order will describe the location, size, and estimated quantity of pipe and appurtenances to be rehabilitated, with a total estimated price for performing the work.

E. The work to be completed under each Purchase Order shall commence within ten (10) days after the written authorization of Purchase Order.

F. The entire Purchase Order shall be completed within the time stipulated in the Purchase Order. If the time stipulated in the Purchase Order extends beyond the time of the Contract, the Contract shall be extended to the completion date of the Purchase Order.

ARTICLE 6 - PAYMENTS

A. Payments for the work performed under each Purchase Order of the Contract will be made by the OWNER to the CONTRACTOR based on the terms and conditions stated in the Agreement.

B. At least five (5) days before the submission of application for payment, the CONTRACTOR shall furnish to the OWNER a complete breakdown of all work performed. This breakdown, when approved, will be used as a basis for preparing an approvable invoice for payment. The CONTRACTOR shall furnish a Monroe County Claim Voucher with each application for payment.

C. Payments shall be calculated based on multiplying the quantity of the work performed, times the unit pricing submitted in the CONTRACTOR's Bid Proposal (Appendix B), or cost plus fifteen percent (15%) for general overhead and profit, or a negotiated price, or any combination thereof.

D. The CONTRACTOR shall provide the closed circuit televising video/digital recording of the improvements completed prior to submission of the Contractor's payment application or invoice for the Purchase Order.

E. Neither the final payment nor any partial payment shall constitute acceptance of any defective workmanship or material, or noncompliance with the Contract Documents.

ARTICLE 7 - ACCEPTANCE AND GUARANTEE OF WORK

A. Upon completion of the work under a Purchase Order, the OWNER shall approve all of the work done and shall, within fifteen (15) days of approval, prepare a final certificate of work done and the value thereof. The OWNER shall upon approval of the final certificate and the application for payment, including a Monroe County Claim voucher submitted by the CONTRACTOR, promptly pay the CONTRACTOR the entire sum due after deduction of all previous payments and amounts to be kept and retained under provisions of this Contract. All prior payments shall be subject to correction in the final estimate and payment.

B. Before issuance of the final certificate, the CONTRACTOR shall submit evidence satisfactory to the OWNER that all payrolls, material bills and other indebtedness connected to the work have been paid.

C. The CONTRACTOR shall guarantee the work accomplished under this Contract for a period of one year from the date of issuance of final certificate for a Purchase Order. The guarantee period shall be considered as work remaining to be completed under this Agreement and shall have a value of one percent (1%) of the final Purchase Order amount during the Guarantee Period. During the Guarantee Period, twice the value of the guarantee (i.e., two percent (2%) of the contract Purchase Order amount) shall be retained by the OWNER.

D. Upon expiration of the guarantee period, the CONTRACTOR shall submit an invoice for approval to the OWNER for final payment, which shall include any and all monies due to the CONTRACTOR, including the

amount withheld during the guarantee period. All prior partial payments shall be subject to correction in the final invoice and payment.

ARTICLE 8 - BRAND REFERENCE

A. Reference to a manufacturer's product by brand name or number with the CONTRACTOR's Bid Proposal, attached as Appendix B, is done solely to establish the minimum quality and performance characteristics required. Alternates that are proposed must have a sufficient operating track record to demonstrate that the equipment will perform as well as the specified brand. The acceptance of a CONTRACTOR'S alternate rests solely with the OWNER.

ARTICLE 9 - MATERIALS

A. The furnishing of all materials shall be the responsibility of, and paid for by the CONTRACTOR.

B. All materials shall be new and unused and shall be essentially the standard product of a manufacturer regularly engaged in the production of such material. The OWNER reserves the right to reject any material or supplier who, although he meets the above requirements, does not provide satisfactory evidence indicating availability and prompt delivery of materials. Items of any one type of material shall be the product of a single manufacturer or supplier. All materials or equipment delivered to the site shall be accompanied by certificates, signed by an authorized officer of the manufacturing company, guaranteeing that the materials conform to Specification requirements. Such certificates shall be immediately turned over to the OWNER. Materials delivered to the site without such certificates will be subject to rejection.

C. Prior to award of the Contract and within forty-eight (48) hours of request by the OWNER, the CONTRACTOR shall furnish for approval the identification of the materials to be used and all samples and testing data as required by the technical specification. The submittal shall include the identification of the availability of all materials. Work shall be in accordance with the approved materials.

D. The CONTRACTOR shall have the full continuing responsibility to install all materials supplied and purchased, to protect the same, to maintain them in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the OWNER until such time as the work covered by the Contract is fully accepted by the OWNER.

ARTICLE 10 - INSURANCE

This article supersedes "Section 2. Insurance" in the Standard Clauses for County Contracts referenced in Article 1.

A. The CONTRACTOR shall secure and maintain for the entire length of the Contract, including the guarantee period, insurance policies, protecting the CONTRACTOR and his Subcontractors, including their officers, officials, employees and agents, from claims for bodily injuries, death or property damage which may arise from operations under this Contract whether such operations be by himself or by any Subcontractor or anyone employed by them directly or indirectly. The following occurrence-based insurance policies with insurance companies authorized to do business in New York State are required:

(1) Statutory New York State Worker's Compensation and Disability insurance.

(2) General Liability Insurance; occurrence form; single limits of liability \$1,000,000; aggregate limits of liability in a minimum amount of \$3,000,000. This coverage may be in the form of a single policy or a basic policy plus umbrella coverage. This coverage shall include CONTRACTOR'S Protective Liability covering operations of Subcontractors and CONTRACTOR whose work encompasses storage of use of explosives shall provide evidence of blasting coverage. If any of the rating classifications embody property damage exclusions X (explosion), C (collapse) or U (underground), coverage eliminating such exclusions must be provided with same limits. Original certificates and endorsements evidencing such coverage shall be delivered to the County before final execution of this Agreement.

(3) Contractual Liability covering Hold Harmless Clause.

(4) Automobile Liability and Property Damage coverage for owned, non-owned, and hired vehicles. (Bodily Injury \$1,000,000 each person, \$1,000,000 each accident; Property Damage \$1,000,000 each accident), or a combined single limit policy of \$1,000,000 (bodily injury and property damage).

(5) All Risk Builders Risk or All Risk Installation Floater, as appropriate, in an amount equal to one hundred percent (100%) of the amount of the Contract, specifying the OWNER as Named Insured.

(6) CONTRACTOR whose Contract encompasses hazardous material work in any part shall provide a certificate evidencing insurance coverage of such work on an occurrence basis. Insurance policies excepting coverage for hazardous materials are not acceptable.

B. All insurance carriers for the policies of insurance required herein must carry an "A" or better BEST rating.

C. The County of Monroe and the OWNER if different than the County, its officers, officials, employees, agents and CONSULTANT must be named as an Additional Insured on the CONTRACTOR's General Liability and Automobile Liability policies, and on any Excess/Umbrella policies if required to meet the minimum liability thresholds. The policy(ies) must be endorsed by the insurance carrier to authorize the additional insured designations. The CONTRACTOR's coverage shall be specified as primary.

D. Certification of such insurance shall be filed with the OWNER and CONSULTANT prior to Contract signing and shall be subject to approval for adequacy of protection. Said certificates of insurance shall contain a thirty (30) day written notice of cancellation in favor of the OWNER. The evidence of coverage required therein shall be provided on the County's certificate form or an ACORD form.

E. The above outlined insurance requirements are the minimum during construction.

F. During the guarantee period, CONTRACTOR may furnish completed operations liability insurance in a minimum amount of \$1,000,000 each occurrence, \$3,000,000 aggregate in lieu of the coverage required by paragraph a. above. Prior to the release of the semi-final payment, the CONTRACTOR shall provide a certificate of insurance for this coverage which may not be canceled prior to the end of the guarantee period.

ARTICLE 11 - RIGHTS OF OWNER

OWNER'S failure to exercise any of its rights under this Contract, including its right to terminate the work or to withhold payment, shall not constitute a waiver by the OWNER of any such rights. No inference of waiver of any option or right of the OWNER shall be drawn from OWNER's failure to enforce such rights or CONTRACTOR's failure to complete any portion of the work in accordance with any interim date, final date or any other deadline agreed upon as part of the project construction schedule. CONTRACTOR shall remain liable for any damages arising from its failure to perform in accordance with the schedule, notwithstanding any action or failure to act by OWNER, including but not limited to any delay in or failure to: terminate the Contract; send any notice to the CONTRACTOR; or to take any action required or permitted by OWNER under this Contract.

ARTICLE 12 - OWNER'S RIGHT TO TERMINATE AND/OR COMPLETE CONTRACT

Should the CONTRACTOR become insolvent, or should he refuse or neglect to perform the work in a proper manner and as directed by the OWNER, or otherwise fail in the performance of any of his obligations under this Contract, and Surety after proper request fails to complete the Contract, then the OWNER, upon the certificate of the CONSULTANT that sufficient cause exists to justify such action, and after giving the CONTRACTOR and his Surety seven (7) calendar days written notice, may, without prejudice to any other right or remedy, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient. In such cases, no further payment shall be made to the CONTRACTOR until the work is completed, at which time, if the unpaid balance of the Contract price shall exceed the expense of finishing the work, such excess shall be paid to the CONTRACTOR. Should such expense exceed the unpaid balance, the CONTRACTOR and his Surety shall pay the difference to the OWNER. The OWNER shall audit and certify the expense incurred by him in finishing the work and the damage incurred through the CONTRACTOR'S fault.

ARTICLE 13 - DISPUTE RESOLUTION

In an effort to resolve any conflicts that arise during the term of this Contract or following the completion of Work, the OWNER and the CONTRACTOR agree that all disputes between them arising out of or relating to this Contract shall first be submitted to non-binding mediation unless the parties mutually agree otherwise. After direction by the CONSULTANT to proceed with the disputed work, and throughout the mediation procedures, the CONTRACTOR shall diligently proceed with the performance of the Contract and in accordance with all instructions of the CONSULTANT.

The OWNER and the CONTRACTOR further agree to include a similar mediation provision in all contracts with independent contractors, subcontractors and subconsultants retained for the project and to require all independent contractors, subcontractors and subconsultants also to include a similar mediation provision in all contracts with subcontractors, subconsultants, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those contracts.

ARTICLE 14 - OTHER AGENCIES

The CONTRACTOR(S) must honor the prices, terms and conditions of this contract with political subdivisions, school districts, fire districts or other district or public authority located entirely or partly within Monroe County. Usage of this contract by any of these other political subdivisions or agencies or corporations will have to be coordinated between that subdivision or agency or corporations and the CONTRACTOR. Orders placed against this contract between any subdivision or agency or corporation will be contracts solely between the CONTRACTOR(S) and those entities. Monroe County will not be responsible for, nor will it have any liability or other obligation for, such contract between the CONTRACTOR(S) and any third party.

IN WITNESS WHEREOF, Colleen D. Anderson, Purchasing Manager of the COUNTY OF MONROE, and Jake Kenyon, CEO of Kenyon Pipeline Inspection, LLC hereto have executed this Contract as of the day and year appearing opposite their respective signatures below. By electronically approving this Contract, both parties agree to all terms and conditions listed in this Contract, as well as all attachments included with the Contract.

SECTION 01 01 01

GENERAL PROVISIONS

PART 1 – GENERAL

1.01 GENERAL

- A. The provisions of Section 200 through 700 and any subsections in Section 100 which are included as part of the requirements in Sections 200 through 700 of the New York State Department of Transportation Specifications or latest revision and all addenda in effect on the date of advertising for bids shall apply except as amended by the City of Rochester, Department of Environmental Services, Standard Construction Contract Documents, November 1991 or latest revision, and where modified by these Specifications.

1.02 SCOPE OF WORK

- A. Cured-In-Place Pipelining (CIPP) Term Construction Contract (TCC #7) includes furnishing all equipment, superintendence, labor, skill and material (except as noted herein), and all other items necessary for the rehabilitation of sewers and appurtenances using CIPP means and methods in the County or in the Districts at multiple locations within the project limits.
- B. The Project limits are Monroe County and the Pure Water sewer districts in Monroe County, New York.
- C. The principal features of work is the installation of CIPP for the rehabilitation of sanitary, storm, combined sewers and laterals, for four inch (4") to thirty-six inch (36") diameter pipe by insertion of a thin walled, resin impregnated polyester felt tube into existing sewer pipe, which is then conformed to the inside of the existing pipe and lateral and cured into permanent position. This description is general only and shall not be construed as a complete listing of every item of work required.
- D. The CONTRACTOR shall perform all work required for such construction in accordance with the drawings and specifications and as outlined in each individual Purchase Order, and subject to the terms and conditions of the contract, complete and ready for use.
- E. The furnishing of all materials and work shall be the responsibility of and paid for by the CONTRACTOR.
- F. In addition, this Contract may be utilized by other agencies within Monroe County as identified in Article 14, "Other Agencies", of the Form of Contract.

1.03 DEFINITION

- A. Within this Section 010101 - General Provisions, where reference is made to the ENGINEER, the OWNER and or the OWNER's designated representative shall be substituted.
- B. Where reference is made to "as shown on the plans", or "as shown on the Standard Detail Drawings" the term "as shown on the Purchase Order" may be substituted.
- C. Where reference is made in the New York State Department of Transportation Specifications to New York State Department of Transportation, Commissioner, etc., the appropriate Monroe County department, or official shall be substituted.

1.04 CONTRACT DRAWINGS AND SPECIFICATIONS

- A. Included by reference as part of the Contract Documents are:
 - 1. New York State Department of Transportation (NYSDOT), "Standard Specifications for Construction and Materials", published on the NYSDOT public website as of the date of the Term Construction Contract #7.
 - 2. City of Rochester, Department of Environmental Services, "Standard Construction Contract Documents", November 1, 1991 or latest revision (CORSCCD).
- B. In the event of a conflict between the specification requirements, the order of precedence shall be:
 - 1. These Specifications.
 - 2. CORSCCD Specifications.
 - 3. NYSDOT Specifications.

1.05 PROTECTION OF PROPERTY

- A. The CONTRACTOR shall be responsible for the preservation and protection of property adjacent to the work site against damage and or injury as a result of his operations under this Contract. Any damage or injury occurring on account of any act, omission, or neglect on the part of the CONTRACTOR shall be restored in a proper and satisfactory manner or replaced by and at the expense of the CONTRACTOR.

1.06 EXISTING UTILITIES AND STRUCTURES

- A. The term "existing utilities" shall be deemed to refer to both publicly and privately owned utilities such as storm drains, sanitary sewers, water lines, gas, electrical telephone cable television services and appurtenances.
- B. It shall be the responsibility of the CONTRACTOR to ascertain the actual extent and exact location of existing utilities and structures.

- C. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Any damage resulting from the work of this contract shall be promptly repaired by the CONTRACTOR at his own expense in a manner approved by the ENGINEER and further subject to the requirements of the authority having jurisdiction.
- D. Where excavations by the CONTRACTOR require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the CONTRACTOR. All such work shall be performed in a manner satisfactory to the ENGINEER and the respective authority having jurisdiction over such work. In the event the CONTRACTOR fails to provide proper support or protection to any existing utility, the ENGINEER may at his discretion, have the respective authority provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the CONTRACTOR.

1.07 DRAINAGE AND DEWATERING OF EXCAVATIONS

- A. Except as noted in paragraph (B) below, the CONTRACTOR shall be responsible at all times for preventing the accumulation of groundwater and the removal of all water in and in the vicinity of excavations.
- B. Where the OWNER determines that unstable soil conditions exist because of groundwater, the OWNER will authorize the CONTRACTOR and separately reimburse to stabilize these conditions.
- C. The proposed methods of controlling and removing groundwater and water and stabilizing shall be submitted to the OWNER for approval prior to their use.

1.08 WORK ON PROPERTIES AND IN STREETS AND ROADWAYS

- A. The CONTRACTOR shall be responsible for securing all permits and licenses required to perform the Work including the Permit for work within the applicable municipal rights-of-way. The CONTRACTOR shall provide the OWNER a copy of the applicable permits prior to the start of construction.
- B. The CONTRACTOR shall restrict his operations to the areas within permanent and temporary easements if such easements have been obtained by the OWNER, and to areas within existing municipal street rights-of-way.
- C. Temporary easements required by the CONTRACTOR for additional work areas shall be obtained and paid for by the CONTRACTOR. All temporary easements obtained by the CONTRACTOR shall contain a provision holding the District and County of Monroe harmless to any and all claims thereto related. The agreement shall bear the signature

of the OWNER of the land. Copies of all temporary easements shall be supplied to the OWNER prior to utilization of the temporary easements.

- D. Prior to the start of work, the CONTRACTOR shall have his job surveyor locate the temporary and permanent easement lines and other key features associated with construction of the improvements.
 - 1. A continuous snow type fence shall be installed and maintained in place along these lines during construction operations until this area has been restored to its original condition. The fence shall be in place five (5) days in advance of work in any area. No construction activity, access, storage, or other use shall take place exterior of the fencing.
 - 2. Snow type fencing for individual tree protection during the construction shall be installed and maintained by the CONTRACTOR as required or ordered by the OWNER.

1.09 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Any maintenance and protection of traffic required by the work performed under this contract shall be in accordance with the "Manual of Uniform Traffic Control Devices NYSDOT".
- B. For projects within the City of Rochester, the Permit Section in the City of Rochester Department of Environmental Services shall be advised of commencement of the operations at least seven (7) working days prior to construction. The Permit Section will determine if the Monroe County Division of Traffic Engineering must review and approve the temporary traffic disruption.
- C. Where a traffic plan is required, the CONTRACTOR shall be responsible for developing, installing, and maintaining the approved plan at no additional cost to the OWNER.
- D. The CONTRACTOR shall submit the traffic plan to the Monroe County Division of Traffic Engineering, allowing a minimum of five (5) working days for approval.
- E. When traveled way is closed for any reasons, detour routes shall be as designated by the Monroe County Division of Traffic Engineering.

1.10 TESTING AND CHECKING

- A. Unless specifically identified as the responsibility of the OWNER, the CONTRACTOR shall be responsible for the performing and paying for all laboratory and field-testing and checking required by the Contract.
- B. Work within the City of Rochester: Tests required by the City of Rochester to determine if the work has been performed in accordance with the specifications shall be the

responsibility of the OWNER. However, should the tests show the work to be unacceptable to the City of Rochester, the CONTRACTOR shall be responsible for paying the cost of the test and penalties, in addition to correcting the work.

- C. The OWNER shall be responsible for field compaction density tests. Where test results indicate insufficient compaction and additional compaction is required, the CONTRACTOR shall be responsible for all field compaction density retesting, until sufficient compaction is achieved.

1.11 DUST CONTROL

- A. The CONTRACTOR shall take all necessary measures to control dust resulting from his operations and to prevent spillage and excavated material on public roads. When directed by the OWNER, the CONTRACTOR shall sprinkle water in such quantities and at such frequencies as may be required to control such dust and prevent it from becoming a nuisance to the surrounding area at no additional cost to the OWNER. All roads must be maintained dust free at all times. Daily cleaning will be required.

1.12 DISPOSAL OF MATERIALS

- A. It shall be the responsibility of the CONTRACTOR to remove from the site and dispose of, according to applicable regulations, all rubbish, construction debris and waste materials, "unsuitable excavation material", and unused materials.
- B. "Unsuitable excavation material" shall include, but not be limited to, excavated earth not suitable for pipe/structure support or backfill, rock, pavement/surface materials, and abandoned sewer facilities.
- C. Unless otherwise directed by the OWNER, all "unsuitable excavation material" shall be loaded directly from the excavation and removed from the construction site on the same day.
- D. Materials to be disposed of shall be disposed of at a permitted/authorized "construction and demolition" debris disposal facility, and/or facility permitted/authorized for respective materials. Discharge of unused material, including, but not limited to concrete and controlled density fill, to sewer mains, laterals, catch basins, manholes and other sewer system appurtenances is strictly prohibited.

1.13 CONSTRUCTION PHOTOGRAPHS

- A. The CONTRACTOR shall provide "before" and "after" construction photographs, as directed by and at no additional cost to the OWNER, at mutually agreed upon locations so as to avoid disputes concerning the restoration work. Digital

photographs shall be provided on a compact disc to the OWNER. CONTRACTOR shall provide a minimum of twelve (12) “before” and twelve (12) “after” photographs, or quantity as directed by the OWNER. Final photographs shall be taken at the same location and in the same direction as preconstruction photograph.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 14 10

CARE AND PROTECTION OF PROPERTY

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Protection of Property
- B. Work within Highway Right-of-Way
- C. Notice to Property Owner

1.02 PROTECTION OF PROPERTY

- A. Entering or occupying with men, tools, materials, or equipment any land other than the right-of-way and easements without written, notarized consent from the property owner is prohibited. Provide a copy of the written, notarized consent to the ENGINEER. Assume full responsibility for use of said private properties and defend OWNER against all claims for damages from use of same.
- B. Provide and maintain all necessary watchman, barricades, lights, and warning signs and take all necessary precautions for the protection and safety of the public, OWNER, ENGINEER, and property.
- C. Continuously maintain adequate measures to protect all Work from damage and take all reasonable precautions to protect the public's and OWNER's property from injury or loss arising in connection with this Agreement.
- D. Make good any damage, injury or loss to the Work, property of the OWNER and the public resulting from lack of reasonable protective precautions.
- E. In an emergency affecting the safety of life, the Work, or adjoining property, the CONTRACTOR shall act to prevent such threatened loss or injury without special instructions or authorization from the ENGINEER. Also act, without appeal, if so authorized or instructed by the ENGINEER.
- F. Exercise extreme care to prevent damage to trees, flowers, shrubs, etc. Replace or repair any damaged trees, shrubs, flowers, etc.
- G. Replace or re-erect fences and guard rails taken down or disturbed, to the satisfaction of the ENGINEER.

- H. Conduct work in a manner to properly protect all Underground Facilities. Work near Underground Facilities shall be in accordance with the utility's requirements, rules, and regulations. If any utility is damaged, immediately notify the utility involved so that proper inspection and repair can be made.
- I. The OWNER or ENGINEER will attempt to notify the CONTRACTOR of any hazardous condition during non-working hours by telephone. If the OWNER or ENGINEER is unable to reach the CONTRACTOR or the CONTRACTOR fails to correct the hazardous condition utilizing all necessary safety devices within one hour after notification, the OWNER will make all necessary repairs at the expense of the CONTRACTOR. If the hazardous condition is of such a nature, in the opinion of the ENGINEER, that it should be remedied immediately and the CONTRACTOR is unable or refuses to do so, OWNER's personnel will make all necessary repairs at the expense of the CONTRACTOR.
- J. Prior to construction, install snow fence to protect trees and plantings as shown on the drawings or directed by the ENGINEER. Secure fence with stakes every five (5) feet.
- K. Maintain drainage throughout construction.

1.03 NOTICE TO PROPERTY OWNERS

- A. The CONTRACTOR shall provide property owners at least one day advance written notice of pending construction. Keep driveways open and in good condition at all times.

1.04 WORK WITHIN HIGHWAY RIGHTS-OF-WAY

- A. Perform and complete all work within the state, county, city, and town rights-of-way to the full satisfaction of the various Departments of Public Works concerned.
- B. Conduct operations associated with the Work so as not to interfere with the movement of traffic on highways and with operations of the particular Department of Public Works.
- C. If at any time during the work, traffic or facilities of the State of New York, county, City of Rochester or town are endangered, immediately do such work as the representative of the particular Department of Public Works concerned may direct to restore safety. The expense of restoring safety based on the directions of the particular Department of Public Works representative shall be born solely by the CONTRACTOR.

- D. Permit inspection by the State of New York, county, City of Rochester, town, or village at all times as the Work progresses.
- E. Provide written notice to the State of New York, county, City of Rochester, town, or village five (5) days before such work is to begin within their right-of-way.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 22 10

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.
- B. Defect assessment and non-payment for rejected work.
- C. Procedures for preparation and submittal of applications for payment.

1.02 GENERAL

- A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the individual specification section shall govern. Actual quantities provided will determine payment.
- B. Within this Section 012210 - Measurement and Payment, where reference is made to the ENGINEER, the OWNER and or the OWNER's designated representative shall be substituted.
- C. Take all measurements and compute quantities. The ENGINEER will verify measurements and quantities.
- D. Assist ENGINEER by providing necessary equipment, workers, and survey personnel as required.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantities and measurements indicated in the Bid are for bidding and contract purposes only. Quantities and measurements for materials supplied or placed in the Work and verified by the ENGINEER shall determine payment.
- B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices stated in the Bid.
- C. The quantities included in the Bid Proposal are approximate only and cannot be determined prior to issuance of a Purchase Order. The quantities are utilized solely for the purpose of establishing unit prices for the term of the Contract and for determining

the Low Bidder. The quantities are not guaranteed nor promises given as to the work ordered during the term of the Contract.

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- B. Measurement by Area: Measured by square dimension using mean length and width or radius.
- C. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- D. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.
- E. Lump Sum: Items described in Bid.

1.05 APPLICATION FORMAT

- A. For each item, provide a column for listing: Item Number; Item Description, Estimated Quantity, Units (LF, EA, CY, etc.), Quantity for this Estimate, Quantity from Previous Estimates, Quantity to Date, Unit Price, Dollar Amount this Estimate, Dollar Amount to Date, Percent Complete, Balance to Finish. Authorized modifications listed as subcategories under their associated Change Orders and retainage must be listed separately.
- B. Base estimates of lump-sum items on a schedule dividing each item into its appropriate component parts together with a quantity and a unit price for each part such that the sum of the products of prices and quantities will equal the contract price for the item. Submit schedule for ENGINEER's approval before the first estimate becomes due.
- C. Submit invoices for force account work which include, in addition to the above, a complete description of the work performed. Also, include a summary of totals for labor, equipment, materials, labor overhead, construction overhead, and profit as set forth in the Form of Contract.

1.06 PREPARATION OF APPLICATIONS

- A. Present required information in typewritten form.
- B. Execute certification by signature of authorized officer.

- C. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for the portion of work performed.
- D. List each authorized Change Order as an extension on continuation sheet and include Change Order number and dollar amount as outlined for original items of work.
- E. Utilize the Contract Unit Prices for calculation of the Payment Items.

1.07 SUBMITTAL PROCEDURES

- A. Submit four copies of all pay requests and change orders, all with original signatures, are to be submitted for review and approval.
- B. Submit an updated construction schedule and certified payrolls with each Application for Payment.
- C. Submit under transmittal letter.

1.08 SUBSTANTIATING DATA

- A. When the ENGINEER requires substantiating information, submit data justifying dollar amounts in question.
- B. Provide one copy of data, with cover letter, for each copy of submittal. Show Application number, date and line item by number and description.

1.09 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. When, in the ENGINEER's opinion, it is not practical to remove and replace defective Work, the ENGINEER will direct one of the following remedies:
 - 1. Defective work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the ENGINEER.
 - 2. Defective work will be partially repaired according to ENGINEER's instructions, and the unit sum/price will be adjusted to a new sum/price at the discretion of the ENGINEER.
- C. Individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.
- D. The authority of the ENGINEER to assess defects and identify payment adjustment is final.

1.10 NON-PAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond required lines and levels of the Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

1.11 SHOP DRAWING SUBMITTALS

- A. All shop drawings, if necessary and/or as requested by the OWNER or ENGINEER, must comply with the Contract Documents.
- B. Submit a minimum of three (3) copies of each shop drawing for ENGINEER's review.
 - 1. Two (2) copies will be retained for the ENGINEER's use and the remainder will be returned.
- C. The ENGINEER will review and stamp shop drawings as follows:
 - 1. "APPROVED": shop drawing complies with the Contract Documents and is acceptable as it is. No re-submittal or revision is required.
 - 2. "MAKE CORRECTIONS NOTED": shop drawing partially complies with the Contract Documents and is acceptable with some minor revisions. ENGINEER will note revisions on shop drawing. No re-submittal is required.
 - 3. "REVISE AND RESUBMIT": shop drawing partially complies with Contract Documents and is not acceptable as it is. Resubmit shop drawing with additional information.
 - 4. "REJECTED": shop drawing does not comply with Contract Documents and is not acceptable at all. Resubmit a shop drawing for a different product, method, layout, etc. which complies with Contract Documents.
 - 5. "SUBMIT SPECIFIED ITEM": shop drawing does not comply with Contract Documents and is not acceptable at all. Resubmit a shop drawing for a product, method, layout, etc. which complies with Contract Documents.
- D. Submit and receive back all shop drawings prior to using any associated methods or materials.
- E. ENGINEER's acceptance of shop drawings indicates that the submittal has been reviewed to the extent necessary to ensure conceptual compliance with the Contract Documents.

- F. Acceptance of shop drawings does not relieve the CONTRACTOR from verifying details including, but not limited to, dimensions, field conditions, spacing, tolerances, materials, etc.

1.12 PAYMENT ITEM DESCRIPTIONS

- A. The following includes the description of Payment Items in the Contract, along with a description of the Measurement and Payment for each Payment Item.

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
250-C	TEST / INSERTION PIT EXCAVATION

GENERAL DESCRIPTION:

Test and Insertion Pit Excavation shall be as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT:

The quantity of excavation shall be the number of cubic yards, measured to the nearest cubic yard, of material excavated as measured in its original position within the payment limits indicated in this item. The top payment limit shall be the existing ground surface. The bottom payment limit shall be the bottom of excavation as ordered by the ENGINEER. Side payment limits shall be vertical and spaced a minimum four feet by eight feet, or larger as ordered by the ENGINEER.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
250-C	TEST / INSERTION PIT EXCAVATION	Cubic Yard

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
402-I	TURF RESTORATION

GENERAL DESCRIPTION:

Turf Restoration shall be as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT:

The quantity shall be the number of square feet, measured to the nearest square foot, of turf surface area restoration installed.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
402-I	TURF RESTORATION	Square Foot

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
501-B	MOBILIZATION (DIRECTED BY THE OWNER)

GENERAL DESCRIPTION:

Mobilization (Directed By The Owner) shall be defined as a condition where the ENGINEER directs the Contractor to transport materials, equipment, and work force from one project site to another in emergency situations. This does not include mobilization authorized by the ENGINEER as part of a Purchase Order where greater than twenty-four (24) hours of notice of mobilization is provided.

METHOD OF MEASUREMENT:

The quantity shall be the number of hours, to the nearest one-half of an hour, for the transport of materials and equipment from one project site to a second site plus the return transport of equipment to the initial site. The ENGINEER shall determine the number of hours measured for each mobilization.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
501-B	MOBILIZATION (DIRECTED BY THE OWNER)	Hour

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION – FULL SECTION REHABILITATION</u>
700-L	4 & 5-INCH DIAMETER CIPP (LATERAL)
700	4 & 5-INCH DIAMETER CIPP
701-L	6-INCH DIAMETER CIPP (LATERAL)
701	6-INCH DIAMETER CIPP
702	8-INCH DIAMETER CIPP
703	10-INCH DIAMETER CIPP
704	12-INCH DIAMETER CIPP

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION – FULL SECTION REHABILITATION</u>
705	15-INCH DIAMETER CIPP
705-A	16-INCH DIAMETER CIPP
706	18-INCH DIAMETER CIPP
707	21-INCH DIAMETER CIPP
708	24-INCH DIAMETER CIPP
709	27-INCH DIAMETER CIPP
710	30-INCH DIAMETER CIPP
711	36-INCH DIAMETER CIPP
712	42-INCH DIAMETER CIPP
713	48-INCH DIAMETER CIPP
714	54-INCH DIAMETER CIPP
715	60-INCH DIAMETER CIPP
716	66-INCH DIAMETER CIPP
717	72-INCH DIAMETER CIPP

GENERAL DESCRIPTION:

Full Section CIPP Rehabilitation shall be defined as those that both begin and end at an existing point of access to the sewer. The Work shall be inclusive of and performed in accordance with the requirements of Sections 330130.72 and 330130.74 of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT:

Measurement for payment for Full Section CIPP Rehabilitation shall be by the actual horizontal length in linear feet, measured to the nearest foot of rehabilitated sewer pipe or lateral, as measured from end of lined pipe to end of lined pipe.

BASIS OF PAYMENT:

Payment for this item shall include the full compensation for installation of the CIPP liner including all notifications, coordination, submittals, traffic control, bypass pumping, light sewer cleaning, pre- and post-construction televising, sealing at manholes, material disposal, restoration and cleanup, and incidentals required to install the CIPP liner.

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
700-L	4 & 5-INCH DIAMETER CIPP (LATERAL)	Linear Foot
700	4 & 5-INCH DIAMETER CIPP	Linear Foot
701-L	6-INCH DIAMETER CIPP (LATERAL)	Linear Foot
701	6-INCH DIAMETER CIPP	Linear Foot
702	8-INCH DIAMETER CIPP	Linear Foot
703	10-INCH DIAMETER CIPP	Linear Foot

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
704	12-INCH DIAMETER CIPP	Linear Foot
705	15-INCH DIAMETER CIPP	Linear Foot
705-A	16-INCH DIAMETER CIPP	Linear Foot
706	18-INCH DIAMETER CIPP	Linear Foot
707	21-INCH DIAMETER CIPP	Linear Foot
708	24-INCH DIAMETER CIPP	Linear Foot
709	27-INCH DIAMETER CIPP	Linear Foot
710	30-INCH DIAMETER CIPP	Linear Foot
711	36-INCH DIAMETER CIPP	Linear Foot
712	42-INCH DIAMETER CIPP	Linear Foot
713	48-INCH DIAMETER CIPP	Linear Foot
714	54-INCH DIAMETER CIPP	Linear Foot
715	60-INCH DIAMETER CIPP	Linear Foot
716	66-INCH DIAMETER CIPP	Linear Foot
717	72-INCH DIAMETER CIPP	Linear Foot

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION – TOP HAT LATERAL REHABILITATION</u>
718-1	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 8" SEWER
718-2	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 10" SEWER
718-3	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 12" SEWER
718-4	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 15" SEWER
718-5	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 16" SEWER
718-6	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 18" SEWER

GENERAL DESCRIPTION:

Top Hat Lateral Rehabilitation shall be defined as a one (1) foot top hat lateral pipe connection to the sewer line by the CIPP process. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

Measurement for payment for shall be by the actual number of lateral connections rehabilitated.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
718-1	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 8" SEWER	Each
718-2	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 10" SEWER	Each
718-3	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 12" SEWER	Each

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
718-4	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 15" SEWER	Each
718-5	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 16" SEWER	Each
718-6	4-6 INCH DIA TOP HAT CIPP LATERAL REHABILITATION IN 18" SEWER	Each

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION – SPOT SECTION REHABILITATION</u>
720	4 & 5-INCH DIAMETER CIPP, SPOT REHABILITATION
721	6-INCH DIAMETER CIPP, SPOT REHABILITATION
722	8-INCH DIAMETER CIPP, SPOT REHABILITATION
723	10-INCH DIAMETER CIPP, SPOT REHABILITATION
724	12-INCH DIAMETER CIPP, SPOT REHABILITATION
725	15-INCH DIAMETER CIPP, SPOT REHABILITATION
725-A	16-INCH DIAMETER CIPP, SPOT REHABILITATION
726	18-INCH DIAMETER CIPP, SPOT REHABILITATION
727	21-INCH DIAMETER CIPP, SPOT REHABILITATION
728	24-INCH DIAMETER CIPP, SPOT REHABILITATION
729	27-INCH DIAMETER CIPP, SPOT REHABILITATION
730	30-INCH DIAMETER CIPP, SPOT REHABILITATION
731	36-INCH DIAMETER CIPP, SPOT REHABILITATION
732	42-INCH DIAMETER CIPP, SPOT REHABILITATION
733	48-INCH DIAMETER CIPP, SPOT REHABILITATION
734	54-INCH DIAMETER CIPP, SPOT REHABILITATION
735	60-INCH DIAMETER CIPP, SPOT REHABILITATION

GENERAL DESCRIPTION:

Spot Section CIPP Rehabilitation shall be defined as those sections of sewer and laterals that have at least one end not connecting to an existing access point of the sewer system. The Work shall be inclusive of and performed in accordance with the requirements of Sections 330130.72 and 330130.74 of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

Measurement for payment for Spot Section CIPP Rehabilitation shall consist of single payment for a minimum five (5) linear foot horizontal length of sewer pipe and lateral. Any sewer and lateral rehabilitation required beyond the five (5) linear feet shall be measured as the actual horizontal length in linear, measured to the nearest foot of rehabilitated sewer pipe and lateral.

Measurement for payment for each Spot Section CIPP Rehabilitation shall consist of a minimum five (5) foot length section. Payment for additional length of rehabilitation beyond a five (5) foot length shall be paid by the actual horizontal length in feet, measured to the nearest foot of rehabilitated sewer pipe and lateral.

BASIS OF PAYMENT:

Payment for this item shall include the full compensation for installation of the CIPP liner including all notifications, coordination, submittals, traffic control, bypass pumping, light sewer cleaning, pre- and post-construction televising, sealing at manholes, material disposal, restoration and cleanup, and incidentals required to install the CIPP liner.

The basis of payment shall be for each minimum five (5) foot section plus additional payment for lengths beyond the five (5) foot length at the unit pricing specified in Pay Items 700 - 715.

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
720	4 & 5-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
721	6-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
722	8-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
723	10-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
724	12-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
725	15-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
725-A	16-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
726	18-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
727	21-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
728	24-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
729	27-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
730	30-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
731	36-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
732	42-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
733	48-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
734	54-INCH DIAMETER CIPP, SPOT REHABILITATION	Each
735	60-INCH DIAMETER CIPP, SPOT REHABILITATION	Each

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
740	SERVICE LATERAL RECONNECTION BY REMOTE

GENERAL DESCRIPTION:

Service Lateral Reconnection By Remote is defined as using a remote-controlled televised cutting device specifically designed for cutting CIPP to open a lateral connection in the sewer line. The work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the actual number of service lateral reconnections.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
740	SERVICE LATERAL RECONNECTION BY REMOTE	Each

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
741	REPAIR PROTRUDING LATERAL CONNECTION

GENERAL DESCRIPTION:

Repair Protruding Lateral Connections shall be defined as the removal and proper re-installation of protruding taps or service connections which obstruct or hinder the insertion of the CIPP liner. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of service laterals repaired.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
741	REPAIR PROTRUDING LATERAL CONNECTION	Each

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
742-A	TEMPORARY BYPASS SYSTEM FOR SEWERS 6-INCH TO 12-INCH DIAMETER
742-B	TEMPORARY BYPASS SYSTEM FOR SEWERS 15-INCH TO 24-INCH DIAMETER
742-C	TEMPORARY BYPASS SYSTEM FOR SEWERS 27-INCH TO 36-INCH DIAMETER
742-D	TEMPORARY BYPASS SYSTEM FOR SEWERS 42-INCH TO 60-INCH DIAMETER

GENERAL DESCRIPTION:

Pipe dimensions refer to the inside diameter of the host pipe.

Temporary Bypass System For Sewers shall be defined as the sewer flow bypassing, not specified as part of the Work for another item, as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

Measurement of Temporary Bypass System For Sewer shall be the number of days the bypass system is operated.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
742-A	TEMPORARY BYPASS SYSTEM FOR SEWERS 6 TO 12-INCH DIA.	Day
742-B	TEMPORARY BYPASS SYSTEM FOR SEWERS 15 TO 24-INCH DIA.	Day
742-C	TEMPORARY BYPASS SYSTEM FOR SEWERS 27 TO 36-INCH DIA.	Day
742-D	TEMPORARY BYPASS SYSTEM FOR SEWERS 42 TO 60-INCH DIA.	Day

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
789	STANDARD COMPOSITE MANHOLE REPAIR – CEMENT MORTAR COATING

GENERAL DESCRIPTION:

Standard Composite Manhole Repair shall be defined as the installation of up to three (3) inches of cement mortar coating to manhole walls, benches, and inverts as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of square feet of the manhole repaired utilizing the application of the specified coating products, and as measured to the nearest square foot.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
789	STANDARD COMPOSITE MANHOLE REPAIR – CEMENT MORTAR COATING	Square Foot

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
790	STANDARD COMPOSITE MANHOLE REPAIR – EPOXY COATING

GENERAL DESCRIPTION:

Standard Composite Manhole Repair shall be defined as the installation of epoxy coating to manhole walls, benches, and inverts as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of square feet of the manhole repaired utilizing the application of the specified coating products, and as measured to the nearest square foot.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
790	STANDARD COMPOSITE MANHOLE REPAIR – EPOXY COATING	Square Foot

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
791	ADDITIONAL MANHOLE REPAIR – CEMENT MORTAR COATING EXCEEDING 3” THICKNESS

GENERAL DESCRIPTION:

Additional Manhole Repair shall be defined as the installation of masonry coating to manhole walls, benches, and inverts beyond the three (3) inch thick coating covered under payment item 789 as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of pounds of the specified coating product applied and measured to the nearest pound.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
791	ADDITIONAL MANHOLE REPAIR – CEMENT MORTAR COATING EXCEEDING 3” THICKNESS	Pound

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
792	HEAVY CLEANING OF SEWERS

GENERAL DESCRIPTION:

Heavy Cleaning Of Sewers shall be as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of hours required for set-up, cleaning, and break-down of equipment for sewer cleaned and measured to the nearest one-half hour.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
792	HEAVY CLEANING OF SEWERS	Hour

<u>PAYMENT ITEM #</u>	<u>DESCRIPTION</u>
793	CCTV – ADDITIONAL WORK, 8”-12” DIAMETER
794	CCTV – ADDITIONAL WORK, >12”-36” DIAMETER
795	CCTV – ADDITIONAL WORK, >36”-60” DIAMETER

GENERAL DESCRIPTION:

CCTV Additional Work shall be the light cleaning of sewers and closed-circuit television inspection not specified as part of the work for another item as ordered by the ENGINEER. The Work shall be inclusive of and performed in accordance with the requirements of the Specifications, and the only compensation for this item.

METHOD OF MEASUREMENT

The quantity shall be the number of horizontal linear feet of sewer televised measured to the nearest foot.

BASIS OF PAYMENT:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
793	CCTV – ADDITIONAL WORK, 8”-12” DIAMETER	Linear Foot
794	CCTV – ADDITIONAL WORK, >12”-36” DIAMETER	Linear Foot
795	CCTV – ADDITIONAL WORK, >36”-60” DIAMETER	Linear Foot

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Coordination
- B. Field Engineering
- C. Preconstruction Conference
- D. Progress Meetings
- E. Construction Progress Schedules
- F. Final Inspection Conferences
- G. Communication
- H. Emergency Call Out

1.02 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion for portions of the Work designated for OWNER's partial use.

1.03 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of New York and acceptable to the OWNER.
- B. Locate and protect all survey control, survey monuments, property pins and reference points.
- C. Control datum for survey is that shown on Drawings.

- D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.04 PRECONSTRUCTION CONFERENCE

- A. OWNER will schedule a conference at the time of Notice of Award.
- B. Attendance required by OWNER and CONTRACTOR.
- C. Agenda:
 - 1. Regulatory Agencies
 - 2. Utilities
 - 3. Owner's Representatives
 - 4. Submission of bonds and insurance certificates.
 - 5. Distribution of Contract Documents or supplemental information.
 - 6. Submission of list of subcontractors, list of products, Schedule of Values and Progress Schedule.
 - 7. Designation of personnel representing the CONTRACTOR, and the OWNER.
 - 8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and contract closeout procedures.
 - 9. Scheduling
 - 10. Construction facilities and controls provided by OWNER
 - 11. Temporary utilities provided by OWNER
 - 12. Survey layout
 - 13. Housekeeping procedures
 - 14. Procedures for testing
 - 15. Procedures for maintaining record documents
 - 16. Requirements for start-up of equipment
 - 17. Inspection and acceptance of equipment put into service during construction period

1.05 PROGRESS MEETINGS

- A. Attend scheduled meetings throughout progress of the Work at one to four-week intervals, as determined by the OWNER.
- B. OWNER will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to participants and those affected by decisions made.
- C. Required Attendance: Job superintendent, major Subcontractors and suppliers, OWNER, Funding Agency, and others, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings
2. Review of work progress
3. Field observations, problems, and decisions
4. Identification of problems which impede planned progress
5. Review of submittals schedule and status of submittals
6. Review of off-site fabrication and delivery schedules
7. Maintenance of progress schedule
8. Corrective measures to regain projected schedules
9. Planned progress during succeeding work period
10. Coordination of projected progress
11. Maintenance of quality and work standards
12. Effect of proposed changes on progress schedule and coordination
13. Other business relating to Work

1.06 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate as established in Notice of Award.
- B. Revise and resubmit as required.
- C. Submit schedule with each Application for Payment, identifying changes since previous version.
- D. Submit a computer generated or horizontal bar chart with separate line for each major section of Work. Or submit a computer-generated network analysis diagram using the critical path method, generally as outlined in Associated General Contractors of America (AGC) publication, "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".
- E. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates and duration.
- F. Indicate estimated percentage of completion for each item of work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by OWNER and under Allowances

1.07 FINAL INSPECTION CONFERENCES

- A. When required in individual Materials and Performance Sections or to meet a project Milestone, a work site Final Inspection Conference will be convened prior to commencing other work.
- B. Attendance of parties directly affecting, or affected by, work of the specific Section is required.
- C. OWNER will prepare agenda, preside at conference, record minutes, and distribute copies after conference to participants.
- D. Review conditions of installation, preparation and installation procedures and coordination with related work.
- E. OWNER will issue a punch list of items which need repair, replacement and/or restoration.

1.08 COMMUNICATION

- A. Notify OWNER of start of work on project.
- B. Notify OWNER of hours to be worked.
- C. Notify OWNER in advance when work will be suspended for any reason.
- D. Notify OWNER of each subsequent startup.
- E. There will be a charge of \$200.00 for each time required notification is not provided.

1.09 EMERGENCY CALL OUT

- A. CONTRACTOR shall have an employee available at all time for calls and problems which may arise during the project. Employee shall:
 - 1. Have authority to act and resolve any problems.
 - 2. Be available after normal working hours, weekends, and holidays.
 - 3. Carry a pager or cellular phone.
- B. Provide the OWNER with employee's name, home phone number, place of residence and pager/cell number.
- C. Respond within one hour to a call from the OWNER.
- D. Notify the OWNER's office when problem has been resolved.

- E. The ENGINEER or OWNER will resolve or repair the problem if there is no response within one (1) hour of the call. If deemed an emergency situation by the OWNER, no written notice that the OWNER may correct defective work shall be required.
- F. All costs incurred by the OWNER or ENGINEER shall be billed to the CONTRACTOR with a minimum charge of One Thousand dollars (\$1,000.00) for each event.
- G. Failure of the CONTRACTOR or the emergency call out employee to respond to two (2) call outs will result in a work stop order, potential termination of the Contract and/or replacement of that employee as emergency call out employee.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance
- B. Schedule of references

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids.
- C. Obtain copies of standards when required by Contract Documents and maintain at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.
- D. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- E. The contractual relationship of the parties shall not be altered by mention or inference contained in any reference document.

1.03 SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219

AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, DC 20006
AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
ANSI	American National Standards Institute 11 West 42nd Street New York, NY 10036
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
HYDRAULIC INSTITUTE STANDARDS	712 Lakewood Center North 14600 Detroit Avenue Cleveland, OH 44107

MUTCD Manual of Uniform Traffic Control Devices
New York State Department of Transportation
1530 Jefferson Road
Rochester, NY 14623

NEW YORK STATE STANDARD SPECIFICATIONS
New York State Department of Transportation
Official NYSDOT documents posted at:
<https://www.dot.ny.gov/main/business-center/engineering/specifications/busi-e-standards-usc>

STATE BUILDING CODE
New York State - Department of State
162 Washington Avenue
Albany, NY 12231

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213

UL Underwriters' Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

PART 2 – PRODUCTS
(Not Used)

PART 3 – EXECUTION
(Not Used)

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Interruption of Service
- B. Planned Shutdowns and Notifications
- C. Shutdowns

1.02 INTERRUPTION OF SERVICE

- A. Do not shut down or interrupt flow through any facility unless specifically permitted to do so, in writing, by the OWNER.
- B. Do not operate main line valves, pumps, electrical controls, and other facilities controlling flow. Assist the OWNER in closing all valves necessary for interruption or shutdown of flow.
- C. When an interruption of service occurs, work continuously and with expedience until completion of all work necessary to restore service to its normal state.

1.03 PLANNED SHUTDOWNS AND NOTIFICATIONS

- A. Notify OWNER and ENGINEER in writing of proposed shutdown of any facility, and approximate duration thereof, a minimum of three (3) days in advance. Include date, time, and extent of duration of shutdown in the written notification to OWNER.
- B. Notify all customers, in writing, twenty-four (24) hours prior to shutdown with the notification form provided by OWNER. Completely fill out notification form and distribute it to all affected customers prior to shutdown.
- C. Immediately prior to individual service and lateral work, notify the customer again to verify that all water use has been stopped.
- D. Bear all responsibility for any loss or damage arising out of the failure of any such customer to receive notice of proposed shutdown or interruption of service.

- E. Identify material, size and location of utility or service prior to making shutdown. Do not shut down or cause any interruption of flow until all labor, material, and equipment necessary to perform the work are present at the work site.
- F. Provide temporary service where utility cannot be restored within four hours.
- G. Restore service as soon as possible. Immediately notify OWNER of said restoration of service.

1.04 EMERGENCY SHUTDOWNS

- A. In the event of a rupture of a water main or other failure of any facility, whether the result of the CONTRACTOR's activities or other unrelated matters, act in accordance with the provisions of Section 011410 – Care and Protection of Property.
- B. As soon as the shutdown or interruption of service has occurred, notify the Owner of the area affected and the proposed number of hour's duration of the shutdown. In addition, notify the customers who are affected by the shutdown by going door-to-door.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 55 26

TRAFFIC CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Work within Right-of-Ways
- B. Signs, Signals, and Devices
- C. Construction Parking
- D. Flagmen
- E. Flares and Lights
- F. Haul Routes
- G. Traffic Signs and Signals
- H. Sign Removal

1.02 REFERENCES

- A. Manual of Uniform Traffic Control Devices (MUTCD), available at the OWNER'S and ENGINEER's office for review.

1.03 WORK WITHIN RIGHT-OF-WAYS

- A. Prevent damage to vehicles on highways and to facilities of the State of New York, county, or town in which the work is being done. Conduct operations so as not to interfere with the movement of traffic on highways and with operations of the particular Department of Public Works involved.
- B. Provide written notice to the City of Rochester, State of New York, County or Town Department of Public Works five (5) days before work is to begin in their right-of-way.

1.04 SIGNS, SIGNALS, AND DEVICES

- A. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Specified in Part 201 MUTCD.

- B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions: Specified in Parts 292 and 294 in MUTCD.
- C. Flagman Equipment: As approved by local jurisdictions and Part 293 in MUTCD.
- D. Work Zone Warning Signs: As approved by local jurisdiction or as specified in MUTCD Section 238 and Section 300.

1.05 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic, parking, and access by emergency vehicles.
- B. Prevent parking on or adjacent to access roads or in non-designated areas.

1.06 FLAGMEN

- A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.07 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic as specified in Part 294 of MUTCD.

1.08 HAUL ROUTES

- A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

1.09 TRAFFIC SIGNS AND SIGNALS

- A. Locate traffic signs and/or signals at approaches to site, on-site, crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic, as specified in Part 201 of MUTCD.
- B. Relocate as work progresses, to maintain effective traffic control.

1.10 REMOVAL

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

1.11 TRAFFIC REGULATION

- A. Maintain safe and continuous through traffic.
- B. Maintain ingress and egress for all adjacent driveways, service roads and public streets.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 57 00

TEMPORARY CONTROLS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Water Control
- B. Dust Control
- C. Erosion and Sediment Control
- D. Noise Control

1.02 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.03 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere. This shall include as a minimum, sprinkling and sweeping on paved areas and sprinkling and mulching in unpaved areas.
- C. Do not use calcium chloride unless directed by the ENGINEER/OWNER.

1.04 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Utilize erosion control procedures, including mulching, on site. Furnish erosion control as required and, immediately following (weather permitting), completion of site and access clearing.
- G. Allow sediment to settle out of water that interferes with construction before such water enters any surface waterway. Pump water as far as possible from waterway banks when dewatering. Do not damage or kill vegetation by excessive watering or accumulating silt in the discharge area. Install settling basins and plastic filter fabric to achieve environmental objectives as ordered by the ENGINEER.

1.05 NOISE CONTROL

- A. Provide all construction equipment with adequate muffler devices.
- B. Restrict work to the hours between 7:00 a.m. and 8:00 p.m., unless further restricted as a condition of permits, local regulations, or as specified in the Purchase Order or instructions from the Owner.

1.06 SURFACE WATER CROSSINGS

- A. Protect slopes at surface water crossings or drainage ways by installing riprap, sandbags, sod, jute mesh or excelsior blankets as conditions require.
- B. Use water diversion berms, sodding, jute mesh or excelsior blankets on slopes exceeding 15 percent.

1.07 ENVIRONMENTAL CONTROLS

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Prohibited construction procedures include, but are not limited to:
 - 1. Dumping of spoil material in any stream corridor, any wetland, surface waterway or at unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, wetland, or surface waterway.
 - 3. Damaging vegetation beyond the extent necessary for construction of facilities.

4. Open burning of project debris.
5. Pumping of silt laden water from trenches or other excavations into any surface waterway, stream corridor, or wetland.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 01 57 25

TEMPORARY BYPASS PUMPING

PART 1 – GENERAL

1.01 SUMMARY

- A. The Contractor is required to furnish all materials, labor, equipment, power, and maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.
- B. The design, installation, and operation of the temporary bypass pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the engineer that the vendor specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by his firm within the past three years, upon request. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction as supplied by the contractor.

1.02 SYSTEM REQUIREMENTS

- A. The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references.
- B. The Contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.
- C. The plan shall include but not be limited to the details of the following:
 - 1. Staging areas for pumps.
 - 2. Sewer plugging method and types of plugs.
 - 3. Size and location of manholes or access points for suction and discharge hose or piping.
 - 4. Size of pipeline or conveyance system to be bypassed.
 - 5. Number, size, material, location, and method of installation of suction piping.

6. Number, size, material, method of installation and location of installation of discharge piping.
7. Bypass pump sizes, capacity, number of each size to be on site and power requirements.
8. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
9. Standby power generator size, location.
10. Downstream discharge plan.
11. Method of protecting discharge manholes or structures from erosion and damage.
12. Thrust and restraint block sizes and locations.
13. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
14. Method of noise control for each pump and/or generator.
15. Any temporary pipe supports and anchoring requirements.
16. Design plans and computation for access to bypass pumping locations indicated on the drawings.
17. Calculations for selection of bypass pumping pipe size.
18. Schedule for installation of and maintenance of bypass pumping lines.
19. Plan indicating selection of location of bypass pumping line locations.

1.03 SYSTEM DESCRIPTION

A. Design Requirements

1. Bypass pumping systems shall have sufficient capacity.
2. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping systems will be required to be operated 24 hours per day.
3. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.
4. Bypass pumping system shall be capable of bypassing the flow around the work area and be sized to handle any amount of flow up to full available flow as defined by the Owner into the work area as necessary for satisfactory performances of work.
5. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. System must overcome any existence force main pressure on discharge.

B. Performance Requirements

1. It is essential to the operation of the existing system being bypassed that no interruptions in the flow occur throughout the duration of the project. To this

end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the incoming flow before it reaches the point where it would interfere with his work, carry it past the work area and return it to the existing system downstream of his work.

2. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
3. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
4. The Contractor shall divert the flow around the work area in manner that will not cause damage to or surcharging of customers system and will protect public and private property from damage and flooding.
5. The Contractor shall protect water resources, wetlands, and other natural resources.

PART 2 – PRODUCTS

2.01 EQUIPMENT

- A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
- B. The Contractor shall provide the necessary stop/start controls for each pump.
- C. The Contractor shall include one stand-by pump of each size to be maintained on site. Back up pumps shall be online, isolated from the primary system by a valve.
- D. It is recommended that the pump be contained inside a temporary portable berm or secondary containment to contain any fuel or sewage that may spill during the normal course of operation.
- E. Discharge Piping – In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the engineer.

PART 3 – EXECUTION

3.01 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test:

1. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to the actual operation. The Engineer will be given 24 hours notice prior to testing.

B. Inspection:

1. Contractor shall inspect bypass-pumping system on a continuous basis to ensure the system is working correctly.

C. Maintenance Service:

1. Contractor shall ensure the temporary pumping system is properly maintained and a responsible operator shall be available at all times when pumps are operating.
2. Contractor shall monitor pump fuel levels if required and make arrangements for timely refueling as needed

D. Extra Materials:

1. Spare parts for pumps and piping shall be kept on site as required.
2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.02 PREPARATION

A. Precautions

1. Contractor is responsible for locating any existing utilities in the area selected for the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
2. During all bypass-pumping operations, the Contractor shall protect the Owner's system (Pumping Station, Conveyance System Etc.) as applicable from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the Owner's system caused by human or mechanical failure.

3.03 INSTALLATION AND REMOVAL

- A. The Contractor shall remove manhole sections or make connections to the existing conveyance system and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide adequate suction conduit.
- B. Plugging or blocking of flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

- C. When working inside manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- D. The installation of the bypass pipelines is prohibited in all wetland areas. The pipeline must be located if possible off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the Contractor must place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after receipt of written permission from the Customer, the Contractor shall remove all the piping, restore all property to pre-construction condition, and restore all pavements. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline from the Owner.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide labor, materials, equipment and supplies to perform the required clearing and grubbing, excavation, backfill, and grading indicated on the Contract Drawings.

1.02 REFERENCED STANDARDS

- A. OSHA's Construction Standards for Excavation, 29 CFR 1926, Subpart P: Excavation, latest revision.
- B. New York State Department of Transportation Standard Specifications, latest revision.

1.03 DEFINITIONS

- A. The following terms shall have the meanings ascribed to them in this Section, wherever they appear in this specification.
- B. Rock: Limestone, sandstone, shale, granite, or similar material in solid beds or masses in its original or stratified position which, in the opinion of the Engineer, can be removed only by blasting, drilling, wedging, or use of pneumatic tools, and all boulders with a volume greater than one (1.0) cubic yard. Removal of materials which can be loosened with a pick or backhoe, frozen materials, soft laminated shale or hardpan, pavements, curbs, and similar materials shall be considered as earth excavation.
- C. Subgrade Surface: Surface upon which subbase or topsoil is placed.
- D. Subbase: Select granular material or other porous material, which is placed immediately beneath pavement or concrete slabs.
- E. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Method C).

1.04 SUBMITTALS

- A. Samples: Furnish pit location and current DOT acceptance number with each sample.
 - 1. Select Granular Material: 40 - 50 lbs.
 - 2. Selected Fill: 40 - 50 lbs.
 - 3. Crushed Stone: 40 - 50 lbs.
 - 4. Pea Gravel: 40 - 50 lbs.
 - 5. Sand: 40 - 50 lbs.
 - 6. Filter Fabric: 1 sq. yd.
- B. Product Data: Manufacturer's specifications, performance characteristics and operating instructions for compaction equipment.
- C. Sheeting, Shoring, Bracing: If deemed necessary, submit to the Engineer a detailed plan of any intended slope protection, by sheeting, shoring, or bracing, which shall be in conformance with OSHA's 29 CFR Part 1926, Subpart P, latest revision, and signed by a licensed Professional Engineer. This submittal will not relieve the Contractor of complete responsibility for the successful performance of the intended sheeting, shoring, and bracing methods.

1.05 JOB CONDITIONS

- A. Protect newly graded areas from traffic and erosion and keep them free of trash and debris until physical completion of the work.
- B. Protect existing public and private utilities and/or structure below ground surface, adjacent to the work site.
- C. Protect existing trees and plants during performance of the work. Box trees and plants within the grading limit lines with temporary snow fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.
- D. Cold Weather Requirements: When freezing temperatures are predicted, do not excavate to final required elevations for Concrete Work unless concrete can be placed immediately. Retain enough earth over the bottom elevation of footings to prevent frost penetration.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Select Granular Material: Shall be angular crusher run limestone as delivered unsorted from the crusher and shall be well graded, durable, and composed of rock pieces, chips, and fines. Select Granular Material shall be free from organic or other deleterious materials and in also meet the requirements of (DOT Subbase Course Type 2):

<u>Sieve</u>	<u>Percent Passing</u>
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

1. Magnesium Sulphate Soundness Test: 20 percent maximum loss by weight after 4 test cycles.
- B. Select Fill: Covered under Section 31 23 24.
- C. Suitable Fill Material: For use as fill in landscaping and other such applications. Suitable Fill Material shall consist of available site material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, or mixtures thereof. Maximum particle size shall not exceed 2/3 of the layer thickness prior to compaction. Material containing cinders, industrial waste, sludge, building rubble, organic matter including topsoil, sod, muck, and peat shall be considered unsuitable for fill and backfill.
- D. Suitable Native Material: Shall be available site material consisting of mineral soil (inorganic), loose materials free from rocks and/or hard chunks of clay, free of sharp materials, and free of frozen materials. If materials on site are found to be not suitable, the Contractor shall import suitable material.
- E. Crushed Stone and Crushed Gravel: Shall be clean, durable crushed stone or gravel consisting of regular fragments obtained by crushing. It shall be free from sand, silt, clay, shale, broken slag, organic material, or any other deleterious materials. The material shall be obtained from sources which are approved by the New York State Department of Transportation (NYSDOT), and shall conform to the NYSDOT Standard Specifications, latest edition, Material Designation 703-0201 and 703-0202 respectively, in the sizes stated below.

NYSDOT (Table 704-4 Size)

1B; 1A; 1ST; 1; 2; 3A; 3; 4A; 4; 5

- F. Pea Gravel: Screened Gravel, DOT Material Designation 703-0203, Size 1ST (Table 703-4)
- G. Sand cushion: Sand meeting NYS DOT Standard Specifications Section 703-06
- H. Sand: ASTM C 33.
- I. Stone Filling: (Meeting the requirements of DOT 620-2.01 and 620-2.02)
 - 1. Fine Stone Filling:

90-100%	smaller than 8 inches
50-100%	larger than 3 inches
0-10%	smaller than No. 10 Sieve
 - 2. Light Stone Filling:

90-100%	lighter than 100 pounds
50-100%	larger than 6 inches
0-10%	smaller than 1/2 inch
 - 3. Medium Stone Filling:

50-100%	heavier than 100 pounds
0-10%	smaller than 4 inches
 - 4. Heavy Stone Filling

50-100%	heavier than 600 pounds
0-10%	smaller than 6 inches
- J. Dry Rip-Rap: (Meeting the requirements of DOT 620-2.01 and 620-2.03). Dry Rip-Rap shall consist of stones shaped as nearly as practicable in the form of right rectangular prisms. At least 50%, by weight of the stones shall weigh in excess of 300 pounds each, and the remainder of the stones shall weigh from 100 to 300 pounds each.

2.02 COMPACTION EQUIPMENT

- A. Compaction equipment used for the Work is subject to approval by the Engineer. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be approved. Furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment to determine its classification and performance characteristics.

2.03 SHEETING, SHORING AND BRACING

- A. Steel sheet piling: Continuous interlock type complete with all required accessories conforming to ASTM A 328 or to ASTM A 572.
 - 1. Provide steel sheet piling of design, configuration, and length to sustain pressure of earth to be retained.
- B. Timber Sheeting, Shoring and Bracing: Timber sheeting, structural grade timber or lumber uprights, stringers and cross braces of sufficient dimension to resist pressure

of work to be retained, in conformance with OSHA's 29 CFR Part 1926 Subpart P, latest revision.

PART 3 – EXECUTION

3.01 CLEARING AND GRUBBING

- A. Remove all trees, shrubs and other vegetation and all existing improvements both above and below grade only to the extent required to provide new construction.
- B. Protect all trees which are to remain with fencing erected beyond the drip line of outermost branches. Contractor shall take all precautions necessary to prevent damage to trees or shrubs to be retained.
- C. Where limbs are removed to accommodate construction, they shall be removed carefully, and exposed wood treated with approved dressing. Where roots are exposed or damaged by construction, they shall be carefully and cleanly cut, and the area backfilled to prevent desiccation.
- D. Where necessary, the trees shall be pruned to restore the appearance of the tree, or to restore the balance between the root system and top growth.
- E. Any tree which is designated to remain that dies or becomes damaged beyond repair shall be replaced by the Contractor at his expense, with a tree of a size and species as directed by the Engineer.

3.02 REMOVAL OF TOPSOIL

- A. Strip and stockpile topsoil that will be reused in the Work. Place, grade, and shape stockpiles as directed by the Engineer for protection against erosion and for proper drainage.

3.03 UNDERGROUND UTILITIES

- A. Support and protect to the satisfaction of the utility owner, active utilities from any damage during excavation operations.
- B. In areas where there appears to be conflict between the existing underground utilities and the construction of the work covered by this Contract, it shall be the responsibility of the Contractor to dig test pits, uncover the existing utility, and promptly inform the Engineer of the existence of a conflict for his review and determination regarding resolving such situations. The Contractor shall perform the required task of uncovering existing utilities well ahead of the time he intends to

perform the new work in such areas. No payment will be made for uncovering existing utilities where they appear to be in conflict with the construction of the new work.

3.04 EXCAVATION AND TRENCHING

- A. The Contractor shall familiarize himself, and strictly comply with OSHA's Construction Standards for Excavation, 29 CFR Part 1926, Subpart P: Excavation, latest revision.
- B. Excavate earth as required for the Work.
- C. Unauthorized Excavations (removal of any material below subgrade elevations indicated on the Drawings, or beyond lateral dimensions indicated or specified herein, without specific written instruction from the Engineer): Backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.
- D. Slope the sides of excavations to retain soil repose. Sheet and shore excavations where sloping is not possible due to space restrictions or stability of material. Maintain sides and slopes of excavation in a safe condition to conform to OSHA and NYS Department of Labor rules and regulations, latest revisions, until completion of backfilling.
- E. Concrete Slabs and Bases: Excavate to the following depths below bottom of concrete for addition of select granular material, unless otherwise indicated:
 - 1. Interior: 6 inches.
 - 2. Exterior: 12 inches.
- F. Bell and Spigot Pipe: Unless otherwise indicated on the drawings, excavate trenches 24 inches wide for pipes up to 18" diameter plus the outside diameter of the pipe. Excavate trenches 36 inches wide for pipes greater than 18" diameter plus the outside diameter of the pipe. Cut trench bottom true and even. Excavate adequate bell holes to allow ample room for pipe connections and to allow for uniform bearing of pipe on a minimum of 6" depth of stone bedding or as shown on the applicable pipe bedding detail, for its full length.
- G. Conduit, Cable, Tubing and Piping (other than bell and spigot): Provide sufficient trench width for installation and to accommodate special backfill when specified.
- H. Comply with applicable governing restrictions during excavation and trenching. Shore and brace, or slope sides of excavations when directed in order to conform to governing laws of OSHA, NYS Labor Department.

- I. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade and shape stockpiles for proper drainage as directed.

3.05 SHEETING, SHORING AND BRACING

- A. Where sloping of excavations is not possible due to space restrictions, provide temporary sheeting with shoring and bracing as required to prevent damage or settlement to adjacent grounds and structures resulting from excavation operations. Shore and brace sheeting in compliance with OSHA's 29 CFR Part 1926, Subpart P, latest revision. Promptly remove temporary sheeting and shoring when no longer required.
- B. Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of temporary sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops 12 inches below grade.

3.06 DEWATERING

- A. Prevent surface and subsurface water from flowing into excavations and trenches which will interfere with the progress of the work. Pump out any accumulated water and dispose of in a manner approved by the OWNER and the ENGINEER.

3.07 EXISTING DRAINAGE DITCHES

- A. Provide positive drainage of surface water at all times during construction of work required under this Contract.
- B. Restore existing ditches to their original condition or better, immediately after installing the new work.
- C. The Contractor shall be responsible for any damages to public and/or private property resulting from blockage of drainage due to his construction activities and/or any delay in restoration of existing drainage ditches.
- D. Fertilize and seed slopes and bottom of ditches to prevent erosion after restoration of these ditches.

3.08 PLACING FILL AND BACKFILL

- A. Backfill as promptly as practical, but only after approval by the Engineer. Do not backfill with excavated material unless it meets the requirements of this section.

- B. Place backfill and fill materials in layers not more than 12 inches loose depth, except under pavements where layers shall be not more than 6 inches of loose depth. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
- C. Under Exterior Concrete Slabs and Bases:
 - 1. Up to subgrade surface elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase material: Place 12 inches of select granular material over subgrade surface.
- D. Under Exterior Pavement and Walks:
 - 1. Up to subgrade surface elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase material: Select granular material.
- E. Landscaped Areas: Place suitable excavated native material or select fill if ordered in writing by the Engineer up to subgrade surface elevation. Do not use material containing rocks over 4 inches diameter within the top 12 inches of suitable material.

3.09 COMPACTION

- A. Compact each layer of fill and backfill to the percentage of maximum density specified below. Compact bearing surface material at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier than the optimum content as determined by ASTM D-1557.
 - 1. Structures (area within 10 ft outside perimeter): 95 Percent
 - 2. Lawn or unpaved areas: 85 percent
 - 3. Pavements and walks: 95 percent

3.10 GRADING

- A. Rough Grading: Trim and grade excavations required by this contract, to a level 4 inches below finished grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.
- B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:
 - 1. Grassed areas: Finish areas to receive topsoil to within not more than 1 inch above or below the required subgrade surface elevations.
 - 2. Pavements, Walks, and Building Slabs: Grade subbase material smooth and even, free of voids, compacted as specified to within 1/4 inch above or below the required subbase elevation.

- C. Spread approved topsoil directly upon prepared subgrade surface to a depth measuring 4 inches after natural settlement of topsoil has occurred in areas to be seeded or to receive sod. Provide greater depth to adjust grades when directed by the Engineer.

3.11 RESTORATION

- A. Restore grades to indicated levels where settlement or damage due to performance of Work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials.
- B. Restore asphalt concrete pavements, drives, gutters, curbs, and other exterior surfaces damaged during performance of the Work, to match the appearance and performance of existing adjacent surfaces as closely as practicable and in conformance with the applicable municipality's requirements.
- C. Restore damaged lawn areas by topsoiling and seeding, or sodding. Water restored lawn areas as required until physical completion of the Work.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing.
- B. Transport surplus topsoil to area designated by the Owner or the Engineer. Smooth grade deposited topsoil.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Trenches for pipelines and appurtenances
- B. Maintaining trenches
- C. Encountering underground facilities
- D. Existing structures and pavements within the trench limits
- E. Trees, bushes, and plantings
- F. Surplus material
- G. Dust control
- H. Voids under adjacent structures

1.02 DEFINITIONS

- A. Trenching or Excavation
 - 1. Grubbing, stripping, removing, storing and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to the construction and completion of all the work under construction;
 - 2. All dikes, ditches, flumes, cofferdams, pumping, bailing, draining, well points, or otherwise disposing of water;
 - 3. The removing and disposing of all surplus materials from the excavations in the manner specified;
 - 4. The maintenance, accommodation and protection of travel and the temporary paving of highways, roads and driveways;
 - 5. The supporting and protecting of all tracks, rails, buildings, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, shrubbery, pipes, sewers, conduits or other structures or property in the vicinity of the work, whether over or underground or which appear within or adjacent to the excavations and the restoration of the same in case of settlement or other injury;
 - 6. All temporary bridging and fencing and the removing of same.

B. Earth

1. All materials such as sand, gravel, clay, loam, ashes, cinders, pavements, muck, roots or pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.

C. Backfill

1. The refilling of excavation and trenches to the line of filling indicated on the Contract Drawings or as directed using materials suitable for refilling of excavations and trenches; and the compacting of all materials used in filling or refilling by rolling, ramming, watering, puddling, etc., as may be required.

D. Spoil

1. Surplus excavated materials not required or not suitable for backfill or embankments.

E. Embankments

1. Fills constructed above the original surface of the ground or such other elevation as specified or directed.

F. Limiting Subgrade

1. The underside of the pipe barrel for pipelines.

G. Excavation Below Subgrade

1. Excavation below the limiting subgrade of pipelines.
2. Excavate to such new lines and grades as required when material encountered at the limiting subgrade is not suitable for proper support of pipelines.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum. Locate all utilities and underground obstructions prior to starting excavations, including cutting pavements.
- B. Cut pavement and pavement base over the proposed trench before excavating for pipeline installation. Utilize a jackhammer, wheel cutter ("Pizza Cutter") or power-driven saw. Cut pavement to the required trench width as approved by the OWNER.

- C. Relocate, remove and later restore, or replace existing structures in the proposed trench limits and those structures which would be damaged or impede progress.
- D. Protect the trunks of trees adjacent to the Work that are not to be cut. Tie back overhanging branches and limbs not to be cut to prevent injury from excavating machinery or any other operations related to the work.
- E. Do not cut or remove branches, limbs and roots except for those plantings included in clearing and grubbing areas. In the case of unavoidable damage to plantings, neatly trim the injured portions without splitting or crushing.
- F. Remove and temporarily store in soil, any plants and flowers which would be injured by the work. Replant in their original position after the Work has been substantially completed. Maintain until re-established. Replace with plantings of the same kind, quality and size that existed prior to construction when the original plantings die or their growth, beauty or usefulness is diminished as a result of the work.
- G. Maintain support of existing power, lighting, telephone, traffic control and utility poles adjacent to excavations as required by the owners of the poles.
- H. Do not operate on paved surfaces equipment which has treads or wheels that would cut or damage the pavement.
- I. Avoid damage to existing pavement other than pavement within the limits of the trench. Provide the pads of outriggers with protective covers, or place planks or timbers under the pads to prevent damaged to pavements. No payment shall be made for replacement or restoration of pavements beyond the payment limits which are damaged during the Work.
- J. Strip and stockpile topsoil in areas to be restored as field for eventual redistribution to its original profile location. Strip the entire depth of topsoil to a width of the trench payment limit plus 2 feet or greater as may be required by conditions or other installations. Stockpile topsoil on the parcel of land from which it was stripped at locations approved by the ENGINEER. Remove 10" and larger rocks from the topsoil.

3.02 EXCAVATION

- A. Excavate trenches to the lines and grades specified and as required. Backfill with special granular materials, concrete or other materials as directed by the ENGINEER, any excavated space carried beyond or below the lines and grades shown on the Contract Drawings, or as directed by the ENGINEER. Backfill unauthorized excavations at the CONTRACTOR's expense.

- B. Excavate the trench sides vertically between the centerline of the pipe and an elevation 1 foot above the top of the pipe unless this conflicts with the requirements of OSHA. In the case of rock excavation, excavate to 6 inches below invert elevation of pipe and 12 inches wider than the nominal pipe diameter. Maintain a minimum clearance of 6 inches around the pipe.
- C. Provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and remove all such water as fast as it may collect, in such a manner as shall not interfere with the progression of the work or the proper placing of pipes, or other work.
- D. Prevent damage to surrounding pavement, gutters and structures while excavating.
- E. Furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, damage the pipe, structures, or other work; diminish the width necessary for construction; otherwise damage or delay the work of the Contract; endanger existing structures, pipes or pavements; or cause the excavation limits to exceed the right-of-way limits.
 - 1. In no case will bracing be permitted against pipes or structures in trenches or other excavations.
 - 2. Drive sheeting vertically with the edges tight together as the excavation progresses, and in such manner as to maintain pressure against the original ground at all times. Design all bracing to maintain sheeting in its proper position.
 - 3. The adequacy of all sheeting and bracing is the sole responsibility of the CONTRACTOR.
 - 4. Remove and dispose all material which slides, falls, or caves into the established limits of excavations due to any cause whatsoever, at the CONTRACTOR's expense. No extra compensation will be paid to the CONTRACTOR for any materials ordered for refilling the void areas left by the slide, fall or cave-in.
- F. Discontinue machine excavation in the vicinity of pipes, conduits and other underground structures and facilities and complete the excavation with hand tools as required by Industrial Code Rule 753.
- G. When determination of the exact location of a pipe or other underground structure is necessary for completing the work properly, excavate test holes to determine such locations.
- H. When the bottom of any excavation is taken out beyond the limits indicated or prescribed, backfill and compact the resulting void with #1 or #2 crusher run compacted to 95% maximum modified Proctor density.

- I. Remove material which, in the opinion of the ENGINEER, is found to be unsuitable for foundation of the pipeline and appurtenances during excavation. Payment shall be made under the appropriate item of the bid.
- J. Use suitable surplus excavated materials for backfill of excavations in rock or to replace other materials unacceptable for use as backfill except in areas which require select backfill. Surplus excavated materials may be stockpiled at appropriate locations as needed for future use or as directed by the ENGINEER.
- K. Remove from the site all surplus excavated materials not needed.
- L. Replace existing structures (including concrete gutters, concrete sidewalks and curbs that are crossed by the proposed utility) and stone shoulders or other stone areas which are damaged or removed during the Work.
- M. When existing driveway culverts are encountered, replace with adequate size (minimum 12-inch diameter). Methods, materials, and alignment to be determined by the applicable highway department.
- N. Minimize the creation and dispersion of dust. Sweep and sprinkle with water as required by conditions.
- O. Completely fill all voids which occur under existing sidewalks, curbs, gutters, or other structures during the excavation with Type 5 Select Fill.
- P. Place and maintain a 2" thick layer of compacted temporary asphalt over backfilled trenches until permanent pavement is placed. Materials and workmanship for temporary pavement shall conform to the State of New York Department of Transportation specifications, the City of Rochester's Standard Specifications, and the specifications of any applicable municipality. The plant mix (cold patch or other approved material) shall be suitable for providing a smooth surface for traffic. Temporary pavement, if required, shall be paid for under the appropriate item in the bid.

END OF SECTION

SECTION 31 23 23

BACKFILLING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Backfilling around and above pipe and appurtenances
- B. Consolidation and compaction
- C. Backfill in paved areas, lawn areas and field areas
- D. Surplus material
- E. Fine grading

1.02 REFERENCES

- A. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- B. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 – PRODUCTS

2.01 SELECT FILL MATERIALS

- A. As specified in Section 31 23 24.

2.02 SUITABLE NATIVE MATERIALS

- A. Suitable Native Material: Shall be available site material consisting of mineral soil (inorganic), loose materials free from rocks and/or hard chunks of clay, free of sharp materials, and free of frozen materials. If materials on site are found to be not suitable, the CONTRACTOR shall import suitable material.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify installation has been inspected by the ENGINEER.

3.02 PREPARATION

- A. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with select fill and compact to 95% maximum modified Proctor density.
- B. When required to obtain the optimum moisture content, add, at no additional cost to OWNER, sufficient water during compaction to assure the specified maximum density of the backfill. If, due to rain or other causes, the material exceeds the optimum moisture content, it shall be allowed to dry, assisted if necessary, before resuming compaction or filling efforts.

3.03 BACKFILLING

- A. Backfill all excavations to the original surface of the ground or to such other grades as may be shown, specified, or directed.
 - 1. Backfill with suitable excavated materials which can be satisfactorily compacted during refilling of the excavation. In the event the excavated materials are not suitable, use select fill as specified or ordered by the ENGINEER.
 - 2. Refill and compact settlements and repair finished work damaged by settlement at no additional cost to OWNER.
- B. Backfill the zone around pipes (under, around and to a depth of 12 inches above the pipe) with washed #1 & #2 stone bedding in accordance with the Pipe Bedding Details. Place the material by means and manner as to not damage pipe or appurtenances and in layers not to exceed 6 inches in depth. Compact to 95% maximum modified Proctor density.
- C. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- D. Backfill trenches under streets, roads, driveways, walks, gutters and curbs or other areas requiring structural support with select fill, or as directed by the ENGINEER.
 - 1. Place and compact the select fill or native soil in uniform layers not exceeding 6" in compacted depth. Compact to 95% maximum modified Proctor density. Maintain optimum moisture content of backfill materials to attain required compaction density. Use compaction equipment suitable for material excavated, and pipe or appurtenance installed.

- E. For other areas use native soil which was removed in the course of the construction excavations or replacement fill. Distribute stones in the backfill to prevent the formation of voids. Do not incorporate in the backfill stones over 6 inches in any one dimension.
- F. Trenches in open fields, lawn areas and wooded areas, may be backfilled by filling in the entire trench, except for the zone around the pipe and the topsoil when stripped and stockpiled, in one operation and compacting the backfill with construction equipment, leaving the fill mounded slightly over the trench. Maintain the surface over the trench during the guarantee period.
 - 1. For trenches in areas to be restored under the field restoration item, backfill to allow for the original depth of the topsoil which was stockpiled. Upon completion of the subsoil backfilling, place the stockpiled topsoil on top of the subsoil. Remove large rocks (2" and above) and boulders from the topsoil. The cost of this work shall be included in the field restoration item of the bid.
- G. Employ a placement method that does not disturb or damage other work. Do not backfill against unsupported foundation walls.
- H. Remove surplus backfill materials from site.
- I. Each day complete fine grading operations of the work completed the previous day in areas other than pavement. In pavement areas, complete fine grading and install temporary asphalt the same day.
- J. Fine grade by leveling disturbed areas to as close to final finish grade as possible, leaving the fill mounded slightly over the trench. Remove all debris and place temporary asphalt as specified in the bid or as directed by the ENGINEER. Payment for temporary asphalt shall be made under the appropriate item of the bid.

3.04 FIELD QUALITY CONTROL

- A. The CONTRACTOR shall be responsible for all damage or injury done to pipes, structures, property, or persons due to improper placing or compacting of backfill.
- B. Compaction testing shall be performed in accordance with ANSI/ASTM D1556.

END OF SECTION

SECTION 31 23 24

SELECT FILL

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Types of Select Fill
- B. Placement and Installation
- C. Disposal of Displaced Material

1.02 REFERENCES

- A. ASTM D422, Standard Method for Particle-Size Analysis of Soils.

1.03 SUBMITTALS

- A. Submit name of supplier and source for each type of select fill material.
- B. Provide sample and test report for each type of select fill material.

PART 2 – PRODUCTS

2.01 SELECT FILL MATERIALS

- A. Type 1 is #1 Crusher Run Stone - NYSDOT Standard Specification Item No. 304.03:
Hard durable limestone or approved equal with the following gradation:

Sieve Size <u>Designation</u>	Percent Passing <u>By Weight</u>
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

- B. Type 2 is #2 Crusher Run Stone - NYSDOT Standard Specification Item No. 304.02: Hard durable limestone or approved equal with the following gradation:

Sieve Size <u>Designation</u>	Percent Passing <u>By Weight</u>
3 inch	100
2 inch	90 - 100
1/4 inch	30 - 65
No. 40	5 - 40
No. 200	0 - 10

- C. Type 3 is Run-of-Bank Gravel: Run-of-bank gravel or other approved granular material free from organic matter with a gradation:

Sieve Size <u>Designation</u>	Percent Passing <u>By Weight</u>
1-1/2 inch	100
1/4 inch	30 - 65
No. 200	0 - 10

- D. Type 4 is Sand: Coarse sand having the following gradation:

Sieve Size <u>Designation</u>	Percent Passing <u>By Weight</u>
3/8 inch	100
No. 4	90 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10

- E. Type 5 is Controlled Density Fill (CDF): "K-Krete", "Flowable Fill", or approved equal with a compressive strength of 50 to 100 psi. Fly ash or other pozzolan-containing materials are not acceptable in the mix design. The consistency shall be suitable for pumping or flowing into the annular space between a casing pipe and the carrier pipe.
- F. Type 6 Select Fill (Washed #1, or Washed #1 and #2 Mix).

PART 3 – EXECUTION

3.01 STORAGE AND PROTECTION

- A. Store loose granular materials on solid flat surfaces in a well-drained area.
- B. Protect materials and prevent mixing with foreign matter.

3.02 INSTALLATION

- A. Place select fill in accordance with Section 312323 - Backfilling or as otherwise specified or directed.
- B. Employ a placement method that does not disturb or damage other work.

3.03 DISPOSAL OF DISPLACED MATERIALS

- A. Remove and properly dispose of surplus or displaced materials.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil
- B. Placing topsoil
- C. Seeding, hydroseeding, mulching and fertilizing
- D. Maintenance

1.02 REFERENCES

- A. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.03 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.
- B. Substantial Completion of Seeding: The Work shall not be accepted as substantially complete until such time as restoration of seeded areas has been completed in accordance with this Section, with the exception of Section 32 92 19, Article 1.07, Maintenance and Protection of Seeded Areas and Article 3.07 Maintenance.

1.04 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. All seed to be fresh, clean and from current season's crop.

1.05 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

- B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of General Conditions.
- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.07 MAINTENANCE AND PROTECTION OF SEEDED AREAS

- A. Maintain and protect seeded areas from vehicular and pedestrian traffic immediately after placement until grass is well established and exhibits a vigorous growing condition.

PART 2 – PRODUCTS

2.01 SEED MIXTURE

- A. Seed Mixture for Lawn Areas:
 - 1. 29.40% Kentucky Bluegrass, 80% germination
 - 2. 32.64% Creeping Red Fescue, 85% germination
 - 3. 35.64% Perennial Ryegrass, 90% germination
 - 4. 0.30% Crop
 - 5. 0.50% Weed
 - 6. 1.52% Inert
- B. Seed Mixture for Field and other Non-Lawn Areas:
 - 1. 50% Annual Ryegrass, 90% germination
 - 2. 50% Perennial Ryegrass, 90% germination
- C. Seed Mixture for Low Maintenance Areas:
 - 1. 15.0% Birdsfoot Trefoil (Empire), 80% germination
 - 2. 85.0% Red Fescue (Pennlawn), 85% germination
- D. Germination rates shall be based on test results from the previous year.

2.02 SOIL MATERIALS

- A. Topsoil for Lawn Areas: Screened, fertile, friable, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay, stone or impurities, plants, weeds and roots; pH value of minimum 5.5 and maximum 7.5.
- B. Topsoil for Field and other Non-lawn Areas: Use the stockpiled topsoil which was stripped from these areas.
- C. Topsoil for Low Maintenance Areas: Use stockpiled and screened topsoil as defined above.
- D. Stockpile materials onsite at locations approved by the ENGINEER. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

2.03 ACCESSORIES

- A. Fertilizer: FS O-F-241, Type I Grade A, recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil to the following proportions: Nitrogen 10 percent, phosphoric acid 6 percent, soluble potash 4 percent.
- B. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.
- C. Erosion Fabric: Jute matting, open weave.
- D. Stakes: Softwood lumber, chisel pointed.
- E. String: Inorganic fiber.

2.04 TESTS

- A. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the ENGINEER for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION OF SUBSOIL

- A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.
- C. Scarify subsoil to a depth of 3-inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

3.03 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4-inches in lawn areas. In field areas reapply topsoil that was stripped and stockpiled to its original depth. In areas designated as low maintenance, reapply topsoil that was stripped and stockpiled, and if necessary, add topsoil to obtain a minimum depth of 3-inches. Rake until smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low, or soft areas, and to ensure positive drainage. The compacted topsoil shall match the preconstruction grade.

3.04 FERTILIZING

- A. Apply fertilizer at a rate of 5 pounds per 1000 square feet.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Mix thoroughly into upper 2-inches of topsoil.
- D. Water lightly to aid the dissipation of fertilizer.

3.05 HYDROSEEDING

- A. If CONTRACTOR elects not to place fertilizer as per Article 3.04, fertilizer is to be incorporated into the seeded slurry.
- B. Apply seeded slurry with a hydraulic seeder at a rate of 5 pounds per 1000 square foot evenly.

- C. Seeded slurry shall contain wood cellulose fiber, green in color, applied at a rate of 1,000 to 1,500 pounds per acre.
- D. Seeded slurry to contain soil seal applied at the manufacturer's recommended rate.
- E. Apply water with a fine spray immediately after each area has been mulched. Saturate soil to a depth of 4-inches.
- F. Planting Season: April 1 to July 1 and August 15 to October 15.

3.06 PROTECTION OF RESTORED AREAS

- A. Identify seeded areas with stakes and string around area periphery. Set string height to 30-inches.
- B. Cover seeded slopes where grade is 4-inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- C. Lay fabric smoothly on surface, bury top end of each section in 6-inch deep excavated topsoil trench. Provide 12-inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
- D. Secure outside edges and overlaps at 36-inch intervals with stakes.
- E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6-inches.

3.07 MAINTENANCE

- A. Water seeded areas until these areas exhibit a dense, vigorous growth of grass. After three weeks, reseed those areas which do not exhibit a dense, vigorous growth of grass.
- B. Roll surface to remove minor depressions or irregularities.
- C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- D. Immediately reseed areas which show bare spots.
- E. Protect seeded areas with warning signs during maintenance period.

3.08 APPLICATION

- A. Areas maintained as Lawns: Grass seed mixture specified, 4-inches topsoil, and hydroseed.
- B. Field and other non-lawn Areas: Grass seed mixture specified, native soil, and hydroseed.
- C. Low Maintenance Areas: Grass seed mixture specified, native and, if necessary, screened topsoil to achieve a minimum depth of 3-inches, and hydroseed.

END OF SECTION

SECTION 33 01 30.11

TELEVISION INSPECTION OF SEWERS

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The work covered by this Section includes the furnishing of labor, tools, equipment, and materials, and performing operations required for the closed-circuit televising (CCTV) of sewer pipelines and laterals.
- C. The work shall also include complete maintenance of wastewater flows during CCTV operations.

1.02 REFERENCES

- A. National Association of Sewer Service Companies (NASSCO)
 - 1. Pipeline Assessment Certification Program (PACP)

1.03 SUBMITTALS

- A. CCTV:
 - 1. Submit a written scheme for sanitary sewage flow control 5 working days prior to plugging, blocking, or bypassing flow for purpose of CCTV testing.
 - a. The Contractor shall be responsible for damage caused as a result of the sewer line being plugged, blocked, or bypassed.
 - 2. Submit completed recording of sanitary sewer to the Owner within 5 days of closed-circuit televising. Include log sheet. Log sheet shall conform to requirements of this Section.
 - a. Recording and log sheet shall become the property of the Owner.

1.04 PERFORMANCE REQUIREMENTS

- A. Closed Circuit Televising (CCTV):
 - 1. Recordings that are out of focus or improperly exposed shall not be accepted.
 - 2. Provide recording in digital format on DVD disc.
 - 3. Rate of camera advance: 0.5 ft/sec maximum.

PART 2 – PRODUCTS

2.01 CAMERA

- A. Television cameras used for investigation shall be specifically designed and constructed for sewer investigation. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Picture quality and definitions shall be to the complete satisfaction of the OWNER. Camera shall be capable of moving or being moved through the sewer line in either direction at a uniform rate of approximately one-half foot per second.

2.02 RECORDED MEDIA: Digital format on DVD disc.

2.03 CCTV LOG SHEET

- A. 8.5" X 11" format sheet with columns for recording field conditions, defect conditions, pipe footage, and written comments. Include the following header information on each log sheet, required information is denoted by an asterisk (*):
 - 1. Name and address of firm performing televising (*)
 - 2. Date and time of investigation (*)
 - 3. Weather conditions and temperature
 - 4. Foreman's name
 - 5. Location of investigation (*)
 - a. Town or City
 - b. Street name
 - c. Name of subdivision and section if known or applicable.
 - 6. Manhole stationing (*)
 - 7. Length of sewer measured from the center of manhole (*)
 - 8. Upstream and downstream manhole inverts (*)
 - 9. Diameter and material of mainline pipe (*) and manholes
 - 10. Direction of televising with reference to the direction of flow
 - 11. Recorded disc identification number.
- B. Provide written conclusions and observations of each section of sewer televised.

PART 3 – EXECUTION

3.01 MAINTENANCE OF SEWAGE FLOWS

- A. Maintain sewage flows from upstream sewers and laterals without interruption throughout the Work.

- B. If temporary modification to the sewer system or service laterals for maintenance of sewer service results in any damage to public or private property, repair the damage including cleaning of basements where sewage has backed up.

3.02 BYPASS PUMPING

- A. The CONTRACTOR shall provide bypass pumping, when required, for the flow of sewage around the section, or sections, of pipe designated for CCTV. The bypass shall be made by plugging the line at the 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 anticipated flow. The OWNER may require a detail of the bypass plan to be submitted.
- B. Bypass pumping shall be in accordance with Section 01 57 25.

3.03 TELEVISION INSPECTION

- A. The television camera used for inspection shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Focus and iris settings on the camera shall result in a crisp, clear, illuminated view of the interior of the sewer pipe. The camera shall be capable of being moved through the sewer line in either direction at a uniform, slow rate of about one-half foot per second. Final products that are out of focus or improperly exposed are not acceptable. Picture quality and definitions shall be to the complete satisfaction of the OWNER.
- B. During the actual television inspection, a log shall be maintained by the CONTRACTOR's Operating Technician. This log will be a complete record of all structural defects, service connections, abnormal conditions and other pertinent data observed, together with the footage distance of each. This log will be maintained on forms to be supplied by the CONTRACTOR, in a format approved by the OWNER. The CONTRACTOR shall use a separate log sheet for each section of sewer pipe.
- C. The Operating Technician will utilize a title panel to document on the video pertinent data observed and pipe footage. Video shall display the title panel and indicate pipe footage by character generation. Audio narration is not acceptable.
- D. Position CCTV equipment to create minimal disruption to pedestrian and vehicular traffic. Utilize traffic control devices such as cones, signs, etc., as required by local ordinances.

- E. Exercise safety awareness for individual protection, for the benefit of other members of the CCTV crew, and the general public.
- F. Clean debris from pipe invert to ensure camera travel and maximum observation of the inside of the pipe. Perform light sewer cleaning with a high-pressure water-flushing machine as necessary.
- G. Indicate pipe footage on the recorded video by audio narration or by character generator. Avoid extraneous noise in the Control Room to minimize distortion of audio signal.
- H. Illuminate interior of the sewer pipe to ensure a well-defined picture.
- I. Clear fog created by condensation in the sewer pipe prior to closed-circuit televising.
- J. Remove ropes, strings, and/or cables from the sewer immediately upon completion of the closed-circuit televising.
- K. Maximum depth of sanitary sewage flow during CCTV testing:
 - 1. 6" - 10" Pipe: 20% of pipe diameter
 - 2. 12" - 24" Pipe: 25% of pipe diameter
 - 3. 27" & larger Pipe: 30% of pipe diameter.
- L. Flow Control Precautions: When flow in a sewer line is plugged, blocked, or bypassed; take adequate care to protect the sewer lines from damage that might result from sewer surcharging.
 - 1. Take precautions to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.
 - 2. Do not plug any segment of active sewer for televising without the consent of the OWNER.
- M. The focus and iris settings on the camera shall be such that a crisp, clear view of the interior of the sewer is obtained. Recordings that are out of focus or improperly exposed shall not be accepted.
- N. Utilize a title panel to document on the recorded video pertinent data about the sewer segment to be televised. The panel may be a handwritten board placed in front of the camera, or it may be displayed via a character generator. Use a separate log sheet for each segment of sewer that is televised. Note the following features:
 - 1. Lateral tap left or right
 - 2. Pipe joint offset

3. Pipe line sag, begin and end stations
 4. Camera submerged, begin and end stations
 5. Ponding water over one-half inch (2") in depth, begin and end stations
 6. Estimated groundwater infiltration rate
- O. The video shall be DVD format. Videos shall be compatible for playback in a DVD player. The videos and logs will become the property of the OWNER. If the OWNER determines the quality of the DVDs to be unacceptable, the CONTRACTOR shall re-inspect and televise the sewer at no additional cost to the OWNER.
- P. The CONTRACTOR shall be responsible for any and all potable water necessary for cleaning, liner installation, testing, clean-up or any other requirements of the work. All ropes, strings, and or cables, if used, shall be removed from the sewer pipe immediately upon completion of the television inspection.
- Q. For each Purchase Order, the CONTRACTOR shall submit the DVD's and logs to the OWNER within five (5) business days of completing the work.
- R. The section of sewer being inspected shall be isolated from the remainder of the sewer during the televised video inspections. CONTRACTOR shall bypass all sewage flow around the section of sewer being inspected. Bypass pumping shall be in accordance with Specification Section 01 57 00.
- S. Post-construction television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The installed sewer liner shall be free of significant visual defects, damage, deflection, holes, etc.

END OF SECTION

SECTION 33 01 30.41

CLEANING OF SEWERS

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The work covered by this Section includes the furnishing of labor, tools, equipment, and materials, and performing operations required for the cleaning of sewer pipelines and laterals.
- C. The work shall also include complete maintenance of wastewater flows during cleaning operations.

1.02 REFERENCES

- A. National Association of Sewer Service Companies (NASSCO)
 - 1. Pipeline Assessment Certification Program

1.03 DEFINITIONS

- A. Light Sewer Cleaning
 - 1. Removal of Deposits Settled (DS):
 - a. Pipe size up to 12-inches; 25%
 - b. Pipe size 13- to 24-inches; 15%
 - c. Pipe size 25- to 36-inches; 10%
- B. Heavy Sewer Cleaning
 - 1. Removal of Obstructions (OB) and Deposits Settled (DS) that exceed percentage established for light cleaning. This also includes Deposits Attached Grease (DAGS) if able to remove with rotating nozzle or other mechanical means; not to include saws or cutters.
- C. Deposit Cut
 - 1. Removal of Deposits Attached Encrustation (DAE) and Deposits Attached Grease (DAGS) that require a cutter to remove.
- D. Root Cut Medium
 - 1. Root Cut Medium - Removal of Roots Medium (RM), and Root Balls (RB) in one or two joints

- E. Root Cut Ball
 - 1. Removal of Root Balls (RB) removed in at least 3 joints
- F. Lateral Cut
 - 1. Removing protruding laterals, excludes DIP, SP, CAS etc.

1.04 SUBMITTALS

- A. CCTV:
 - 1. Submit a written scheme for sanitary sewage flow control 5 working days prior to plugging, blocking, or bypassing flow for purpose of CCTV testing.
 - a. The Contractor shall be responsible for damage caused because of the sewer line being plugged, blocked, or bypassed.
 - 2. Submit completed recording of sewer to the Owner within 5 days of closed-circuit televising. Include log sheet. Log sheet shall conform to requirements of this Section.
 - a. Recording and log sheet shall become the property of the Owner.

PART 2 – PRODUCTS

2.01 SEWER CLEANING AND GRINDING OF SERVICE CONNECTIONS

- A. Equipment shall be specifically designed and constructed for sewer cleaning.
- B. The Contractor shall use the manufacturer's recommended size tools for the various size pipes. Equipment recommended by the manufacturer to protect the manhole and pipe, such as pull-in slant jack rollers and roller and yoke assembly, roller manhole jacks, etc. shall be utilized.
- C. The Contractor shall have a CCTV camera in the sewer, during all cleaning operations to include: Lateral Cut and Deposit Cut. The camera shall be used for the Contractor's verification that the cleaning equipment is not damaging the public sewer. No submittal is required for this item and the cost for monitoring the cleaning equipment operation shall be included in the associated unit cost for the cleaning item.

2.02 CAMERA

- A. Television cameras used for investigation shall be specifically designed and constructed for sewer investigation. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Picture quality and definitions shall be to the complete satisfaction of the OWNER. Camera shall be capable of moving or

being moved through the sewer line in either direction at a uniform rate of approximately one-half foot per second.

2.03 RECORDED MEDIA: Digital format on DVD disc.

PART 3 – EXECUTION

3.01 MAINTENANCE OF SEWAGE FLOWS

- A. Maintain sewage flows from upstream sewers and laterals without interruption throughout the Work.
- B. If temporary modification to the sewer system or service laterals for maintenance of sewer service results in any damage to public or private property, repair the damage including cleaning of basements where sewage has backed up.

3.02 BYPASS PUMPING

- A. The CONTRACTOR shall provide bypass pumping, when required, for the flow of sewage around the section, or sections, of pipe designated for cleaning. The bypass shall be made by plugging the line at the 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 anticipated flow. The OWNER may require a detail of the bypass plan to be submitted.
- B. Bypass pumping shall be in accordance with Section 01 57 25.

3.03 SEWER CLEANING AND GRINDING OF SERVICE CONNECTIONS - GENERAL

- A. Solids and debris resulting from the cleaning operation shall be collected and removed from the downstream manhole and disposed of at a site selected by the Owner and approved by appropriate jurisdictional personnel. Under no circumstances shall sewage solids be dumped onto the surface, street, or into ditches, inlets, or storm drains.
- B. The Contractor shall use the manufacturer's recommended size tools for the various size pipes. Equipment recommended by the manufacturer to protect the manhole and pipe, such as pull-in slant jack rollers and roller and yoke assembly, roller manhole jacks, etc. shall be utilized.
- C. The Contractor shall dispose of all sanitary debris and material at a location to be provided and directed by the Owner. The Contractor shall not be reimbursed for disposal costs.

- D. Retrieval of Materials and Equipment: It shall be the Contractor's responsibility to remove materials and equipment that has been lodged in the sewer from cleaning, television inspection, or point repair excavations.
- E. The Contractor is required to submit documentation of the work that is performed, and the type of debris removed, as well as landfill permits and disposal documentation.
- F. The Contractor shall have a CCTV camera in the sewer, during all cleaning operations to include: Lateral Cut and Deposit Cut. The camera shall be used for the Contractor's verification that the cleaning equipment is not damaging the public sewer. No submittal is required for this item and the cost for monitoring the cleaning equipment operation shall be included in the associated unit cost for the cleaning item. This in no way waives the Contractor's responsibility for damaging the sewer but is intended to bring the resulting damage to the Contractor's attention so that the operation can be stopped in a timely manner.

3.04 LIGHT SEWER CLEANING

- A. Clean the sewer and associated manholes, including drop connections and benches, to remove all Deposits Settled (DS), so that the sewer is ready for televising. Cleaning will require an unlimited number of passes of a hydraulic flusher to remove loose debris and collect it for removal in the downstream manhole. All debris must be removed from the sewer, including any debris that may have been washed up into any service connections (does not include known pre-existing conditions in service connections), drop connections or the bench wall of the manholes. This work does not include any root cutting, deposit removal, or grinding of protruding service connections.

3.05 HEAVY SEWER CLEANING

- A. Remove all obstructions in the sewer. All debris must be removed from the sewer, including any debris that may have been washed up into any service connections (does not include known pre-existing conditions in service connections), drop connections or the bench wall of the manholes. Heavy Sewer Cleaning includes all grease, rocks, debris, sticks, etc. that will reduce the hydraulic capacity of the sewer and limit future maintenance access of remote equipment. Heavy Sewer Cleaning includes an unlimited number of passes by high velocity hydro-cleaning equipment. A mechanical/hydraulic Spinner Nozzle may be used where necessary at no additional cost to the Owner.
 - 1. The Contractor is responsible for damage to the sewer or service connections. Heavy Sewer Cleaning does not include cutting/grinding protruding break-in connections.

- B. Maintain detailed documentation of cleaning efforts made to remove these items. Such documentation shall be made available to the Owner at any time.
- C. Immediately notify the Owner if the level of cleaning will cause a sewer collapse due to the existing deterioration of the host pipe. The Owner will determine whether to continue or stop work.

3.06 DEPOSIT CUT

- A. Removal of Deposits Attached Encrustation (DAE) and Deposits Attached Grease (DAGS) that require a cutter to remove. Remove all obstructions in the sewer. All debris must be removed from the sewer, including any debris that may have been washed up into any service connections (does not include known pre-existing conditions in service connections), drop connections or the bench wall of the manholes. Deposit Cut includes all deposits, grease, debris, sticks, etc. that will reduce the hydraulic capacity of the sewer and limit future maintenance access of remote equipment. Deposit Cut includes an adequate number of passes using high velocity hydro-cleaning equipment required to produce a clean pipe. A mechanical/hydraulic root, chain cutter, or similar equipment may be used where necessary at no additional cost to the Owner.
 - 1. The Contractor is responsible for damage to the sewer or service connections. Deposit Cut does not include cutting/grinding protruding break-in connections.
- B. Deposit Cut work requires substantial effort toward cleaning, chipping, cutting, and grinding to remove hardened deposits, grease, and similar materials. Use remote CCTV equipment to monitor the progress of the work and ensure that the sewer is not damaged.
- C. Immediately notify the Owner if Deposit Cut activities performed will cause damage due to the existing deterioration of the host pipe. The Owner will determine whether to continue or stop work.
- D. The Contractor shall maintain detailed documentation of cleaning efforts made to remove Deposit Cut materials.
- E. If attached deposits cannot be removed by tools normally used in the industry, the Owner should be consulted immediately. The Owner and the Contractor will discuss whether to cancel the work on that segmentation.

3.07 ROOT CUT

- A. The Owner will determine if the sewer segment requires root cut cleaning. All roots must be screened, collected, and removed from the sewer for proper disposal.

- B. Immediately notify the Owner if the root cutting activities performed will cause a sewer collapse due to the existing deterioration of the host pipe. The Owner will determine whether to continue or stop work.

3.08 LATERAL CUT

- A. Removing protruding laterals, excluding ductile iron pipe, steel pipe, cast iron pipe, etc.
- B. The Owner will determine when break-in service connections will require grinding based on review of the initial survey television inspection. Cut/grind the protruding service connection by using a remote grinding/cutting device capable of removing, concrete, vitrified clay, PVC, and other types of pipe material. The device shall be specifically designed to cut/grind protruding service connections. Use remote CCTV equipment to monitor the progress of the work and ensure that the service connection is not damaged.
- C. Cut/grind-flush the protruding break-in service to the main sewer pipe without scouring or damaging the main sewer or service connection. All cuttings must be screened, collected, and removed from the sewer for proper disposal.
- D. During the final survey television inspection, slowly pan the entire circumference of the trimmed connection to verify the quality of the work.
- E. Immediately notify the Owner if the pipe is not structurally sound. The Contractor and Owner shall discuss the severity and risk of cutting/grinding the lateral. The Owner shall then determine, if the lateral will be cut/ground at the Owners risk, or if the work should not be performed.
- F. If other than typical lateral materials are encountered, notify the Owner, and the Owner and Contractor will discuss the ability, costs and risks associated with cutting/grinding the lateral. The Owner will decide whether to cut/grind the lateral or to not cut/grind the lateral.

3.09 TELEVISION INSPECTION

- A. The television camera used for inspection shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Focus and iris settings on the camera shall result in a crisp, clear, illuminated view of the interior of the sewer pipe. The camera shall be capable of being moved through the sewer line in either direction at a uniform, slow rate of about one-half foot per second. Final products that are out of focus or improperly exposed are not acceptable. Picture quality and definitions shall be to the complete satisfaction of the OWNER.

- B. During the actual television inspection, a log shall be maintained by the CONTRACTOR's Operating Technician. This log will be a complete record of all structural defects, service connections, abnormal conditions and other pertinent data observed, together with the footage distance of each. This log will be maintained on forms to be supplied by the CONTRACTOR, in a format approved by the OWNER. The CONTRACTOR shall use a separate log sheet for each section of sewer pipe.

END OF SECTION

SECTION 33 01 30.72

CURED-IN-PLACE PIPE LINING

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The work covered by this Section includes the furnishing of labor, tools, equipment and materials, and performing operations required for the rehabilitation of pipelines, conduits and laterals by the installation of a resin-impregnated flexible tube, which is tightly formed to the original conduit by use of a hydrostatic head. The resin is cured using hot water under hydrostatic pressure within the tube. The Cured-In-Place Pipe (CIPP) shall be continuous and tight fitting.
- B. The resin-impregnated flexible tube rehabilitation system shall be designed, provided, and installed in accordance with the Partially Deteriorated Design method by an approved and qualified manufacturer and installer.
- C. The work shall also include complete maintenance of wastewater flows, and the locating and reopening of service wyes or tees.

1.02 SYSTEM DESCRIPTION

- A. All materials shall be accompanied by test reports certifying that the material conforms to the ASTM listed herein. Materials shall be shipped, stored, and handled in a manner consistent with the written recommendations of the manufacturer. Storage locations shall be approved by the Engineer.
- B. The CONTRACTOR shall conform with all work safety requirements of pertinent regulatory agencies and shall secure the site for the working condition in compliance with the same. The CONTRACTOR shall erect such signs and other devices as are necessary for the safety of the work site.
- C. The CONTRACTOR shall perform work in accordance with applicable OSHA standards.
- D. The CONTRACTOR shall repair or replace any damaged pipe as recommended by the manufacturer or as required by the OWNER at the CONTRACTOR's expense.

1.03 REFERENCES

- A. General: References shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.
- B. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
- C. ASTM F1743 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).
- D. ASTM D3262 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- E. ASTM D3681 – Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition.
- F. ASTM D5813 - Standard Specification for Cured-in-Place Thermosetting Resin Sewer Piping Systems.
- G. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for all equipment and products of this section.
- B. Shop Drawings: Submit shop drawings for all equipment and materials to be used during rehabilitation procedures.
- C. Manufacturer's literature, specifications, engineering data, and shop drawings showing complete information on the pipe rehabilitation system including materials composition, physical properties, and dimensions of the pipe. Include pipe manufacturer's recommendations for handling, storage, and repair of damaged pipe.
- D. The CONTRACTOR/installer shall provide CIPP liner thickness design calculations for the specific location.
- E. Methods of construction and restoration of service including detailed drawings, schedules, and written descriptions of construction procedures to install pipe, and bypass sewage.

- F. Two (2) copies of pre- and post-construction televised video inspection reports and two (2) copies of the televising videos (DVD format).
- G. Copy of the proposed letter to the Homeowners advising them about the proposed repair and necessity of shutting the sewer service for a day shall be submitted for Engineers review and approval prior to distribution. Letter shall be distributed by the CONTRACTOR to the Homeowners not less than seven (7) days prior to the construction.

1.05 PRODUCT REQUIREMENTS

- A. The system proposed (materials, methods, workmanship) must be proven through previous successful installations to an extent and nature satisfactory to the OWNER and the Engineer that is commensurate with the size of the project being proposed. Since CIPP is intended to have a 50-year design life, only products deemed to have this performance will be accepted.
- B. For a Product to be considered Commercially Proven, a minimum of 250,000 linear feet or 1,000 manhole-to-manhole line sections of successful wastewater collection system installations in the United States must be documented to the satisfaction of the OWNER to assure commercial viability.
- C. 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. Test samples shall be prepared so as to simulate installation methods and trauma of the product. No product will be approved without independent third-party testing verification.
- D. CIPP Field Samples - When requested by the OWNER, the CONTRACTOR shall submit test results from field installations in the USA 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 paragraph 2.02.C have been achieved in previous field applications. Samples for this project shall be made and tested as described in paragraph 3.07.
- E. Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9000 or other internationally recognized organization standards. Proof of certification shall be required for approval.
- F. All required submittals must be satisfactory to the OWNER.
- G. Regulatory Requirements: Comply with applicable local, state, and federal regulations, safety standards, and codes. Where conflicts arise, follow the stricter requirements.

1.06 CONTRACTOR/INSTALLER QUALIFICATIONS

- A. Shall be in accordance with the Instructions to Bidders.
- B. The Installer must have successfully installed at least 100,000 feet of the product bid in wastewater collection mainline systems and 5,000 feet in lateral lines. Acceptable documentation of these minimum installations must be submitted to the OWNER.
- C. The CONTRACTOR shall be certified as a licensed installer of the manufacturer's pipe system.
- D. The Contractor shall provide certificate of training for all personnel directly involved with installing the pipe.
- E. Manufacturer's list of at least three (3) similar installations in satisfactory operation.
- F. It is the responsibility of the CONTRACTOR to confirm that any subcontractor or manufacturer proposed for performance of the work can demonstrate the minimum requirements specified herein. Rejection of any subcontractor and/or manufacturer shall not be grounds for modifications to the Contract Documents. No change in contract time of completion or contract cost will be allowed as a result of such rejection of a subcontractor and/or manufacturer to meet the minimum requirements specified herein.

PART 2 – PRODUCTS

2.01 CIPP LINER MATERIALS

- A. Tube
 - 1. The tube shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven or woven material, or a combination of nonwoven and woven materials, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit irregular pipe sections and negotiate bends.
 - 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 inversion. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.
 - 3. The tube shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness.
 - 4. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough that the resin is clearly visible, and shall be firmly bonded to the felt material.

5. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 feet. Such markings shall also include the lining manufacturer's name or identifying symbol.
6. The outside 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.
7. 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.
8. 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.
9. Seams in the Tube shall be stronger than the non-seamed felt.

B. The Resin System

1. 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 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project.
2. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

2.02 STRUCTURAL REQUIREMENTS FOR CIPP LINER

- A. The design thickness of the liner for each individual Purchase Order shall be arrived at using standard engineering methodology. ASTM F1216, Appendix X1, has such an acceptable methodology that may be used where applicable. The long-term flexural modulus to be used in the design shall be verified through testing. The long-term modulus shall not exceed 50% of the short-term value for the resin system unless the tube contains reinforcements. In the event that a reinforced tube is utilized, the long-term flexural modulus shall be the percentage of the short-term modulus as determined by the above referenced testing.
- B. The layers of the finished 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 such that the knife blade moves freely between the layers. If separation of the layers occurs during testing of the field samples, new samples will be cut from the work. Any reoccurrence may be cause for rejection of the work.

- C. The finished CIPP shall fit tightly to the host pipeline at all observable points and shall meet or exceed the minimum thickness established by the design process. The materials properties of the finished CIPP shall meet or exceed the following structural standards:

MINIMUM PHYSICAL PROPERTIES

Property	ASTM Ref	Polyester System	Filled Polyester System	Vinyl Ester System
Flexural Strength	D790	4,500 psi	4,500 psi	5,000 psi
Flexural Modulus (Initial)	D790	250,000 psi	400,000 psi	300,000 psi
Flexural Modulus (50 year)	D790	125,000 psi	200,000 psi	150,000 psi
Tensile Strength	D638	3,000 psi	3,000 psi	4,000 psi

- D. The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.
- E. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the Long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing. 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 this 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.

2.03 DESIGN REQUIREMENTS (FOR CIPP LINER THICKNESS)

- A. The minimum thickness of the cured-in-place lining to be installed shall be as determined for the given conditions imposed. Calculations for the determination of the required liner pipe stiffness shall be the largest pipe stiffness for each CIPP installation reach (access point to access point), as determined by calculations provided for the following parameters:
1. Maximum Deflection
 2. Minimum Pipe Stiffness
 3. Ring Bending Strain
 4. Constrained Buckling Resistance Using Long-Term Modulus of Elasticity

- B. Design criteria may change for case-by-case design calculations, if approved by the OWNER. An analysis of design criteria and calculations for the liner thickness shall be provided to the OWNER for approval, whose decision shall be final. The OWNER may vary the liner thickness for the same size sewer, depending upon field condition of the pipes and/or depths.
- C. Correction of failed liner or liner deemed unacceptable, as a result of the post-video inspection and/or test reports for structural values, thickness, chemical resistance, etc., shall be the responsibility of the CONTRACTOR, at no extra cost to the OWNER. Method of correction/repair shall be approved by the OWNER with prior field demonstration, if required. It shall be understood that minimum criteria of the specification shall not be lowered to compromise with lower than the required test values, unless approved in writing.
- D. The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7. Application of Enhancement (K) Factors in excess of 7 shall be substantiated through independent test data.
- E. The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in Part 2.02 C and in accordance with the Design Equations in the appendix of ASTM F 1216, and the following design parameters:

Depth of Cover ¹	Actual per project
Depth of Groundwater Above Pipe	Assumed Ground Surface or per project
Specific Weight of Soil	120 lbs./ft.
Wheel Load ²	16,000 lbs.
Railroad Load ³	80,000 lbs.
Design Temperature	80°F
Deflection Lag Factor, D _L	1.2 (50 years)
Modulus of Soil Reaction E'	1,200 psi
Ovality Correction Factor	As applicable to pipe material and installed shape.
Long-Term Modulus of Elasticity	50 years under constant stress, when submerged in water, to be used for constrained buckling resistance design for combined external loads from groundwater and earth cover.
Minimum Safety Factor	2.0, unless otherwise specified (not applicable for maximum bending strain)
Shape Factor	4
Deflection Coefficient	0.103

Notes:

¹ Design of the CIPP shall be based on prism load on the liner pipe, using the outside diameter of the CIPP in the calculations.

² Impact factors to be included when depth of cover is less than 3 feet, per values recommended by AASHTO.

³ Impact factors to be included when depth of cover is less than 10 feet, per criteria established by AREA *"Manual of Recommended Practice"*.

- F. 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.
- G. The cured-in-place lining shall be designed such that the lining shall not fail, collapse, buckle, crack, or delaminate under load. The maximum long-term (50 years) calculated deflection under all loads shall not exceed five percent (5%). For glass, fiber-reinforced liner pipe, the bending strain (50 years) developed shall not exceed the higher of the minimum long-term value in ASTM D 3262 for the pipe stiffness supplied, or that substantiated by long-term strain tests done in accordance with ASTM D 3681 using 1.0 N sulfuric acid.

2.04 CHEMICAL RESISTANCE

- A. 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.
- B. For glass, fiber-reinforced liner materials, the CONTRACTOR shall provide chemical resistance test reports required under ASTM 3681 "Chemical Resistance of Fiberglass (Glass-Fiber-Thermosetting-Resin) Pipe in a Deflected Condition", as indicated in the Design Criteria of this section.

PART 3 – EXECUTION

3.01 RESPONSIBILITIES FOR INCIDENTAL ITEMS

- A. It shall be the responsibility of the OWNER to locate and designate all access points for the work, and to provide rights of access to these points. In the event the contractor elects to conduct lateral lining from locations within private property, the CONTRACTOR shall obtain a temporary easement or otherwise written evidence to the OWNER demonstrating permission of the property owner. This temporary easement or written evidence of permission shall also include hold harmless clauses protecting both the property owner and the OWNER.

- B. The CONTRACTOR shall be responsible to coordinate with the appropriate governing agency regarding access to water from fire hydrants for cleaning, installation of the tube, and other work items requiring water.
- C. The CONTRACTOR, when required, shall remove, and properly dispose of all internal debris out of the pipeline that will interfere with the installation of the CIPP.
- D. The CONTRACTOR shall perform light sewer cleaning as necessary and a pre-construction televised video inspection to document the physical condition of the sewer pipe including, but not limited to, the location and description of all pipe defects, infiltration/exfiltration leaks, service connections, and other observed conditions. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP into the pipelines, and it shall be noted so that these conditions may be corrected. All televising shall be performed in accordance with Part 3.08.
- E. 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 installation process, and it cannot be removed by conventional sewer cleaning equipment, then the CONTRACTOR shall notify the OWNER. If the OWNER elects to continue the CIPP insertion of this section, the OWNER, at their expense, will implement the necessary measures to uncover and remove or repair the obstruction, and will notify the CONTRACTOR of the estimated schedule for completion of the repair and the consequential resumption of the CIPP insertion activity.
- F. After installation of the new sewer pipe and reinstatement of service connections, the CONTRACTOR shall perform a post-construction close circuit television inspection of the rehabilitated section. If requested, this inspection shall be done in the presence of the OWNER or their representative. The television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The installed sewer pipe shall be free of significant visual defects, damage, deflection, holes, etc. All televising shall be performed in accordance with Part 3.08.

3.02 PUBLIC NOTIFICATION

- A. Prior to beginning construction, the CONTRACTOR will prepare and distribute to all property OWNERS and tenants affected by the project a letter outlining the proposed improvements and the anticipated duration of each phase of construction. This letter will be reviewed and approved by the OWNER and Engineer prior to distribution and will be distributed by the CONTRACTOR not less than seven (7) days prior to the beginning of work or within such other time as the Engineer may direct.

- B. 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.
- C. A public notification program shall be implemented, and shall as a minimum, require the CONTRACTOR to be responsible for contacting each home, tenant 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:
 - 1. Written notice to be delivered to each home, tenant or business 24 hours 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 problems which could arise.
 - 2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

3.03 BYPASS PUMPING

- A. The CONTRACTOR shall provide bypass pumping, when required, for the flow of sewage around the section, or sections, of pipe designated for rehabilitation. The bypass shall be made by plugging the line at the 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 anticipated flow. The OWNER may require a detail of the bypass plan to be submitted.
- B. Bypass pumping shall be in accordance with Section 015725.

3.04 INSTALLATION

- A. The CIPP shall be installed in accordance with the practices given in ASTM F1216 (for direct inversion installations) or ASTM F1743 (for pulled-in-place installations).
- B. The wet-out tube shall be positioned in the pipeline using either inversion or a pull-in method as defined within relevant ASTM standards previously stipulated. If pulled into place, a power winch or its equivalent 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.
- C. The quantity of resin used for the tube's impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances being made for polymerization shrinkage and the anticipated loss of any resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used

in conjunction with a roller system to achieve a uniform distribution of the resin throughout the tube.

- D. Temperature gauges shall be placed at the upstream and downstream ends of the reach being lined to monitor the pressurized fluid's (air or water) temperature. In addition to monitoring the temperature inside the tube, temperature gauges shall be placed between the host pipe and the liner at as many points as is practical to record the heating that takes place on the outside of the liner.
- E. Curing of the resin system shall be as per the Manufacturer (Licensor) of the CIPP product. The temperatures achieved and the duration of holding the pressurized fluid at those temperatures shall be per the Manufacturer's (Licensor's) established procedures.

3.05 REINSTATEMENT OF BRANCH CONNECTIONS

- A. All sewer service connections shall be identified and located by the CONTRACTOR using non-intrusive methods such as video TV camera or "M-scoping" prior to the pipe insertion to expedite reconnection. Upon commencement, pipe insertion shall be continuous and without interruption from access point to access point, except as approved by the Engineer. Upon completion of insertion of the new pipe, the CONTRACTOR shall expedite the reconnection of services to minimize inconvenience to the customers.
- B. Service lateral connections shall be done by remote-controlled televised cutting device and be made by experienced operators so that no blind attempts or holes are made in the liner pipe. Location shall be re-verified carefully with pre-rehabilitation videos for accuracy, especially where dimples are not defined or clearly ascertained. The remote cut shall be smooth and circular in nature, as seen by a 360-degree television camera. The hole shall be a maximum of 100 percent and a minimum of 95 percent of the service pipe diameter. It shall be properly aligned and be concentric to the existing connection.
- C. 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 Engineer, 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.
- D. Excess wrong holes or trial cuts shall not be made and must be repaired at no cost to the OWNER to the full satisfaction of the OWNER. Defective connections shall be repaired to the OWNER's satisfaction, at no extra cost. The OWNER reserves the right to require service connection by excavation at certain or all locations, at the

CONTRACTOR's expense, if the quality, workmanship, and approval rating for remote cut is poor and not satisfactory.

- E. One or more homes discharging into a common connection shall be considered as one service connection. The number of total reconnections shall not be increased without prior approval.

3.06 QUALITY ASSURANCE PROCEDURES

- A. The CONTRACTOR shall prepare a sample for each installation of CIPP. The samples shall be restrained samples for diameters of CIPP less than 18"; and flat plate samples for diameters of CIPP 18" and larger. The flat plate samples shall be taken directly from the wet-out tube, clamped between flat plates, and cured in the downtube. The restrained samples shall be tested for thickness and initial physical properties; flat plate samples shall be tested for initial physical properties only.
- B. 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.

3.07 INSPECTION

- A. CIPP samples 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.
- B. 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 Part 2.03 of this Section.
- C. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

3.08 TELEVISION INSPECTION

- A. The television camera used for inspection shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Focus and iris settings on the camera shall result in a crisp, clear, illuminated view of the interior of the sewer pipe. The camera shall be capable of being moved through the sewer line in either direction at a uniform, slow rate of about one-half foot per second. Final products that are out of focus or improperly exposed are not acceptable. Picture quality and definitions shall be to the complete satisfaction of the ENGINEER.

- B. During the actual television inspection, a log shall be maintained by the CONTRACTOR's Operating Technician. This log will be a complete record of all structural defects, service connections, abnormal conditions and other pertinent data observed, together with the footage distance of each. This log will be maintained on forms to be supplied by the CONTRACTOR, in a format approved by the ENGINEER. The CONTRACTOR shall use a separate log sheet for each section of sewer pipe.
- C. The Operating Technician will utilize a title panel to document on the video pertinent data observed and pipe footage. Video shall display the title panel and indicate pipe footage by character generation. Audio narration is not acceptable.
- D. The video shall be DVD format. Videos shall be compatible for playback in a DVD player. The videos and logs will become the property of the OWNER. If the OWNER determines the quality of the DVDs to be unacceptable, the CONTRACTOR shall re-inspect and televise the sewer at no additional cost to the OWNER.
- E. The CONTRACTOR shall be responsible for any and all potable water necessary for cleaning, liner installation, testing, clean-up or any other requirements of the work. All ropes, strings, and or cables, if used, shall be removed from the sewer pipe immediately upon completion of the television inspection.
- F. For each Purchase Order, the CONTRACTOR shall submit the DVD's and logs to the ENGINEER within ten (10) business days of completing the work.
- G. The section of sewer being inspected shall be isolated from the remainder of the sewer during the televised video inspections. CONTRACTOR shall bypass all sewage flow around the section of sewer being inspected. Bypass pumping shall be in accordance with Specification Section 015725.
- H. Defects which may affect the integrity or strength of the sewer, service connections, or manhole connections as determined by the Engineer shall be repaired or replaced by the CONTRACTOR at no additional cost to the OWNER. Post-construction television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The installed sewer liner shall be free of significant visual defects, damage, deflection, holes, etc.

3.09 RESTORATION AND CLEANUP

- A. 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.

- B. CONTRACTOR shall be responsible for final site restoration including, but not limited to, restoring all lawn, pavement, gutters, curbs, sidewalks, and roadways disturbed or otherwise damaged by the CONTRACTOR's operations to as good condition as existed prior to commencement of the Work and in accordance with applicable local and state specifications, details, standards, and requirements.

3.09 WARRANTY

- A. New sewer pipe shall be certified by the manufacturer for specified material properties. The CONTRACTOR shall warrant the pipe and installation in accordance with maintenance bond. During the warranty period, any defects which affect the integrity of strength of the pipe shall be repaired at the CONTRACTOR's expense in a manner mutually agreed by the OWNER and the CONTRACTOR.

3.10 LATERAL LINING

- A. In accordance with all provisions and requirements described herein, it is the intent of this section to also include and provide these same specifications for the CIPP lining of laterals, usually from a clean out (without the need for excavation) to the point of junction with the main sewer.
- B. The lateral liner shall be a tubular resin impregnated sleeve with sufficient stretch such that it can transition from 4" to 6" in diameter and can negotiate bends without excessive wrinkling. The method involves the impregnation of an absorbent carrier material; the inversion of the material into the lateral, the curing of the sleeve leaving behind a hard-plastic sleeve mechanically bonded to the host pipe.
- C. Prior to lining of the lateral video-taped evidence must document that the section of lateral pipe to be relined is free of debris, obstructions, scale, or any other material that effectively reduces the bore of the pipe. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations.
- D. The lateral liner must be designed and installed so that it extends completely to the inside wall of the mainline pipe. In cases where the liner protrudes into the mainline pipe, the contractor shall be responsible for the mechanical removal of that section of liner, leaving a smooth bore to the inside of the mainline sewer.
- E. All other applicable standards and requirements of this technical specification shall apply to the CIPP lining of lateral pipelines.

END OF SECTION

SECTION 33 01 30.74

CURED-IN-PLACE LATERAL LINING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. This Section describes the requirements of the CONTRACTOR to furnish labor, materials, and equipment for the complete installation of cured-in-place epoxy lining of sewer laterals.
- B. This Section addresses work issued to the CONTRACTOR specific to the performance of cured-in-place lining of laterals from an outside cleanout, without excavation. In the event the CONTRACTOR elects to install a lateral liner from locations within private property rather than an outside cleanout as designated by the OWNER, the CONTRACTOR shall provide either a temporary easement or otherwise written evidence of permission from the property owner to the OWNER documenting such authority. The easement or otherwise written authority shall include explicit hold harmless clauses protecting both the property owner and the OWNER.
- C. The lateral liner shall be a tubular resin impregnated sleeve with sufficient stretch such that it can transition from 4" to 6" in diameter and can negotiate bends without excessive wrinkling. The method involves the impregnation of an absorbent carrier material; the inversion of the material into the lateral, the curing of the sleeve leaving behind a hard-plastic sleeve mechanically bonded to the host pipe.
- D. Prior to lining of the lateral video-taped evidence must document that the section of lateral pipe to be relined is free of debris, obstructions, scale, or any other material that effectively reduces the bore of the pipe. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations.
- E. All other applicable standards and requirements identified within the technical specifications provided herein shall apply.

1.02 SUBMITTALS

- A. License and Certificates
 - 1. The CONTRACTOR shall provide documentation that he/she is a licensed installer of the manufacturer's CIPP system.
 - 2. The CONTRACTOR shall provide a certificate of training for all personnel directly involved with the CIPP of sewer laterals.

- B. Product Data: Submit manufacturer's technical product data, literature, specifications, engineering data, design parameters for liner/tube thickness for each lateral, shop drawings, and installation instructions for all equipment and products of this section.
- C. Draft Notification Letter to Property Owners and Tenants. The letter shall advise the property owner and tenants (if any) of pending proposed repair and necessity (if any) of interrupting sewer service.
- D. The Recorded Pre- and Post- Work CCTV Video Inspection of Sewer Laterals on DVD.
- E. CIPP Installation Log. For each individual lateral a log shall be prepared by the CONTRACTOR with all aspects of the pipe and the liner recorded including: pipe diameter; material; defects; cleaning; liner length and thickness; resin mix and curing times.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - 2. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 - 3. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 4. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
 - 5. ASTM D1600 – Standard Terminology for Abbreviated Terms Relating to Plastics.
 - 6. ASTM F1743 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).

PART 2 – PRODUCTS

2.01 GENERAL: The cured-in-place epoxy pipelining system shall be *Nu Flow, or approved equal*.

2.02 LINING TUBE

- A. The tube shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven or woven material, or a combination of non-woven and woven materials, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used. The material should be able to stretch to fit and conform to the irregular pipe sections, offset bends, bells, and negotiate bends.

- B. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.
- C. The tube shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness.
- D. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough the resin is clearly visible, and shall be firmly bonded to the felt material.
- E. The outside 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.
- F. The tube shall be homogenous 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.
- G. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color, such as light blue, so that a clear detailed examination with closed circuit television inspection equipment may be made.
- H. Seam in the tube shall be stronger than the non-seamed felt.
- I. The felt tube will have an integrated bladder inside it, the bladder will be made from materials compatible with the felt and resin systems used and will withstand the required installation pressure.
- J. Lateral to main sewer optional connection, as directed by the Owner:
 - 1. "Top Hat" type connection with 12-inch insertion into the lateral and "brim" type interface with the interior wall of the main sewer pipe.

2.03 RESIN SYSTEM

- A. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy 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 work.
- B. The resin shall produce a CIPP which will comply with the structural and chemical resistance requirements of this specification.

- C. The resin used to impregnate the tube shall produce a cured tube that shall be resistant to shrinkage, shall not corrode or oxidize, and shall also be resistant to abrasion from solids, grit, and sand in wastewater. The resin shall have proven resistance to the municipal wastewater environment.
- D. The resin shall have proven resistance to ultra-violet light (sunlight) at any stage prior to installation.
- E. The resin shall be an epoxy resin and shall be solvent free. Polyester and vinyl ester resin are not acceptable.
- F. The resin system proposed shall not contain silicones, stearates, and/or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.
- G. Exposure to the chemical solutions listed in Table 1 shall be conducted at temperatures of up to 75 degrees F. This test shall be conducted for a minimum period of one month and shall result in a loss of not more than 20 percent of the initial structural properties.

Table 1.
Minimum Chemical Resistance Requirements for Typical
Municipal Sewer Applications. ASTM D543.

<u>Chemical Solution Concentration</u>	<u>%</u>
Tap Water (pH 6-9).....	100
Nitric Acid.....	5
Phosphoric Acid.....	10
Sulfuric Acid.....	10
Gasoline	100
Vegetable Oil.....	100
Detergent or Soap.....	0.1

- H. Structural Requirements for CIPP Liner
 - 1. The minimum thickness for the CIPP, after curing, shall be calculated in accordance with ASTM 1743, and the design parameters provided for each case.
 - 2. The finished CIPP shall fit tightly to the host pipeline at all observable points and shall meet or exceed the minimum thickness established by the design process. The material's properties of the finished CIPP shall meet or exceed the following structural standards:

Table 2. CIPP Initial Structural Properties – ASTM F1743

Property	ASTM Test Method	Minimum Value
Tensile Strength	D638	3,000 psi
Flexural Strength	D790	4,500 psi
Short Term Flexural Modulus of Elasticity	D790	250,000 psi
<i>Flexural Modulus of Elasticity (50 year)</i>	<i>D790</i>	<i>125,000 psi</i>

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

PART 3 – EXECUTION

3.01 Property Notification

- A. The CONTRACTOR shall provide written notification to property owners and tenants (if any) no less than three (3) days prior to the beginning of work.

3.02 Pre-Installation Inspection and Preparation

- A. The CONTRACTOR shall perform light sewer cleaning as necessary and a pre-construction CCTV televised video inspection to document the physical condition of the sewer pipe including but not limited to location and description of pipe defects, leaks, roots, and other observed conditions. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP into the lateral and it shall be noted so that these conditions may be corrected.
- B. 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 the CIPP.
- C. If the pre CIPP installation inspection reveals any conditions that may or will prevent the installation process of the CIPP tube that cannot be corrected via auguring, snaking, and/or flushing the pipe etc., such as a severe drop joint, or a collapsed pipe, then the CONTRACTOR shall immediately notify the OWNER. If the OWNER elects to continue the CIPP insertion of the lateral, the OWNER, at their expense, will implement the necessary measures to uncover and remove or repair the adverse condition, and will notify the CONTRACTOR of the estimated schedule for completion of the repair and consequential resumption of the CIPP insertion activity.

3.03 Preparation of the tube: "Wet-Out"

- A. The amount of resin and catalyst required shall be accurately calculate based on the size and thickness of the felt, and thoroughly mixed per the manufacturer's requirements.
 - 1. Quantity of resin used for the tube's impregnation shall be sufficient to fill the volume of air voids in the tube w/ additional allowances made for polymerization shrinkage and the anticipated loss of any resin through cracks and irregularities of the pipe wall.
- B. Cover the wet-out area with clean plastic to prevent any resin from spilling onto the ground.
- C. The liner shall be laid out on the clean plastic with metal rollers in place ready to impregnate the resin into the felt.
- D. The resin shall be poured between the felt and the rubber bladder thoroughly to saturate the flexible felt tube with resin using the metal rollers.
- E. Fold and tape the resin impregnated tube to enable an easy installation.

3.04 Tube Insertion

- A. The installation operation shall be carried out using trenchless technology eliminating the need for excavation.
- B. The liner will be installed using *standard inversion methods* or the pull in place method where the liner bladder system will be pulled to the specified location in the pipe and the bladder will be inflated using compressed air or water to an adequate pressure forming the liner to tightly fit the internal circumference of the pipe.
- C. The cured-in-place pipe shall provide a smooth bore interior and shall conform to the existing pipe eliminating groundwater and root infiltration. The tube will be continuous in length and wall thickness shall be uniform.
- D. The lateral liner must be designed and installed so that it extends completely to the inside wall of the mainline pipe. In cases where the liner protrudes into the mainline pipe, the CONTRACTOR shall be responsible for the mechanical removal of that section of liner, leaving a smooth bore to the inside of the mainline sewer.

3.05 Curing

- A. The epoxy resin used shall be designed to have an ambient curing cycle and can be cured using one of the following methods:
 - 1. The bladder will be inflated using air and the liner left in place until the resin curing cycle is complete.
 - 2. The bladder can be inflated using hot water which will result in a shorter curing cycle.
 - 3. Curing of the resin system shall be as per the Manufacturer (Licensor) of the CIPP product.

3.06 Post-Televising Inspection

- A. After installation of the new sewer pipe and reinstatement of service, the CONTRACTOR shall perform a post-construction closed-circuit televised inspection of the rehabilitated pipe. If requested, this inspection shall be done in the presence of the OWNER.
- B. The televising inspection shall be recorded on a DVD to be provided to the OWNER
- C. The television inspection shall be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections.
- D. The finished CIPP shall be continuous and free from visual defects such as foreign inclusions, dry spots, pinholes, delimitation, and wrinkles.

3.07 Documentation

- A. The following items shall be provided to the OWNER at the completion of each lateral CIPP and prior to final payment.
 - 1. An installation log for each individual lateral with all aspects of the pipe and the liner recorded including: pipe diameter; material; defects; cleaning; liner length; resin mix and curing times.
 - 2. A separate DVD containing the Pre, Post CIPP and final video for each individual lateral.

- 3.08 After installation of the CIPP and reinstatement of service, the CONTRACTOR shall perform a post-construction CCTV inspection of the rehabilitated pipe. If requested, this inspection shall be done in the presence of the OWNER. The television inspection shall be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections.

END OF SECTION

SECTION 33 01 30.81

MANHOLE REHABILITATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. This Section describes the furnishing and installing of masonry and epoxy coatings that provide structural integrity and corrosive correction to manhole walls, benches, and inverts. Products shall meet the minimum requirements and standards referenced below and where products from different manufacturers are utilized the CONTRACTOR shall demonstrate material compatibility to the OWNER.
- B. Products used in the rehabilitation shall be from a single manufacturer to insure material compatibility.

1.02 SUBMITTALS

- A. Submit product data including:
 - 1. Manufacturer's specifications, product data, catalog cuts, installation instructions, and dimensional data.
- B. Certifications-Qualifications
 - 1. Submit certification or other evidence of training provided by the rehabilitation material manufacturer for persons applying manhole rehabilitation products.
 - 2. Demonstrate to the ENGINEER that persons applying manhole rehabilitation products are qualified to do so and/or approved by the manufacturer for application of the manhole rehabilitation products.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. General: materials used shall be designed, manufactured, and intended for manhole and sewer structure rehabilitation and the specific application in which they are used.
 - 1. Deliver materials to the project site in original unopened packages and clearly labeled with the manufacturer's identification and printed instructions. Store and handle materials in accordance with manufacturer's recommendations.

2. Acceptable Manufacturer:
 - a. Parson Environmental Products, Inc.
 - b. OWNER approved equivalent
- B. Lining/Coating for Manhole Rehabilitation in low to moderate corrosive environments (pH range 3+): Cement Mortar Manhole Lining Product - *Parson MH Liner*
 1. Portland cement based microsilica enhanced, fiber-reinforced cementitious liner with application thickness capabilities up to 3" in a single coat.

<u>Property</u>	<u>Reference</u>	<u>Values</u>
Compressive Strength	ASTM C109	1 day > 4,000 psi 28 day > 9,000 psi
Flexural Strength	ASTM C293	28 day > 1,600 psi
Tensile Strength	ASTM C496	28 day > 800 psi
Applied Density		125 pcf
Sulfide Resistance	ASTM C267	No weight loss after 90 days in 20,000 ppm aqueous sulfuric acid solution
Bond	ASTM C882	> 2,000 psi
Shrinkage	ASTM C596	28 days 0.0% (at 90% RH)
Freeze/Thaw	ASTM C666	300 cycles, No damage
Permeability	AASHTO T277	< 300 coulombs

- C. Lining/Coating for Manhole Rehabilitation in high corrosive environments (pH range 0): Epoxy Corrosion Barrier Lining Product – *Parsonpoxy SEL-80*
 1. 100% solids epoxy corrosion protection barrier applied at thicknesses up to 100 mils per coat.

<u>Property</u>	<u>Reference</u>	<u>Values</u>
Set time @ 70-degree F		6-8 hours
Cure time @ 70-degree F		18-20 hours
Compressive Strength	ASTM D695	19,500 psi
Tensile Strength	ASTM D638	8,000 psi
Flexural Strength	ASTM D790	13,000 psi
Elongation	ASTM D638	4.3% min.
Flexural Modulus (initial)	ASTM D790	750,000 psi
Flexural Modulus (long-term)	ASTM D790	375,000 psi
Modulus of Elasticity	ASTM D638	554,000 psi
Impact, IZOD	ASTM D256	0.315 ft. lb.
Adhesion	ASTM D4541, conc Steel SSPC-10	Substrate Failure > 1,500 psi
Hardness, Shore D	ASTM D2240	88
Water Vapor, Transmission	ASTM D1653, Method B	3.6 gms/sq. m per 24 hrs

<u>Property</u>	<u>Reference</u>	<u>Values</u>
Taper Abrasion, CS17 Wheel	ASTM D4060, 1000 g load/1,000 cy	< 110 mg loss
Temperature Resistance	Steel, unprimed & conc	220-degree F

PART 3 – EXECUTION

3.01 PREPARATION

- A. Inspect manholes for suitability of products prior to installation and prepare surfaces in accordance with manufacturer's recommendations.

3.02 INSTALLATION

- A. Masonry Surface Restoration for Manhole Walls, Benches, and Inverts:
 1. Thoroughly clean using a minimum 3,500 psi waterblast, and remove loose mortar, paints, protective coatings, efflorescence, and all contaminants and curing components to provide a clean, structurally sound substrate before application of products. Wire brush or sand blast where required.
 2. Apply coatings to a thickness recommended by the manufacturer, with a minimum thickness of ½". Application of product can be accomplished by low to medium velocity wet mix shotcrete equipment or by trowel, with application thickness up to 3" in single lifts. Finish may be done by trowel, float, and/or brush.
 3. Where large voids exist in manhole walls or sewer structures, patching shall be required using recommended products, or products suitable to the repair.
- B. Epoxy Coating Finish for Manholes with Moderate to High Corrosive Environments:
 1. Prior to application of epoxy coating, manhole surfaces must be clean, intact, and structurally sound as rehabilitated and repaired in accordance with Part 3.02 A above.
 2. Corrosion Barrier Coatings shall be accomplished through methods and equipment prescribed by the manufacturer.

END OF SECTION

TERM CONSTRUCTION CONTRACT #7 - CURED IN PLACE PIPELINING (BP#1207-20)**Kenyon Pipeline Inspection, LLC (Vendor# 11118291)**

SAP Contract #77-49

SAP		TCC#7 Pay Item	TCC#7 Description (SAP Short Text)	Unit	2025 Unit Price
Item	Mtl #				
010	1041688	501B	MOBILIZATION (DIRECTED BY OWNER)	HR	\$ 65.00
020	1041689	740	SERVICE LATERAL CONNECTION BY REMOTE	EA	\$ 300.00
030	1041690	741	REPAIR PROTRUDING LATERAL CONNECTIONS	EA	\$ 500.00
040	1041691	742A	TEMPORARY BYPASS PUMPING	6"-12" DIAMETER	DAY \$ 1,300.00
050	1041692	742B		15"-24" DIAMETER	DAY \$ 1,750.00
060	1041693	742C		27"-36" DIAMETER	DAY \$ 1,950.00
070	1041693	742D		42"-60" DIAMETER	DAY \$ 2,300.00
080	1041694	700L*	FULL SECTION CIPP REHAB	4"&5" DIAMETER LATERAL	LF \$ 149.25
090	1041695	700		4"&5" DIAMETER	LF \$ 35.69
100	1041696	701L*		6" DIAMETER LATERAL	LF \$ 148.71
110	1041697	701		6" DIAMETER	LF \$ 47.59
120	1041698	702		8" DIAMETER	LF \$ 38.07
130	1041699	703		10" DIAMETER	LF \$ 38.07
140	1041700	704		12" DIAMETER	LF \$ 42.83
150	1041701	705		15" DIAMETER	LF \$ 65.44
160	1045172	705A		16" DIAMETER	LF \$ 65.44
170	1041702	706		18" DIAMETER	LF \$ 83.28
180	1041703	707		21" DIAMETER	LF \$ 95.17
190	1041704	708		24" DIAMETER	LF \$ 118.97
200	1041705	709		27" DIAMETER	LF \$ 154.65
210	1041706	710		30" DIAMETER	LF \$ 190.34
220	1041707	711		36" DIAMETER	LF \$ 261.72
230	1043989	712		42" DIAMETER	LF \$ 297.41
240	1047611	713		48" DIAMETER	LF \$ 315.26
250	1047612	714		54" DIAMETER	LF \$ 380.69
260	1047613	714		60" DIAMETER	LF \$ 505.61
270	1047614	716		66" DIAMETER	LF \$ 599.58
280	1047615	717		72" DIAMETER	LF \$ 701.89
290	1041708	720	SPOT CIPP REHAB - 1 st 5LF	4"&5" DIAMETER	EA \$ 1,189.65
300	1041709	721		6" DIAMETER	EA \$ 1,189.65
310	1041710	722		8" DIAMETER	EA \$ 1,189.65
320	1041711	723		10" DIAMETER	EA \$ 1,427.58
330	1041712	724		12" DIAMETER	EA \$ 1,784.48
340	1041713	725		15" DIAMETER	EA \$ 2,379.30
350	1047616	725A		16" DIAMETER	EA \$ 2,379.30
360	1041714	726		18" DIAMETER	EA \$ 3,331.02
370	1041715	727		21" DIAMETER	EA \$ 3,568.95
380	1041716	728		24" DIAMETER	EA \$ 5,353.43
390	1041717	729		27" DIAMETER	EA \$ 5,948.25
400	1041718	730		30" DIAMETER	EA \$ 5,948.25
410	1041719	731		36" DIAMETER	EA \$ 8,327.55
420	1047617	732		42" DIAMETER	EA \$ 9,517.20
430	1047618	733		48" DIAMETER	EA \$ 9,517.20
440	1047619	734		54" DIAMETER	EA \$ 14,275.80
450	1047620	735		60" DIAMETER	EA \$ 17,844.75
460	1041720	250C	TEST / INSERTION PIT EXCAVATION	CY	\$ 1.08
470	1041721	402I	TURF RESTORATION	SF	\$ 0.01
480	1047621	718-1	4"-6" TOP HAT CIPP LATERAL REHAB	IN 8" MAIN SEWER	EA \$ 2,141.37
490	1047622	718-2		IN 10" MAIN SEWER	EA \$ 2,141.37
500	1047623	718-3		IN 12" MAIN SEWER	EA \$ 2,379.30
510	1047624	718-4		IN 15" MAIN SEWER	EA \$ 2,974.13
520	1047625	718-5		IN 16" MAIN SEWER	EA \$ 2,974.13
530	1047626	718-6		IN 18" MAIN SEWER	EA \$ 3,568.95
540	1041722	789	STANDARD COMPOSITE MH REPAIR	CEMENT MORTAR COATING	SF \$ 17.30
550	1047627	790		EPOXY COATING	SF \$ 12.98
560	1041723	791		ADD'L MH REPAIR - Masonry Coating >3" Thickness	LB \$ 0.55
570	1047628	792	HEAVY CLEANING OF SEWERS	HR	\$ 477.87
580	1044087	793	CCTV -	8"- 12" MAIN SEWER	LF \$ 2.12
590	1044088	794	ADDITIONAL	>12" - 36" MAIN SEWER	LF \$ 2.12
630	1047629	795	WORK	>36"- 60" MAIN SEWER	LF \$ 5.31