Invitation for Bid No. 2024-048

Sewer Repair & Rehabilitation

Due Date: December 10, 2024
Time: 2:00 PM Local Time
Submittal Location: Union County Government Center
Procurement Department
500 N. Main Street, Suite 709
Monroe, NC 28112

Non-Mandatory Pre-Bid Conference

Date: November 20, 2024
Time: 10:00 AM Local Time
Location: Union County Operations Center, Training Room
4600 Goldmine Road, Monroe, NC 28110

Procurement Contact:

Corey Brooks, CLGPO
Senior Procurement Specialist
704.283.3683
corey.brooks@unioncountync.gov

Contents

1 NOTICE OF ADVERTISEMENT

Union County, North Carolina
IFB No. 2024-048
Sewer Repair & Rehabilitation

Sealed bids for Sewer Repair & Rehabilitation Services will be received by the Union County Procurement Department *until* **2:00 PM** local time on **December 10, 2024,** at the Union County Government Center, 500 North Main Street, Suite 709, Monroe, NC 28112 at which time the bids will be opened and read. **Late bids will not be accepted**.

If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "**BID ENCLOSED – 2024-048**" and shall be addressed to Union County Procurement Department, Attn: Corey Brooks, 500 North Main Street, Suite 709, Monroe, NC 28112.

Union County, North Carolina, through Union County Water/Wastewater Operations, is soliciting bids from qualified companies for Sewer Repair & Rehabilitation as described in this solicitation.

This solicitation may be examined at the Union County Government Center, Procurement and Contract Management Department, 500 North Main Street, Suite 709, Monroe, NC 28112, Monday through Friday between the hours of 8:00 am and 5:00 pm. Copies of the solicitation may be obtained from the locations listed below free of charge:

1. Download the Solicitation Documents from the Union County website: https://www.unioncountync.gov/departments/bids-procurement/current-bids

2. Download the Solicitation Documents from the State of North Carolina eVP website: https://evp.nc.gov/solicitations/ (Search County of Union)

A Non-Mandatory, Pre-Bid Conference will be held on **November 20, 2024 at 10:00 AM Local Time** at the **Union County Operations Center Training Room, 4600 Goldmine Road, Monroe, NC 28110**. Representatives from Union County Water/Wastewater will be on-hand to give a brief overview of the project and to answer questions. Attendance at this meeting is strongly encouraged.

All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the Procurement contact person listed on the cover page (corey.brooks@unioncountync.gov). Deadline for questions is **November 26, 2024, at 5:00 PM** local time.

Bidders must have a license to do work as a general contractor in the State of North Carolina, as set forth under Article 1 chapter 87 of the North Carolina General statutes.

Bidders are required to comply with the non-collusion requirements set forth in the Bidding Documents.

The County reserves the right to reject any and/or all bids, including, without limitation, nonconforming, nonresponsive, unbalanced, or conditional bids. The County also reserves the right to waive informalities and request clarification as needed.

Union County encourages good faith effort outreach to Minority Businesses (HUB Certified) and Small Businesses.

2 BID SUBMISSION

2.1 BID SUBMISSION DEADLINE

Sealed bids are to be received by the Union County Procurement Department for Sewer Repair & Rehabilitation until **December 10, 2024, at 2:00 PM Local Time** at the Union County Government Center, 500 North Main Street, Suite 709, Monroe, NC 28112 at which time the bids will be opened and read. **Late bids will not be accepted.**

2.2 BID DELIVERY REQUIREMENTS

All Bids must be in a sealed box or opaque envelope plainly marked as follows:

[Name of Firm Submitting Bid]
IFB No. 2024-048
Sewer Repair & Rehabilitation
Attention: Corey Brooks

Your company name and the solicitation number must be visible on the delivery box/envelope. Ship, Mail, or Hand Deliver to the following address:

Union County Government Center
Procurement Department
500 North Main Street, Suite 709
Monroe, NC 28112
Attention: Corey Brooks

Electronic (email) or facsimile submissions will not be accepted.

There is no expressed or implied obligation for Union County to reimburse firms for any expenses incurred in preparing Bids in response to this request.

Union County reserves the right to reject any or all Bids, to waive technicalities and to make such selection deemed in its best interest. Union County, at its sole discretion, reserves the right to supplement, amend, substitute or otherwise modify this IFB at any time, to cancel this IFB with or without the substitution of another IFB, and to issue additional request for information.

2.3 NON-MANDATORY PRE-BID CONFERENCE

A Non-Mandatory Pre-Bid Conference will be held on November 20, 2024, at 10:00 AM Local Time at the Union County Operations Center Training Room, 4600 Goldmine Road, Monroe, NC 28110. Representatives from Union County Water/Wastewater will be on-hand to give a brief overview of the project and to answer questions. Although attendance at this meeting is not mandatory, it is strongly encouraged.

2.4 BID QUESTIONS

Bid questions will be due on or before **November 26, 2024, at 5:00 PM** local time. The primary purpose of this is to provide participating Bidders with the opportunity to ask questions, in writing, related to the IFB.

Submit questions by email to Corey Brooks at corey.brooks@unioncountync.gov by the deadline shown above. (Do not send questions in a graph or Excel sheet format.) *The email subject line should be identified as follows: IFB 2024-048 Sewer Repair & Rehabilitation for Cured-In-Place-Pipe and Manhole-to-Manhole Lining.* All questions and answers may be posted as addenda on the County Website and the North Carolina eVP Website as indicated on the Advertisement Page of this solicitation.

2.5 BID ADDENDUM

Union County may modify the IFB prior to the date fixed for submission of Bids by the issuance of an addendum. Should an Offeror find discrepancies or omissions in this IFB, or any other documents provided by Union County, the Offeror should immediately notify the County of such potential discrepancy in writing via email as noted above.

Any addenda to these documents shall be issued in writing. No oral statements, explanations, or commitments by anyone shall be of effect unless incorporated in the written addenda. Receipt of Addenda shall be acknowledged by the Offeror on Appendix C – Addendum and Anti-Collusion Form.

2.6 COMMUNICATION

All communications, any modifications, clarifications, amendments, questions, responses or any other matters related to the IFB must be made only through the Procurement Contact noted on the cover of this solicitation. A violation of this provision is cause for the County to reject a Company's bid. No contact regarding this document with other County employees is permitted and may be grounds for disqualification**.**

3 PURPOSE

3.1 COUNTY

Union County, North Carolina (population 254,070) is located in the central, southern piedmont. The County provides its citizens with a full array of services that include public safety, water/wastewater utilities and sanitation, human services, cultural and recreational activities, and general government administration.

3.2 INTRODUCTION

Union County, through Union County Water & Wastewater Operations (UCWW), is soliciting bids from qualified contractors to provide repair of sewer system defects, including manholes and service laterals, cured-in-place pipe (CIPP), sewer cleaning and television inspection, restoration and other miscellaneous sewer system repair work.

The purpose of this Contract is to provide the Owner with a Contractor to repair, rehab and replace existing sanitary sewers, manholes and service laterals. This Contract will

be used to repair sewer system defects that are allowing substantial rainwater and ground water (inflow and infiltration) to enter the sewer system as well as to repair significant structural defects that are causing re-occurring maintenance issues.

The scope and quantity of work will be dependent on the need for the work as determined by the Owner, Engineer, and/or ORC based on the scope of work items outlined in the bid form.

Work will be identified throughout the Contract and issued to the Contractor in the form of a Work Order or Project. Work will be issued to the Contractor throughout the contract. The required work may be located anywhere within Union County Water & Wastewater Operations (UCWW) service area, including sewer easement areas, yards, residential roads, parking lots, along NCDOT right-of-way, highways, city/town streets, etc.

The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, replacements and restoration required as a result of damages caused during this construction.

The Contractor shall furnish and install all materials which are reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Contract Documents or not.

The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work.

The Contractor must maintain sewer service at all times to all commercial and industrial users in the areas of work. Service to residences may only be interrupted intermittently for short durations (less than 8 hours) and all such outages must be coordinated with the property owner or tenant in advance.

No guarantees will be made of size, amount, or quantity of any specified work orders/projects.

Any contract that is awarded shall be for a period of one (1) year commencing with the Notice of Award. The amount of each contract for each Work Order shall not exceed a total of One Hundred Fifty Thousand and No/100 Dollars ($150,000.00). Work under a contract shall be assigned on an as-needed basis to be determined by Union County in its sole and absolute discretion. Contract award does not authorize a notice to proceed. Should a contract be activated, Union County will issue a work order which sets forth the services to be performed, as well as a Notice to Proceed for said services. No work is guaranteed under any contract.

4 INSTRUCTIONS

4.1 COMMUNICATION

All communications, any modifications, clarifications, amendments, questions, responses or any other matters related to the IFB must be made only through the Procurement Contact noted on the cover of this solicitation. A violation of this provision is cause for the County to reject a Company's bid. No contact regarding this document with other County employees is permitted and may be grounds for disqualification.

4.2 BIDDERS ACKNOWLEDGEMENT

The Bid will remain subject to acceptance for 120 days after the Bid Opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

4.3 DUPLICATE BID

No more than one (1) bid from any Bidder will be considered by the County. In the event multiple bids are submitted in violation of this provision, the County will have the right to determine which bid will be considered, or at its sole option, reject all such multiple bids.

4.4 BID SECURITY

- A Bid must be accompanied by Bid security made payable to Owner in an amount of five (5%) percent of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents).

- The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within ten (10) days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited.

- The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or one (1) day more than the period for which Bids are subject to acceptance, whereupon Bid security furnished by such Bidders will be released.

- Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

4.5 BID SIGNATURES

An authorized company official must sign Bids. Each signature represents binding commitment upon the Bidder to provide the goods and/or services offered to the County if the Bidder is determined to be the lowest responsive, responsible Bidder.

4.6 BIDDERS RESPONSIBILITIES

The Bidder must be capable, either as a firm or a team, of providing all parts as described herein. Exclusion of any parts or services for this Bid may serve as cause for rejection.

The successful Bidder will be responsible for all work in this solicitation whether it is provided or performed by the successful Bidder or subcontractor(s). Further, the County will consider the successful Bidder to be the sole point of contact with regard to contractual matters, including payment of any and all charges resulting from the cost of any contract.

4.7 EXAMINATION OF CONDIITIONS AND CONTRACT DOCUMENTS

It is understood and mutually agreed that by submitting a bid the Bidder acknowledges that all documents have been carefully examined pertaining to the Work; the location, accessibility, and general character of the site of the Work utility facilities within and adjacent to the site; and has satisfied himself as to the nature of the Work; sequences or procedures of construction (if any); the condition of existing structures; the conformation of the ground; the character, quality, and quantity of the material to be encountered; the subsurface conditions (including type and depth of rock and soil layers); the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the Work; the general and local conditions; federal, state, and local laws and regulations; the construction hazards; and all other matters, including, but not limited to, the labor situation which can in any way affect the Work under the Contract; and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the Bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the specifications and other Contract Documents for the construction of the Work and that all the terms, conditions, and stipulations contained therein are accepted; and is prepared to Work in cooperation with other Contractors performing Work on the site. The owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

The Contractor performing excavation Work shall be responsible for locating underground utilities prior to excavation. The utility locations shown in the Plans are approximate and for information only. The Contractor may obtain the services of a commercial utilities locator and/or call the various utility companies who may have lines in the area.

5 SCOPE OF WORK

5.1 INTENT

The intent of this Contract is to assign work to the Contractor on an as-need basis. No guarantees will be made of size, amount, or quantity of any specified work orders/projects. The Contractor shall furnish all labor, materials, equipment, tools, services, supervision and incidentals required to complete the work as directed by the Engineer and/or ORC and specified herein.

The Work includes, but is not necessarily limited to, the following:

1. Maintenance of flow in existing sewers
2. Rehabilitation of existing manholes to the extent indicated by the Engineer and/or ORC
3. CIPP point repairs to sewer services and/or mains
4. Pre/post rehabilitation photography/inspection of each manhole/main to be rehabilitated
5. Traffic Control when approved by the Engineer and/or ORC based on the location of the manhole to be rehabilitated

The work may include performing or pipe bursting, pipe lining using CIPP, manhole rehab, etc.

The Contractor is expected to conduct pre-inspections of manholes with the Owner, Engineer and/or ORC, or Engineers representative at the start of the construction phase (and as the construction phase progresses) to identify specific repair work required at individual manholes and laterals.

Immediately upon completion of rehabilitation of each manhole, the Contractor shall begin and execute to completion clean-up and property restoration. This shall be done prior to the start of work on another site, unless written permission is obtained from the Owner, Engineer and/or ORC to begin another site.

All streets shall be prepared for paving immediately upon completion of manhole rehabilitation in each street. If the final paving cannot be completed immediately, traffic control shall be provided by the Contractor as required by the Engineer and/or ORC at no additional cost to the Owner.

Satisfactory cleanup and restoration operations, as determined by the Owner, Engineer and/or ORC, must be underway at a given site before Contractor will be allowed to start construction on another site.

The Owner reserves the right to terminate the Contract at any time during the Contract Period for any reason including, but not limited to, poor performance, poor quality of work, safety violations, slow or non-compliance with the Contract requirements, lack of regard for local and State agencies and the public, and failure to address punch-list issues that arise.

5.2 COMPLAINT RESOLUTION PLAN

The Contractor must provide a supervisor to be available by phone 24 hours a day, 7 days a week to answer emergency calls related to the Contractor's work and job sites.

The Contractor must respond immediately when called with emergency situations involving job site safety; unsafe traffic control; ingress/egress concerns or other potentially dangerous situations caused by the Contractor's work.

Non-emergency complaints regarding the contractor's work/workmanship must be responded to within 24 hours.

5.3 GUARANTEE

The Contractor shall guarantee all materials and workmanship for a period of two (2) years from the date of acceptance by Union County and shall replace any portions that fail because of faulty materials or workmanship at no additional cost. Items repaired under the provisions shall have an extended warranty period of twelve (12) months from the date of repair of the item.

5.4 CONTRACTOR'S CAPABILITES

The Contractor shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will ensure the completion of the work within the time stipulated in the Agreement. If at any time such personnel appear to the Engineer and/or ORC to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such an order. Failure of the Engineer and/or ORC to give such an order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

When necessary to notify the property owner or tenant of any impact of construction activity, entry onto the land shall only be made by a Foreman, or more senior person, of the Contractor. All Foreman, and those ranking above Foreman, shall carry laminated photo identification cards bearing their name, position, Contractor name, and local day time and after-hours phone number of the Contractor. This identification shall be produced, whether requested, anytime a Foreman or more senior person enters private land to communicate with the property owner or tenant.

5.5 TRAFFIC CONTROL

The Contractor shall furnish, install, operate and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow during construction.

All traffic control shall be in strict accordance with the requirements of the North Carolina Department of Transportation (NCDOT), and agency with jurisdiction over the road. Signs and signing procedures in roads shall conform fully to all applicable Federal, State, and Local codes.

The Contractor shall follow NCDOT's Guidelines for Transportation Management Plan Development, NCDOT's current edition of the "North Carolina Supplement to the MUTCD, Part VI and the State Policy and Procedure for Traffic Control Through Construction Work Zones" or other specific guidance from the agency having jurisdiction over the road.

The Contractor shall remove temporary equipment and facilities when no longer required and restore grounds to the original or to specified conditions.

Night work and weekend work may be permitted by the NCDOT or agency with jurisdiction if requested by the Contractor.

The Contractor shall notify all property owners at least 72 hours in advance of any work which will interfere with access to their residence or place of business.

No roads shall be closed for construction activities. At least one lane of traffic will be safely maintained at all times when construction is in progress. Access to businesses and residences along the roads shall be maintained at all times. All lanes will be open when work is suspended for one hour or longer. The Contractor is in no way relieved of liability for maintaining safe conditions regardless of approval of his work by others and is expected to conduct operations expeditiously to reduce the effect on vehicular traffic. All standards of the governing agency shall be strictly followed.

All traffic control measures (cones, flaggers, signs, etc.) shall be considered incidental to the work and all costs associated with such traffic control shall be included in the various Bid Items – no separate payment will be made.

Traffic control shall be included in each unit bid price in accordance with Section 4.15 Work Areas. This would include NCDOT functional classifications of "collector" and "local". Traffic control required for a NCDOT classification higher than "collector" will be addressed with the County as necessary and would be paid for separately. Approval from the County for these exceptions will be required prior to commencing work.

5.6 CARE AND PROTECTION OF PROPERTY

The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer and/or ORC.

All sidewalks which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials. All curbing shall be restored by the Contractor in a condition equal to the original construction and in accordance with the best modern practice. Full lengths of curbing shall be replaced.

Along the location of this work all fences, walks, and other physical features except trees, bushes, and shrubbery shall be protected and restored in a thoroughly workmanlike manner

by the Contractor. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer and/or ORC as soon as conditions permit. Any fencing that is located within or crosses Union County Water's water or sewer easements and/or right-of-ways shall have access gates installed as required by UCW. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be re-graded and restored to their original condition by sodding the area with an in-kind grass.

Trees within the project easements or those close to the project easements shall be boxed or otherwise protected against injury by the Contractor. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer and/or ORC. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

All work associated with restoration services and/or repair to public/private property shall be included in the unit price schedule. No additional line item will be paid for these services.

5.7 MAINTENANCE OF FLOW

When bypass pumping is required, the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage or drainage around the section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event.

The Contractor shall submit to the Engineer and/or ORC, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of flow interruption. The Contractor shall prepare a specific, detailed description of the proposed pumping system (Bypass Pumping Plan). The Bypass Pumping Plan shall be submitted and approved prior to the mobilization of any of the equipment included in the Bypass Pumping Plan. The Bypass Pumping Plan shall outline all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This Bypass Pumping 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 herein. All procedures for maintaining flows must meet the approval of the Owner, Engineer and/or ORC. No construction shall begin until all provisions and requirements have been reviewed and accepted by the Engineer and/or ORC.

Flows from private, commercial and industrial users shall be handled by the Contractor during rehabilitation of the sewer system without interruption.

The Contractor shall be required to repair at his own expense any damage to public or private property caused by his operations. Should damage of any kind occur to the existing drains or sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer and/or ORC.

The Contractor shall not be permitted to overflow, bypass, pump or by any other means convey drainage to any land, street, storm drain or water course.

Any and all flow maintenance activities shall in no way impede traffic flow. Traffic flow must be maintained at all times.

The Contractor shall immediately notify the Owner should a sanitary sewer overflow occur and take the necessary action to recover, remove and mitigate in an approved manner the spillage to the satisfaction of the Owner and/or other governmental agency. If sewage is spilled onto public or private property, the Contractor shall cleanup and disinfect the spillage to the satisfaction of the Owner and/or other governmental agency.

The Contractor is responsible for costs, including fines, for maintaining flow in sewers.

5.8 CONTRACTOR'S RESPONSIBILITY TO SUPPLY MATERIALS AND PERFORM WORK AT HIS EXPENSE

An attempt has been made while writing this Specification to state the Contractor's responsibilities for supplying materials and performing work under this Contract. All supply of materials and performance of work stated or implied to be the Contractor's responsibility shall be supplied and/or performed by the Contractor and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

5.9 PUBLIC NOTIFICATION

The Owner will notify all residences, property owners, and businesses within the project areas prior to the start of work on the project. Ten (10) days before the start of work in each area, the Contractor shall place a notice at the front door of each residence in that area advising the homeowners of the current schedule and advising the Contractor's emergency telephone number. The Contractor shall coordinate and cooperate with the Owner on the most appropriate way to notify businesses in the area. The text of the notices shall be approved by the Owner in advance.

5.10 DISPOSAL OF MATERIALS

Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

Contractor shall comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal.

5.11 TEMPORARY WATER SERVICE

The Contractor shall obtain prior approval from Union County Water before using the local public water supply and shall comply with all Federal, State, and local laws and regulations concerning water drawn from a public water supply. The Contractor shall provide an approved backflow prevention device and a flow metering device for the purposes of measuring the quantity of water used by the Contractor. The quantity of water used throughout this contract must be submitted to the Owner, not later than monthly, totalized in gallons used. Water will be provided free of charge. Waste of water by the Contractor shall

be sufficient cause for withdrawing the privilege of unrestricted water use. Hydrants shall only be operated under the supervision of Union County Water & Wastewater Operations (UCWW) personnel

5.12 PROJECT IMPLEMENTATION

As mentioned previously herein, the intent of this Contract is that work will be assigned to the Contractor on an as-need basis.

The Contractor shall complete each Work Order in the order it is issued unless higher priority work is subsequently issued that must take precedence and/or unless otherwise approved by the Engineer and/or ORC. A Work Order shall be complete including complete restoration and final inspection before beginning another Work Order unless specifically approved by the Engineer and/or ORC. The Contractor shall diligently perform the work once the work has started on a Work Order and shall not stop work until the Work Order is completed unless specifically approved by the Engineer and/or ORC.

If inclement weather requires temporary suspension of work, the Contractor shall not be paid any additional money due to the project suspension or delays or for additional mobilization requirements. The Contractor should expect and plan work accordingly for times of bad weather.

The Contractor shall generally proceed with work on each Work Order as follows:

1) The Contractor shall perform the work as approved and required by the Engineer and/or ORC in accordance with the Specifications.

2) The Engineer and/or ORC will forward requirements for any manhole rehabilitation to the Contractor, either along with the approval for the main sewer rehabilitation or at some time during the completion of the main sewer work. Manhole work may also be issued on a stand-alone basis as the only required work. The required manhole rehabilitation work may include any of the various bid items.

3) The Contractor shall completely restore all areas impacted by the work.

5.13 WORK AREAS

The work will be performed in unpaved areas (lawn and easement areas) and in paved areas. The unit prices bid shall include all costs associated with working in each work area, including accessing the sewers and manholes, restoring the areas disturbed by the work, performing the work, traffic control, etc. Several of the Bid Items separate the work into unpaved areas and paved areas. Unpaved areas include grassed areas such as lawns, yards and easements off of streets. Paved areas include all paved areas, all concrete areas, and all gravel areas.

5.14 WORK HOURS

Normal work hours shall be 8:00 am to 5:00 pm, Monday through Friday, except for holidays. A normal work week shall be defined as 40 hours. It is anticipated that work in residential areas and easement areas will be completed during the normal work hours.

Any requests to work at times different from those specified or requests to work longer than the normal 40-hour work week shall be made in writing by the Contractor to the Engineer/ORC. Requests shall be made at a minimum of 72 hours prior to the requested change. The Engineer and/or ORC will review such requests and issue a decision on the request. The Engineer and/or ORC's decision shall be final, and no additional money shall be due the Contractor based on the final decision. The Contractor shall not assume that overtime work will be allowed.

If weekend work is required or agreed to by the Engineer, the Contractor shall work the specified weekend (6 hour minimum workday), unless work is prevented due to bad weather. Should the Contractor choose not to work the specified weekend due to reasons other than bad weather, then the Engineer may not allow the Contractor to work the following weekend. This restriction will not be grounds for delay, additional costs, or changes in work.

Should bad weather prevent the Contractor from working the specified weekend, then the Contractor may work the following weekend, provided that a proper request is made by the Contractor and the Engineer and/or ORC approves the request, as specified.

5.15 PRE-CONSTRUCTION VIDEO INSPECTION AND PHOTOGRAPHY

The Contractor shall be responsible for performing video inspections and taking photographs of all project areas prior to performing any work as he deems necessary. The purpose of the inspections and photographs shall be to document the pre-construction conditions for comparison with the final restoration work. If the Contractor fails to make such inspections and photographs and the Owner, Engineer and/or ORC receive a complaint on the final restoration, the Contractor shall be responsible for additional restoration at no additional cost to the Owner as necessary to completely resolve the complaint.

5.16 PROPERTY OWNER RELEASES

The Contractor will contain his work activities within the public road right-of-ways and public utility easements as shown on the plans. Any contractor activities outside these easements and right-of-ways will be considered work on private property. Work on private property may require the contractor to obtain from the impacted property owner, a release that holds the County harmless against claim for damages resulting from the contractor's activities on private property. Any specific work or service performed by the contractor on behalf of the property owner shall be noted in the release document. The release shall be signed and dated by the legal owner of the property and shall be witnessed and dated by the Contractor's representative. The contractor is responsible for retaining the original release. The Contractor shall provide a copy of the release to the Engineer and/or ORC prior to request for payment on the subject project.

6 PROJECT(S) SUMMARY

Reference the following for detailed information:

Section 01015 – Control of Work

Section 01300 – Submittals

Section 01380 – Photographs and Videos

Section 01510 – Maintenance of Flow in Existing Sewers and Drains

Section 01570 – Traffic Control

Section 02750 – Cured-In-Place-Pipe (CIPP) Lining

Section 02754 – Cured-In-Place-Pipe Point Repairs (CIPP)

Section 02756 – Lateral Service Connection Full Wrap Seal

Section 02761 – Video Inspection and Cleaning of Sanitary Sewers

Section 02768 – Monolithic Manhole Lining Systems

Section 02985 – Seeding, Sodding and Landscaping

Section 15004 – Manhole Rehabilitation

Section 330130 – CCTV Inspection of Sanitary Sewers

Union County Manhole Asset Data Sheet

Union County Water and Sewer Standard Specifications and Details

A general summary of some potential work to be performed under this Contract is as follows:

6.1 MANHOLE REPAIR

The manhole repair work may include, but is not limited to repairing leaks in manholes, installing cement mortar and/or epoxy lining and performing miscellaneous manhole repair work.

The Contractor shall furnish all labor, materials, equipment and incidentals required to rehabilitate manholes as specified herein. Rehabilitation work for each manhole may not be shown on the drawings and will be identified in the field by the Engineer and/or ORC or Engineers representative.

Bid Items for miscellaneous manhole repair work include resetting existing frames and covers, replacing existing frames and covers with new frames and solid or watertight covers, adjusting manhole cover elevations in paved and unpaved areas, installing inflow dishes, and other miscellaneous items. For these Bid Items, the unit costs bid shall include complete restoration of the paved or unpaved areas. Bid Items are also

included for rebuilding benches and inverts, various grout repairs, and chemical grout injection.

6.2 MAIN GRAVITY SEWER REPAIR/REHABILITATION

Gravity sewers may be repaired by performing Cured in Place Lining and CIPP point repairs to repair major defects, by installing cured-in-place pipe (CIPP) lining from manhole to manhole or by point repairs. Point repairs and sewer replacement/rehab work will vary in length.

All lateral to main CIPP connection lining repairs shall be conducted from sewer main connection point to 10 feet up the lateral.

6.3 ACCEPTANCE TESTING

After the various types of rehabilitation and repair have been completed, the work shall be visually inspected by the Contractor in the presence of the Engineer and/or ORC for compliance with these specifications and the manufacturer's recommendations. The Engineer and/or ORC shall also inspect the work during the 2-year warranty period. Any leakage or defects in the work shall be corrected by the Contractor at no additional cost to the Owner.

A. Field acceptance of manhole lining system shall be based on the Engineer and/or ORC's evaluation of the appropriate installation of the lining per field inspections. Acceptance shall also be based on the Engineer's evaluation of the curing test data and vacuum testing results, where appropriate, and still photographs of the finished manholes.

B. There shall be no groundwater infiltration or other leakage through the manhole wall after it has been lined. If leakage is found, it shall be eliminated with an appropriate method as recommended by the liner manufacturer and approved by the Engineer and/or ORC at no additional cost to the Owner.

C. All pipe connections shall be open and clear.

D. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delamination or other type defects in the lining.

E. If any defective lining is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to the Owner. This requirement shall apply for the entire guarantee period.

F. For each pay request, 20% of the manholes submitted on that pay request shall be inspected via vacuum testing once the liner has sufficiently cured. The vacuum testing shall be accomplished prior to submitting the pay request for the manholes. The manholes inspected shall be chosen by the Engineer and/or ORC or their designated representative and the testing shall be witnessed by the Engineer and/or ORC or their designated representative. For the final pay request, Contractor shall be required to test 100% of the manholes rehabilitated in the project at no additional cost to the Owner. The

vacuum testing shall be conducted in conformance with ASTM C1244-02. All detected defects in the liner shall be immediately repaired and the manhole retested until passing. All repair procedures shall follow the manufacturer's recommended procedures.

Manholes that are completely rehabilitated using the cementitious liner shall be vacuum tested prior to final acceptance. Vacuum testing shall not be performed earlier than 72 hours after application of the liner. A vacuum of 10 inches of mercury shall be drawn and vacuum pump shut off. With the valves closed, the time shall be measured for which it takes the vacuum to drop to 9 inches of mercury. The manhole shall be approved as passing the test if the time is greater than the values shown below:

Depth (ft.)	Manhole Diameter (in.)		
	48 inches	60 inches	72 inches
Less than 10 ft.	60 sec.	75 sec.	90 sec.
10 – 15 ft.	75 sec.	90 sec.	105 sec.
15 – 20 ft.	90 sec.	105 sec.	120 sec.

If the manhole fails the initial test, necessary repairs shall be made with an approved material. Retesting shall continue until the manhole satisfactorily passes the test. All tests shall be performed in the presence of the Owner, Engineer and/or ORC.

Where the vacuum test failed due to defects not in the liner (such as cracked clay or concrete pipes or defects in the manhole frame), the Contractor shall note the cause of the failure on the test log and provide a still photograph of the defect. In addition, the Contractor shall provide to the Owner, through the Engineer and/or ORC, a still photograph of all finished manholes with the manhole identification number visible in the photograph (for instance written on a dry erase board) and not obscuring the view of the manhole. The Owner, through the Engineer and/or ORC, shall have final say as to the acceptability of the photographs. If a photograph is deemed unacceptable, the Contractor shall be required, at no additional cost to the Owner, to take additional photographs of the manhole until an acceptable photograph is submitted.

The Contractor will furnish all personnel, facilities, and equipment necessary to conduct the testing. Testing of the manholes shall not be paid for directly but shall be included in the contract unit price for Manhole Rehabilitation.

G. The cured epoxy lining shall be spark tested for pinholes with a spark tester set at 10,000 volts minimum (100 V per mil). All pinholes shall be repaired according to manufacturer recommendations. All pinholes shall be marked off on surface areas containing pinholes to a point 6 inches beyond all pinholes and patch with epoxy to a minimum additional thickness of 40 mils. Blisters and uncured lining shall be completely removed, and the areas recoated

Refer to section 16 Appendix G – Reference Documents to see Union County Water & Wastewater Operations (UCWW) Specification and Details

6.4 INFLOW DISHES

Inflow dishes shall be installed in locations as directed by the Engineer and/or ORC.

The inflow dish shall be manufactured of polyethylene copolymer material that meets ASTM specifications designation D1248, Class A, Category 5, Type 111 with a minimum impact brittleness temperature of -180° F, environmental stress crack rating (ESCR) of 800, and flexural modulus of 175,000. The thickness shall be 0.187 inches. The lift strap shall be a woven polypropylene web attached to the bowl of the dish by a wide head stainless steel rivet and a stainless steel 3/4" backup washer. All cut edges shall be seared to ensure against raveling. The depth of the inflow dish shall be such that the manhole lid will not come into contact with the inflow dish during removal and replacement of the lid. The inflow dish shall be designed to provide a sufficiently loose fit into the manhole frame to allow easy removal. The inflow dish shall be as manufactured by Contractor Specialties and Supply Company or approved equal and shall have a 5-year minimum warranty against cracking.

The Contractor shall ensure that each inflow dish is appropriately sized for the manhole in which it is to be installed. The installation of the inflow dish shall not adversely affect the fit of the cover. The installation will be in paved and unpaved areas. The Contractor should note that many different types and sizes of inflow dishes will be necessary to fit the various sizes and shapes of frames and covers.

The manhole frame rim shall be free of all dirt and debris prior to the installation of the inflow dish. This can be accomplished by scraping the rim with a sharp chisel to remove the heavy debris and finish cleaning with a wire brush. The inflow dish should be fully seated around the manhole frame rim to ensure against water seepage between the insert and the manhole frame rim.

6.5 CLEANING AND TELEVISION INSPECTION OF SEWERS

Where required and specified, the Contractor shall thoroughly clean and televise the sewers and submit one copy of the final television inspections to the Engineer and/or ORC for review as specified herein. Each submittal shall include the inspection database file and the corresponding video files on DVD, flash drive or portable external hard drives. In addition, one copy of the printed logs (in color) that correspond to the inspections shall be submitted to the Engineer and/or ORC. Each submittal to the Engineer and/or ORC shall include a transmittal that lists the file names and all sewer segments and video files included with the submittal. The Engineer and/or ORC will return any submitted hard drive to the Contractor after the inspections have been reviewed.

The Contractor’s cleaning operations shall fully clean the sewers and remove all roots, grease and debris. The sewers shall be completely cleaned to facilitate CIPP lining installation, if so specified. The cleaning shall be performed and completed from manhole to manhole prior to the television inspection. The Contractor shall also clean the next downstream sewer included in the work order prior to performing the TV to make sure there is no debris in the downstream sewer that may back-up flow and impact

the TV inspections. Acceptance of the cleaning portion of the work shall be dependent upon the results of the pre-rehabilitation television inspection. Lines not acceptably clean as to permit television inspection or the subsequent lining installation shall be re-cleaned, re-inspected and re-submitted to the Engineer and/or ORC for review at no additional cost to the Owner.

The equipment used for the cleaning operations shall be specifically designed for cleaning sewers. The Contractor shall use the appropriate equipment to clean all debris, roots and grease from each sewer segment thoroughly. The required equipment may be high velocity water jet cleaning equipment with various attachments or mechanical cleaning equipment such as power buckets or power rodders. The Contractor shall select the cleaning equipment and procedures based on the conditions of the sewers at the time the work commences. All solids shall be removed at the downstream manhole of the section being cleaned - passing material from one sewer segment to another will not be permitted. Cleaning operations shall begin at the most upstream sewers and proceed downstream. The solids shall be removed from the site and properly disposed of at approved locations provided by the Contractor.

The Contractor shall take all necessary precautions to avoid damage or flooding to public or private property being served by the line being cleaned. The Contractor shall be responsible for all flooding and pay for cleanup from flooding to the satisfaction of the property owner. The Contractor shall document all backups and submit documentation to the Engineer and/or ORC including the reason for the backup, the time and date of the backup, the property owner's name, address and phone number, the resolution to problem, the time and date the problem was resolved, and any special cleanup work that had to be performed. This required documentation shall be submitted for all backups regardless of when they occur. All cleanups shall be completed within 4 hours of any backup.

The Contractor shall take care in cleaning older sewers and shall protect existing sewers from damage caused by improper use of cleaning equipment.

After the sewers are completely cleaned, the sewers shall be inspected via closed circuit television (CCTV). The purposes of the CCTV inspections are to verify that the sewers have been thoroughly cleaned, to document the condition of the existing sewers and the locations of service connections, and to locate sewer defects. The camera equipment used for the CCTV inspections shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be a color, pan-and-tilt camera.

The picture quality and definition shall be to the satisfaction of the Engineer and/or ORC. The Contractor shall submit a sample television inspection after the inspection of the first section(s) of sewer(s) is performed so that the Contractor and Engineer and/or ORC can agree on performance and quality of the inspections which must be met throughout the Contract. Sewers not inspected to the Engineer and/or ORC's satisfaction shall be re-inspected by the Contractor at no additional cost to the Owner.

All cameras shall move through the sewers via self-powered tractor assemblies – no skid assemblies shall be permitted. The tractor assemblies used for the inspections shall be the appropriate size assembly for the pipe being televised according to the manufacturer of the television equipment. For example, an 8-inch tractor assembly shall be used to televise 8-inch-diameter sewers. However, 4" service laterals may be inspected with a "push" camera.

Depending on the situation, service laterals may be inspected from either the clean-out or from the main sewer. The Engineer and/or ORC will approve the method of televising laterals prior to the work being performed.

The inspections shall be complete from manhole to manhole without the need for reverse setups unless approved otherwise by the Engineer and/or ORC. If, during the work, the CCTV inspection is blocked by debris, a protruding lateral or sewer system defect, the Contractor shall remove the blockage or repair the defect as authorized by the Engineer and/or ORC and then continue the inspection. No additional payment will be made for the initial CCTV inspections that were blocked.

The accuracy of the measurements cannot be stressed too strongly. Daily calibration of measuring devices shall be performed. Sewer lengths shown and reported on the CCTV inspection video and logs shall be within 3 feet (plus or minus) of the actual sewer length as measured above ground from center of one manhole to the center of the next manhole. CCTV inspections that do not meet these criteria shall be re-performed and re-submitted to the Engineer and/or ORC at no additional cost to the Owner.

If the Contractor's cleaning or television equipment become lodged in the sewers during the work, the Contractor shall be responsible for removing the equipment, including excavation of the sewer, and paying all costs associated with the removal unless otherwise agreed to by the Engineer and/or ORC (for example, if the equipment is hung in pipe with major structural damage that definitely needs repaired, the Engineer and/or ORC may agree to pay for removing the equipment).

Upon completion of the cleaning and television inspection work, the Contractor shall submit one copy of the final digital television inspections to the Engineer and/or ORC as specified. The inspections must be in order and complete or the Engineer and/or ORC will immediately return the inspections to the Contractor for corrections. The final inspection shall mean that the sewer has been completely cleaned (no roots, debris or grease), the inspection is complete from manhole to manhole without the need for a reverse setup unless otherwise approved, and all protruding service connections have been cut flush with the existing pipe wall. If point repairs, service lateral replacements or manhole replacements are performed after the inspections are submitted, it shall be the Contractor's responsibility to confirm that the work was performed properly, including proper alignment, grade and connection to the existing sewer (no offset joints) and that no debris has entered the sewer.

The Contractor will be paid for all cleaning and television inspections at the unit price bid. The unit price shall include complete cleaning regardless of the severity of debris and roots.

6.6 POST REHABILITATION TELEVISION INSPECTION

See Section 33 01 30 for technical requirements.

Payment will not be made for repairs until the post-rehabilitation television inspections are submitted and approved by the Engineer and/or ORC.

6.7 DIGITAL VIDEO INSPECTION AND CCTV DATABASE

See Section 33 01 30 for technical requirements.

6.8 PACP

All work submitted by the Contractor shall be completed by PACP Certified professionals. A current PACP certification number shall be included for each person creating/gathering inspection reports.

All costs associated with providing the digital television inspections as specified including performing the inspections using Union County Water & Wastewater Operations (UCWW) specified software and/or templates shall be included in the various bid items – no separate or additional payment shall be made.

7 PAY ITEM DESCRIPTIONS

Pay items have been set up in the Bid for all work that is permanent and measurable. The bid for each pay item shall include the cost of all new material, labor, equipment, and all else required to complete that pay item as specified. Payment for work will only be made after the work is complete and has been inspected and approved by the Engineer and/or ORC.

The Bid includes the following abbreviations:

- LF = linear foot
- VF = vertical foot
- EA = each
- SF = square feet
- GAL = gallon

7.1 ITEM 1 - RESETTING EXISTING FRAMES AND COVERS

This item includes all materials, equipment, and work required to reset existing frames and covers in unpaved areas and paved areas as specified.

This item includes payment for saw-cutting existing asphalt or concrete and disposing of material (in paved areas only), excavation, manhole wall and frame preparation, resetting existing frame and cover, removal and off-site disposal of existing materials,

backfilling and compaction, accessing manholes as specified, traffic control, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas including pavement, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made on a per each unit basis for the unit price bid in the solicitation.

7.2 ITEM 2 - REPLACING EXISTING FRAME AND COVER WITH NEW FRAME AND COVER

This item includes all materials, equipment, and work required to replace existing frames and covers with new frames and either watertight or solid covers in unpaved areas and paved areas as specified. Watertight covers are defined as cam-lock bolt-down covers. Solid covers shall have no vent holes and shall have non-penetrating pick holes. Frames and covers shall be Union County Water's standard frames and covers as manufactured by East Jordan Iron Works (EJIW), U.S. Foundry & Mfg. or approved equal.

This item includes payment for saw-cutting existing asphalt or concrete and disposing of material (in paved areas only), excavation, manhole wall and frame preparation, new frame and cover, removal and off-site disposal of existing materials, backfilling and compaction, accessing manholes as specified, traffic control, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas including pavement, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made on a per each unit basis for the unit price bid in the Proposal.

7.3 ITEM 3 - RAISING MANHOLE FRAMES AND COVERS

This item includes all materials, equipment, and work required to raise existing manhole frames and covers with concrete grade rings in unpaved areas and paved areas as specified. The frames and covers to be raised may be buried or exposed. Bid Items are included for a per each unit basis for raising existing manhole frames and covers up to 1 vertical foot and payment per vertical foot for each foot over 1 foot. When an existing manhole frame and cover is raised more than 1 vertical foot, the Contractor shall be paid for the first 1 foot under the per each unit Bid Item and then on a vertical foot basis for each foot over 1 foot.

Payment will be made for each manhole raised based on the height raised. Measurement will be from the existing manhole cover elevation to the final cover elevation.

This item includes payment for locating manholes (if required), saw-cutting existing asphalt or concrete and disposing of material (in paved areas only), excavation, manhole wall and frame preparation, new concrete grade rings, removal and off-site disposal of existing materials, backfilling and compaction, accessing manholes as specified, traffic control, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas including pavement, and for all else incidental thereto for which separate payment is not provided under other bid items.

Manhole location shall include reasonable means to search for the manhole utilizing a high quality metal detector and plans/drawings ass appropriate. The Engineer and/or ORC may direct the Contractor to perform CCTV at the unit price bid to locate manholes that cannot be found using a high quality metal detector.

Payment will be made based on the unit prices bid in the Proposal measured to the nearest one-tenth of a foot.

7.4 ITEM 4 – SEAL FRAME TO MANHOLE WITH SEALANT COMPOUND

This Item includes all materials, equipment, and work required to seal manhole frames in paved or unpaved areas. Work includes sandblasting and preparation of the existing manhole frame and chimney, collection of blasting debris, chemical leak injection, hand patching voids / holes, priming, and installing frame seal.

Material shall be Internal Manhole Seals FLEX SEAL 2.0 or equal.

Payment will be made on per each unit basis for the unit price bid in the Bid.

7.5 ITEM 5 - INFLOW DISHES

This Item includes all materials, equipment, and work required to install inflow dishes in paved or unpaved areas. Work shall be as specified and in accordance with the Material and Technical Specifications.

This item includes payment for providing the appropriate size inflow dish to fit as specified into each manhole, accessing sewers and manholes for installation, traffic control, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made on a per each unit basis for the unit price bid in the Bid.

7.6 ITEM 6 – REBUILD BENCH AND INVERT IN EXISTING MANHOLES

This Item includes all materials, equipment, and labor for access; inspection and cleaning; removal and disposal of debris from manhole; manhole preparation, including stopping of active leaks and filling voids; building up the manhole benching to provide a uniform slope from channel top to manhole wall; coating the invert channel and bench with hydrogen-sulfide resistant repair mortar; signage and traffic control; testing; restoration; clean-up; and all other incidental items for which a separate payment is not provided.

Payment will be made on a per each manhole basis for the unit price bid in the Bid.

7.7 ITEM 7 – GROUT CHIMNEY WITH 1-INCH THICK CEMENTITIOUS COATING

This item includes all materials, equipment, and work required to repair manhole chimneys with 1-inch thick hydrogen-sulfide resistant cementitious coating. The work includes high pressure cleaning of interior, removal of and disposal of loose or unsound material, chemical grout injection of visible leaks, patching of holes / voids, repair of joints, and application of coating/lining to a finished, troweled thickness of 1-inch.

Payment will be made on a per vertical foot basis measured from the bottom of the chimney to the manhole frame for the unit price bid.

7.8 ITEM 8 – GROUT JOINT WITH 1-INCH THICK CEMENTITIOUS COATING

This item includes all materials, equipment, and work required to repair manhole joints with 1-inch thick hydrogen-sulfide resistant cementitious coating. The work includes high pressure cleaning of interior, removal of and disposal of loose or unsound material, chemical grout injection of visible leaks, patching of holes / voids, repair of joints, and application of coating/lining to a finished, troweled thickness of 1-inch.

Payment will be made on a per each joint basis for the unit price bid.

7.9 ITEM 9 – GROUT HOLE WITH CEMENTITIOUS REPAIR MORTAR

This item includes all materials, equipment, and work required to grout holes with hydrogen-sulfide resistant cementitious repair mortar. The work includes cleaning, removal of unsound material, and grouting the hole with cementitious repair mortar to a smooth finish.

Payment will be made on a per each hole basis for the unit price bid.

7.10 ITEM 10 – GROUT PATCH REINFORCING STEEL WITH CEMENTITIOUS REPAIR MORTAR

This item includes all materials, equipment, and work required to grout holes with hydrogen-sulfide resistant cementitious repair mortar. The work includes cleaning, removal of unsound material, and grouting area with exposed reinforcing steel with cementitious repair mortar to a smooth finish.

Payment will be made on a per each hole with exposed reinforcing steel basis for the unit price bid.

7.11 ITEM 11 – INJECTING CHEMICAL GROUT TO REPAIR LEAKS

This item includes all materials, equipment, and work required to repair individual leaks at manhole joints, frames, cracks, holes, and pipe connections by chemical grout injection. Work shall be as specified and in accordance with the Material and Technical Specifications. The work includes cleaning, removal of unsound material, drilling and installing injection ports, injecting chemical grout with an injection pump finishing with cementitious repair mortar to a smooth finish.

Large Leaks- Prime Flex 910 or equal

Others-Prime Flex 900 XLV or equal

Requires completion of grout handling and mixing training certification from the grout manufacturer/supplier for personnel working with chemical grouts and additives.

Payment will be made on a per each chemical grout injection location (up to a maximum of 2 gallons) basis for the unit price bid. Additional payment will be made on a per gallon

basis for any individual repair that requires more than 2 gallons of chemical grout injection.

7.12 ITEM 12 - INSTALLATION OF 1-INCH-THICK CEMENTITIOUS MORTAR IN MANHOLES

This item includes all materials, equipment, and work required to install 1-inch-thick hydrogen-sulfide resistant cementitious mortar on existing manhole walls and benches as specified. Bid items are included for coating existing 4-foot and 5-foot diameter manholes (inside diameter) and for installing any specified product or a hydrogen-sulfide resistant material where specified.This item includes working in any location (unpaved areas or paved areas).

This item includes payment for pre-construction inspection of manholes, manhole cleaning, root removal and grease removal, other work required to prepare the manhole for lining including, but not limited to, stopping active leaks and filling voids in the manhole wall or between brick layers, furnishing and installing cementitious mortar lining on the manhole walls to the limits shown on the Details and on the benching to the top of the invert channel, sealing around the manhole wall/pipe interfaces, performing specified product tests and vacuum tests and other specified acceptance tests, accessing manholes as specified, traffic control, complete restoration of all areas disturbed by the work, and all else incidental thereto for which separate payment is not provided under other bid items.

Installation of cementitious mortar lining in manholes will be measured in place on a vertical foot (VF) basis to the nearest one-tenth of a foot. Measurement will be from the point of intersection between the manhole benching and the manhole invert channel to the point of termination of the lining at the manhole frame as specified by the Engineer and/or ORC and in the details.

Quadex- Alumina Liner or Equal

Requires certification from the grout manufacturer/supplier as an approved applicator.

Payment will be made on the basis of the unit price bid in the Proposal.

7.13 ITEM 13 - INSTALLATION OF 2-INCH-THICK CEMENTITIOUS MORTAR IN MANHOLES

This item includes all materials, equipment, and work required to install 2-inch-thick hydrogen-sulfide resistant cementitious mortar on existing manhole walls and benches as specified. Bid items are included for coating existing 4-foot and 5-foot diameter manholes (inside diameter) and for installing any specified product or a hydrogen-sulfide resistant material where specified. This item includes working in any location (unpaved areas or paved areas).

This item includes payment for pre-construction inspection of manholes, manhole cleaning, root removal and grease removal, other work required to prepare the manhole for lining including, but not limited to, stopping active leaks and filling voids in the

manhole wall or between brick layers, furnishing and installing cementitious mortar lining on the manhole walls to the limits shown on the Details and on the benching to the top of the invert channel, sealing around the manhole wall/pipe interfaces, performing specified product tests and vacuum tests and other specified acceptance tests, accessing manholes as specified, traffic control, complete restoration of all areas disturbed by the work, and all else incidental thereto for which separate payment is not provided under other bid items.

Installation of cementitious mortar lining in manholes will be measured in place on a vertical foot (VF) basis to the nearest one-tenth of a foot. Measurement will be from the point of intersection between the manhole benching and the manhole invert channel to the point of termination of the lining at the manhole frame as specified by the Engineer and/or ORC and in the details.

Quadex- Alumina Liner or Equal

Requires certification from the grout manufacturer/supplier as an approved applicator.

Payment will be made on the basis of the unit price bid in the Proposal.

7.14 ITEM 14 - INSTALLATION OF 125 MIL EPOXY IN MANHOLES

This item includes all materials, equipment, and work required to install 125 mils of 100% solids epoxy on existing manhole walls and benches as specified. Bid items are included for coating existing 4-foot and 5-foot diameter manholes (inside diameter). This item includes working in any location (unpaved areas or paved areas).

This item includes payment for pre-construction inspection of manholes, manhole cleaning, root removal and grease removal, other work required to prepare the manhole for lining including, but not limited to, stopping active leaks and filling voids in the manhole wall or between brick layers, furnishing and installing cementitious mortar lining build back on the manhole walls and on the benching to the top of the invert channel, sealing around the manhole wall/pipe interfaces, installing the 125 mil 100% solid epoxy coating, performing specified product tests, holiday testing vacuum and other specified acceptance tests, accessing manholes as specified, traffic control, complete restoration of all areas disturbed by the work, and all else incidental thereto for which separate payment is not provided under other bid items.

Installation of 100% solid epoxy lining in manholes will be measured in place on a vertical foot (VF) basis to the nearest one-tenth of a foot. Measurement will be from the point of intersection between the manhole benching and the manhole invert channel to the point of termination of the lining at the manhole frame as specified by the Engineer and/or ORC and in the details.

Raven 405 or Equal

Requires certification from the grout manufacturer/supplier as an approved applicator.

Payment will be made on the basis of the unit price bid.

7.15 ITEM 15 - INSTALLATION OF 1-INCH-THICK CEMENTITIOUS MORTAR IN WET WELLS

This item includes all materials, equipment, and work required to install 1-inch-thick hydrogen-sulfide resistant cementitious mortar on existing wet well walls. This item includes working in any location (unpaved areas or paved areas).

This item includes payment for pre-construction inspection of wet wells, cleaning, root removal and grease removal, other work required to prepare the wet well for lining including, but not limited to, stopping active leaks and filling voids in the wet well walls, furnishing and installing cementitious mortar lining on the wet well interior concrete surfaces, sealing around wall/pipe interfaces, performing specified product tests and vacuum tests and other specified acceptance tests, accessing wet wells as specified, traffic control, complete restoration of all areas disturbed by the work, and all else incidental thereto for which separate payment is not provided under other bid items.

Quadex- Alumina Liner or Equal

Requires certification from the grout manufacturer/supplier as an approved applicator.

Installation of cementitious mortar lining in wet wells will be measured in place on a square foot (SF) basis to the nearest square foot. Payment will be made on a per square foot basis for the unit price bid in the Proposal.

7.16 ITEM 16 - INSTALLATION OF 125 MIL EPOXY IN WET WELLS

This item includes all materials, equipment, and work required to install 1-inch-thick cementitious mortar on existing wet well interior surfaces as specified. Bid items are included for coating existing wet wells of any diameter with hydrogen-sulfide resistant material.

This item includes payment for pre-construction inspection of wet wells, cleaning, root removal and grease removal, other work required to prepare the wet well for lining including, but not limited to, stopping active leaks and filling voids in the wet well walls, furnishing and installing cementitious mortar lining build back on the wet well interior surfaces, sealing around wall/pipe interfaces, installing the 125 mil 100% solid epoxy coating, performing specified product tests, holiday testing vacuum and other specified acceptance tests, accessing wet wells as specified, traffic control, complete restoration of all areas disturbed by the work, and all else incidental thereto for which separate payment is not provided under other bid items.

Raven 405 or Equal

Requires certification from the grout manufacturer/supplier as an approved applicator.

Installation of 125 mil 100% solids epoxy in wet wells will be measured in place on a square foot (SF) basis to the nearest square foot. Payment will be made on a per square foot basis for the unit price bid in the Proposal.

7.17 ITEM 17 – SEWER CLEANING AND TELEVISION INSPECTION

This item includes all work and equipment required to completely clean (remove debris, roots, grease, pipe tuberculation and other material) and televise existing 4" through 12" sewers to evaluate the condition of the sewers as specified. Costs shall include removing and disposing of any and all debris encountered in the work regardless of severity. Costs shall also include submittals of digital inspections in the Owner's format to the Engineer and/or ORC as specified. Further, costs shall include any and all costs associated with accessing the sewers and manholes to perform the work as specified. Bid Items are included for cleaning and televising existing 8", 10", and 12" sewers.

Sewer cleaning and television inspection for service laterals will be paid for on a per each unit basis for each service lateral cleaned and televised regardless of the length. Service laterals may be 4" or 6" in diameter.

Sewer cleaning and television inspection will be measured and paid for on a linear foot basis to the nearest one-tenth of a foot for main sewers 8" and larger. Measurement will be along the horizontal centerline of the pipe with no deductions for manholes and will be from center of manhole to center of manhole.

Payment will be made on the basis of the unit price bid in the Bid.

This item does not include televising sewers for final acceptance. Those costs shall be included in the various unit prices for that work – no separate payment will be made.

7.18 ITEM 18 - CURED-IN-PLACE PIPE LINING

This item includes all materials, equipment, and work required to install cured-in-place pipe lining (CIPP) in existing 8" through 12" sewers in various locations (unpaved or paved areas). Costs shall include any thickness required for installation based on design calculations but not less than the specified minimum installed thicknesses. Work shall be as specified and in accordance with the Material Specifications. CIPP product tests will be performed separately by the Engineer and/or ORC as specified.

The CIPP installation Bid Items include payment for preparing the existing sewer and performing pre-construction inspections including additional pre-cleaning and television inspection of the sewer as required prior to CIPP installation, supplying and installing the pipe lining, coating the invert channel with grout to raise the channel to the liner pipe elevation, bypass pumping of existing wastewater flow during construction, providing a watertight seal at the manhole-pipe interface, accessing sewers and manholes for lining installation as specified, performing post-rehabilitation television inspections, distributing project notices, traffic control, compliance with required working hours, coordination with and location of existing utilities, erosion control, complete restoration of all areas disturbed by the work, and for all else incidental thereto for which separate payment is not provided under other bid items. Payment will not be made until the final post-rehabilitation television inspections are submitted and reviewed by the Engineer and/or ORC.

Installation of CIPP will be measured in place on a linear foot basis to the nearest one-tenth of a foot. Measurement will be along the horizontal centerline of the pipe with no deductions for manholes and will be from center of manhole to center of manhole. Payment will be made on the basis of the unit prices bid in the Bid.

Removing protruding service connections using a robotic cutter prior to installing the CIPP liner shall be paid for on a per each unit basis for the unit price bid in the Bid.

7.19 ITEM 19 - RECONNECTING EXISTING ACTIVE SERVICE CONNECTIONS TO NEW LINED SEWERS

This item includes all materials, equipment, and work required to reconnect existing active service connections to the main sewer after it is lined via an internal remote cutter as specified. This item includes payment for accessing the sewers and manholes as specified, locating existing service connections, remote cutting through new lining, retrieval and removal of cut-out sections of lining, buffing openings with a wire brush to provide a smooth opening, and all else incidental thereto for which separate payment is not provided under other bid items. This item includes all sizes of main sewer and service laterals.

Payment will be made on a per each unit basis for the unit price bid in the Bid.

7.20 ITEM 20 – CLEANOUT REPAIRS

This item includes all materials, equipment, and work required to replace damaged cleanout caps, adapters, inserts, etc.

Measurement for this item will be made on a per cleanout basis, and payment will be made on a per each unit basis for the unit price bid in the Bid.

7.21 ITEM 21 - BYPASS PUMPING USING 6-INCH PUMPS

This item includes the cost to provide, operate and maintain 6-inch pumps for bypassing existing wastewater flow while performing the work where required and where approved by the Engineer and/or ORC. All other bypass pumping with pumps smaller than 6-inch pumps shall be considered incidental to the work and all costs associated with such pumping shall be included in the various Bid Items – no separate payment will be made. The Engineer and/or ORC must approve the use of 6-inch pumps prior to performing the work if the Contractor plans on requesting payment for the pumps. If 6-inch pumps are used without approval, no payment will be made. If pumps smaller than 6 inches can handle the wastewater flow, no payment will be made for 6-inch pumps.

Payment will be made for 6-inch bypass pumps on a per each unit basis per day at the unit price bid in the Proposal.

7.22 MOBILIZATION

This item is for the costs incurred prior to beginning work on this contract, including permits, licenses, fees, insurance, bonds, equipment mobilization, signage, etc.

Payment will be limited to 2% of the subtotal of the individual Project Work Order prior to contingency. One half of the amount will be paid with the first pay application and the remainder paid with the second pay application.

Payment will be made according to the lump sum amount.

7.23 CONTINGENCY ALLOWANCE

This item is a five percent (5%) contingency allowance to be included in the individual Project Work Order. This allowance shall be used only upon issuance of a written work order by the Engineer and/or ORC. Any unused portion of the allowance remaining at the completion of the contract shall revert to the County as a credit. The County reserves the right to delete the allowance from the contract prior to award. Should an amount other than 5% of the subtotal be entered in the item specified, the County reserves the right to correct this amount of the correct figure. Payment will be made on a lump sum or unit price basis.

7.24 ATTACH TO BID

7.24.1 REFERENCES

Bidders shall provide 3 references for similar projects to include:

- Company Name
- Contact Name and Title
- Direct Phone Number
- Email Address

7.24.2 SUBCONTRACTOR LIST

If subcontractors are to be used on this project, please provide the following:

- Company Name
- Contact Name and Title
- Address
- Direct Phone Number
- Email Address

7.25 DEVIATIONS

Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that products offered will be in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by Union County that deviations will be acceptable. Bidder is advised that the response (or lack thereof) on this question does not take precedence over specific responses or non-responses provided elsewhere in this bid.

8 EVALUATION OF BIDS AND AWARD PROCEDURES

8.1 BID INFORMATION

Bids must be made in strict conformance using the Invitation for Bid (IFB) forms provided herein. All blank spaces for bids must be filled in properly. Numbers must be written in ink or typewritten, and the completed forms shall be without erasures, lineation, or alterations. In accepting the bid, the County will assume that no alterations have been made, and if they appear afterward, they shall not be binding on the County.

All Bid Documents shall be signed by an individual who is authorized to contractually bind the company. The signature must indicate the title or position the individual holds in the agency or firm. Agencies or firms which sign contracts with the name of the agency or firm must provide the name of a corporate officer or executive director for signature validation by the County. **All unsigned Bids will be disqualified.** In submitting a Bid, Offeror affirms all statements contained in the bid are true and accurate.

8.2 TERMS OF SUBMISSION

All material received from a person or company ("Respondent") in response to this solicitation shall become the property of Union County and will not be returned to the Respondent. Any and all costs incurred by a Respondent in preparing, submitting, or presenting submissions are the Respondent's sole responsibility and Union County shall not reimburse the Respondent. All responses to this solicitation will be considered a public record and subject to disclosure under applicable public records law.

Any material in a response which the Respondent considers a trade secret and exempt from disclosure as a public record under applicable law, including N.C.G.S. §§ 132-1.2 and 66-152, must be properly designated as a trade secret. In order to properly designate such material, the Respondent must: (i) submit any trade secret materials in a separate envelope, or file, from all other submitted material, being clearly marked as "Trade Secret – Confidential and Proprietary Information," and (ii) stamp the same trade secret/confidentiality designation on each page of the materials therein which contain trade secrets.

To the extent consistent with public records law, Union County will make reasonable efforts to maintain the confidential nature of trade secrets, as determined by Union County and subject to the conditions set forth herein. Respondent understands and agrees by submitting a response to this solicitation, that if a request is made to review or produce a copy of any information in the Respondent's materials which was properly labeled by the Respondent as a trade secret, Union County will notify the Respondent of the request and the date that such materials will be released to the requestor unless the Respondent obtains a court order enjoining that disclosure. If the Respondent fails to obtain the court order enjoining disclosure prior to that date, Respondent understands and agrees that Union County will release the requested information to the requestor on that date.

Furthermore, the Respondent also agrees to indemnify and hold harmless Union County and each of its officers, employees, and agents from all costs, damages, and expenses incurred in connection with refusing to disclose any material that has been designated as a trade secret by Respondent.

8.3 AWARD

The award shall be made to the lowest responsive, responsible bidder, taking into consideration quality, performance, and the time specified in the bid for the performance of the contract

The term of this contract shall be for two (2) years with three (3) one-year renewal options at the County's discretion. The award is for a fixed, firm unit price during the initial two (2) year term where product needs are based upon indefinite quantities, and where orders will be based on actual needs that may exceed or be less than projections. All expenditures under a unit price contract are contingent upon appropriations having been made by Union County Board of Commissioners. Price adjustments may be negotiated at the time of renewal, based on the applicable Consumer Price Index adjustment over the preceding twelve months.

Union County shall review the terms and conditions, and confirm performance under this contract has been satisfactory. However, the County reserves the right to terminate the contract or to allow the contract period to elapse.

A Bid may be rejected if it is incomplete. Union County may reject any or all Bids and may waive any immaterial deviation in a Bid.

More than one Bid from an individual, firm, partnership, corporation or association under the same or different names, will not be considered.

The award document may incorporate, by reference, all the requirements, terms and conditions of the solicitation and the Bidder's Bid as negotiated.

The County shall have a period of 120 days after opening of Bids in which to award the contract. A Contract shall serve as the agreement for the purpose of this award. Contents of the Bid shall become contractual obligations if a contract ensues. Failure of the Bidder to honor these obligations may result in cancellation of the award.

8.4 APPLICATION OF NORTH CAROLINA GENERAL STATUTES

The General Statutes of North Carolina regarding purchasing and competitive bidding (G.S. § 143-129) are made a part herein and will govern the bidding process as applicable.

9 GENERAL CONDITIONS AND REQUIREMENTS

9.1 MINIMUM REQUIREMENTS FOR BIDDERS

Bids shall be considered only from companies normally engaged in providing the type of installations specified in this solicitation. Union County, in its discretion, shall determine whether the evidence of responsibility and ability to perform is satisfactory.

The Bidder should have previous experience in the performance of projects of a similar nature to ensure timely and efficient completion of this project.

The individual/firm warrants that he/she is fully qualified, with adequate personnel and experience, to undertake the services required. The Offeror shall also certify that

insurance coverage that meets or exceeds industry standards for this type of work will be in force to mitigate risk during performance under the contract.

9.2 TERMS AND CONDITIONS

All payroll taxes, liability and worker's compensation are the sole responsibility of the Offeror. The Offeror understands that an employer/employee relationship does not exist under this contract.

The County reserves the right to reject any and all bids, the right to waive informalities, and the right to disregard nonconforming or conditional bids or counter bids. It is the intention of Union County to execute a final, binding Contract with the successful Offeror which incorporates terms and conditions no less onerous than those appropriate to the engagement of a licensed contracting firm in connection with a project of this magnitude.

All bids submitted in response to this request shall become the property of Union County and as such, may be subject to public review.

9.3 TAXES

Contractor shall be responsible for paying all taxes, fees, assessments and premiums of any kind payable on it employees and operations. Contractor shall substantiate, on demand by Union County, that all taxes and other charges are being properly paid.

Pursuant to N.C.G.S 105-164.14, Union County is eligible for sales and use tax refunds on all material which become a permanent part of the construction. Contractor agrees to provide Union County such documentation as may be necessary to meet the requirements of the North Carolina Department of Revenue regarding requests for refund of sales and use taxes. Such requirements include those described in the North Carolina Department of Revenue Sales and Use Tax Technical Bulletins 18-2(F) outlined below:

To substantiate a refund claim for sales or use taxes paid on purchases of building materials, supplies, fixtures, and equipment by a contractor, Union County must secure from a contractor certified statements setting forth the specific required information. A "certified statement" is s statement signed by a Contractor's Union, a corporate officer of a contractor, or an employee of a contractor who is authorized to provide information set forth in the statement. The certified statement must include all of the following information:

a. The date the property was purchased;
b. The type of property purchased;
c. The cost of property purchased and the amount of sales and use taxed paid thereon;
d. The vendor from whom the property was purchased;
e. The project for which the property was purchased;
f. If the property was purchased in the State of North Carolina, the county to which it was delivered, or, if the property was not purchased in the State of North Carolina, the county in which the property was used;
g. The invoice number of the purchase.

In the event Contractor makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total

amount of the invoices, and the State and local sales and use taxes paid thereon. Such statement must also include the cost of any tangible personal property withdrawn from Contractor's warehouse stock and the amount of State and local sales or use tax paid thereon by Contractor. Any local sales or use taxes included in Contractor's statements must be shown separately from the State sales or use taxes. Contractor's statements must not contain sales or use taxes paid on purchases of tangible personal property purchased by Contractor for use in performing the Contract which does not annex to, affix to or in some manner become a part of the building or structure that is owned or leased by a governmental agency and is being erected, altered or repaired for use by a governmental entity as defined by N.C.G.S. § 105-164.14(c).

Examples of property on which sales or use tax has been paid by Contractor and which shall not be included in Contractor's certified statement are scaffolding, forms for concrete, fuel for the operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals. Similar certified statements by Subcontractors must be obtained by Contractor and furnished to Union.

Contractor shall submit notarized sales tax certificates which meet the requirements detailed above with each Application for Payment. Payment will not be made until the sales tax certificate(s) have been submitted to Union. Union is the recipient of sales tax refunds, and no such funds shall be provided to Contractor, or claim made by Contractor.

A sample tax form is provided in Appendix E.

9.4 IFB EXPENSES

Expenses for developing the bids are entirely the responsibility of the vendor and shall not be chargeable in any way to the County.

9.5 CERTIFICATION

In response to the IFB Request, the Contractor certifies the following:

- This bid is signed by an authorized representative of the firm;
- It can obtain insurance certificates as required within ten (10) calendar days after notice of award;
- All labor costs, direct and indirect, have been determined and included in the proposed cost; and
- The potential Contractor has read and understands the conditions set forth in this solicitation.

9.6 FINANCIAL INFORMATION

The Bidder must have the following financial information readily available and have the ability to provide it to the County, without exception, within twenty-four (24) hours upon request during the bid certification process:

1. Annual audited financial reports for the past five (5) fiscal years;
2. Credit reports, credit bulletins, bank and vendor references, and any other
3. published statements by agencies that have been issued or published about the entity within the past five (5) years;

4. Indicate whether the Company (and/or predecessor, guarantor, or subcontractor) has declared bankruptcy within the last five (5) years;
5. Provide a description of the financial impact of any past or pending legal proceedings and judgments that could materially affect the Bidder's financial position or ability to provide service to the County.

9.7 MATERIALS APPROVAL

All products or materials required for the successful completion of the Scope of Work must be approved by the Union County Project Manager.

9.8 CONTRACTUAL OBLIGATIONS

The contents of this Bid and the commitments set forth in the Bid shall be considered contractual obligations if a contract ensues. Failure to accept these obligations may result in cancellation of the award. All legally required terms and conditions shall be incorporated into final contract agreements with the selected Service

9.9 COMPLIANCE WITH LAWS

Seller represents and warrants that the performance of this order and the furnishing of goods or services required shall be in accordance with the applicable standards, provisions and stipulations of all pertinent Federal, State or County laws, rules, regulations, resolutions and ordinances including but not limited to the Fair Labor Standards Act, the Equal Employment Opportunity rules and regulations and the Occupational Safety and Health Acts.

9.10 SUBCONTRACTOR DISCLOSURE

A single Company may propose the entire solution. If the Bid by any Company requires the use of sub-contractors, partners, and/or third-party products or services, this must be clearly stated in the Bid. The Company submitting the Bid shall remain solely responsible for the performance of all work, including work that is done by sub-contractors.

A contractor whose Bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (a) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or nonresponsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (b) with the approval of the awarding authority for good cause shown by the contractor. The terms, conditions, and requirements of each contract between Contractor and a subcontractor performing work under a subdivision or branch of work listed in this subsection shall incorporate by reference the terms, conditions, and requirements of the Contract between Contractor and Owner. Failure to include this list of subcontractors may cause a Bid to be rejected as nonresponsive by Owner.

If Owner, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

9.11 EXCEPTION TO THE IFB

An “exception” is defined as the Service Provider’s inability or unwillingness to meet a term, condition, specification, or requirement in the manner specified in the IFB. All exceptions taken must be identified and explained in writing and must specifically reference the relevant section(s) of this IFB. Other than exceptions that are stated in compliance with this Section, each Bid shall be deemed to agree to comply with all terms, conditions, specifications, and requirements of this IFB. If the Service Provider provides an alternate solution when taking an exception to a requirement, the benefits of this alternate solution and impact, if any, on any part of the remainder of the Service Provider’s solution, must be described in detail.

9.12 MODIFICATION OR WITHDRAWAL OF BID

Prior to the scheduled closing time for receiving bids, any Contractor may withdraw his bid. After the scheduled closing time for receiving bids, no bid may be withdrawn for 90 days. Only written requests for the modification or correction of a previously submitted bid that are addressed in the same manner as bids and are received by the County prior to the closing time for receiving bids will be accepted. The bid will be corrected in accordance with such written requests, provided that any such written request is in a sealed envelope that is plainly marked “Modification of Bid.” Oral, telephone or fax modifications or corrections will not be recognized or considered.

9.13 CONTRACT COMMENCEMENT

Commencement of a contract shall not begin prior to all necessary County approvals, including County Commission approval where required, and receipt of a County Purchase Order. Commencement of a contract without these approvals is solely at the Bidder’s own risk and is likely to result in no payment for services performed or goods received.

9.14 DISPUTES

In case of any doubt or differences of opinion as to the services to be furnished hereunder, the decision of the County shall be final and binding upon both parties.

9.15 EQUAL EMPLOYMENT OPPORTUNITY

All Companies will be required to follow Federal Equal Employment Opportunity (EEO) policies. Union County will affirmatively assure that on any project constructed pursuant to this advertisement, equal employment opportunity will be offered to all persons without regard to race, color, creed, religion, national origin, sex, and marital status, status with regard to public assistance, membership or activity in a local commission, disability, sexual orientation, or age.

9.16 MINORITY BUSINESSES (MBE) OR DISADVANTAGED BUSINESSES (DBE)

It is the policy of Union County that Minority Businesses (MBEs), Disadvantaged Business Enterprises (DBEs) and other small businesses shall have the opportunity to compete

fairly in contracts financed in whole or in part with public funds. Consistent with this policy, Union County will not allow any person or business to be excluded from participation in, denied the benefits of, or otherwise be discriminated against in connection with the award and performance of any contract because of sex, race, religion, or national origin.

9.17 LICENSES

The successful Firm(s) shall have and maintain a valid and appropriate business license (if applicable), meet all local, state, and federal codes, and have current all required local, state, and federal licenses.

9.18 E-VERIFY

E-Verify is the federal program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program, used to verify the work authorization of newly hired employees pursuant to federal law. Offeror/Firm shall ensure that Firm and any Subcontractor performing work under this contract: (i) uses E-Verify if required to do so; and (ii) otherwise complies with applicable law.

9.19 DRUG-FREE WORKPLACE

During the performance of this project, the Contractor agrees to provide a drug-free workplace for his employees; post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the workplace and specify the actions that will be taken against employees for violations of such prohibition; and state in all solicitations or advertisements for employees placed by or on behalf of the firm that the Firm maintains a drug-free workplace.

For the purposes of this section, “drug-free workplace” means a site for the performance of work done in connection with a specific contract awarded to a Contractor/Firm in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the Request.

9.20 INSURANCE

<u>One or more of the following insurance limits may be required if it is applicable to the project. The County reserves the right to require additional insurance depending on the nature of the agreement.</u>

At Contractor’s sole expense, Contractor shall procure and maintain the following minimum insurances with insurers authorized to do business in North Carolina and rated A-VII or better by A.M. Best, or as otherwise authorized by the Union County Risk Manager.

A. WORKERS’ COMPENSATION
(for any agreement unless otherwise waived by the Risk Manager)
Statutory limits (where contractor has three or more employees) covering all employees, including Employer’s Liability with limits of:

$500,000 Each Accident
$500,000 Disease - Each Employee
$500,000 Disease - Policy Limit

B. COMMERCIAL GENERAL LIABILITY
(for any agreement unless otherwise waived by the Risk Manager)
Covering Ongoing and Completed Operations involved in this Agreement.

$2,000,000 General Aggregate
$2,000,000 Products/Completed Operations Aggregate
$1,000,000 Each Occurrence
$1,000,000 Personal and Advertising Injury Limit
$5,000 Medical Expense Limit

C. COMMERCIAL AUTOMOBILE LIABILITY
(for any agreement involving the use of a contractor vehicle while conducting services associated with the agreement)

$1,000,000 Combined Single Limit - Any Auto

D. PROFESSIONAL LIABILITY
(for any agreement providing professional service such as engineering, architecture, surveying, consulting services, etc.)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Professional Liability Insurance for a period of two (2) years following termination of the Agreement.

E. POLLUTION LIABILITY INSURANCE
(for any agreement involving the clean-up or transportation of pollutants)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Pollution Liability Insurance for a period of two (2) years following termination of the Agreement.

F. NETWORK SECURITY & PRIVACY LIABILITY (CYBER)
(for any agreement involving software applications)

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Technology Errors & Omissions Insurance for a period of two (2) years following termination of the Agreement.

G. Builder's Risk
(for any agreement involving above ground construction projects)
Amount of Contract

ADDITIONAL INSURANCE REQUIREMENTS

A. The Contractor's General Liability policy shall be endorsed, specifically or generally, to include the following as Additional Insured:
UNION COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED WITH RESPECTS TO THE GENERAL LIABILITY INSURANCE POLICY.

Additional Insured status for Completed Operations shall extend for a period of not less than three (3) years from the date of final payment.

B. Before commencement of any work or event, Contractor shall provide a Certificate of Insurance in satisfactory form as evidence of the insurances required above.

C. Contractor shall have no right of recovery or subrogation against Union County (including its officers, agents and employees).

D. It is the intention of the parties that the insurance policies afforded by contractor shall protect both parties and be primary and non-contributory coverage for any and all losses covered by the above-described insurance.

E. Union County shall have no liability with respect to Contractor's personal property whether insured or not insured. Any deductible or self-insured retention is the sole responsibility of Contractor.

F. Notwithstanding the notification requirements of the Insurer, Contractor hereby agrees to notify County's Risk Manager at 500 N. Main Street # 130, Monroe, NC 28112, within two (2) days of the cancellation or substantive change of any insurance policy set out herein. Union, in its sole discretion, may deem failure to provide such notice as a breach of this Agreement.

G. The Certificate of Insurance should note in the Description of Operations the following:

Department: _____
Contract #: _____

H. Insurance procured by Contractor shall not reduce nor limit Contractor's contractual obligation to indemnify, save harmless and defend Union County for claims made or suits brought which result from or are in connection with the performance of this Agreement.

I. Certificate Holder shall be listed as follows:

Union County
Attention: Union County Risk Manager
500 N. Main Street, Suite #130
Monroe, NC 28112

J. If Contractor is authorized to assign or subcontract any of its rights or duties hereunder and in fact does so, Contractor shall ensure that the assignee or subcontractor satisfies all requirements of this Agreement, including, but not limited to, maintenance of the required insurances coverage and provision of certificate(s) of insurance and additional insured endorsement(s), in proper form prior to commencement of services.

9.21 INDEMNIFICATION

Contractor agrees to protect, defend, indemnify and hold Union County, its officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this agreement and/or the performance hereof that are due, in whole or in part, to the negligence of the Contractor, its officers, employees, subcontractors or agents. Contractor further agrees to investigate, handle, respond to, provide defense for, and defend the same at its sole expense and agrees to bear all other costs and expenses related thereto.

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10 APPENDIX A – BID FORM

IFB No. 2024-048 Sewer Repair & Rehabilitation f

SUBMIT WITH BID

Company Name: _____

Unit prices quoted and accepted shall be firm throughout the term of the awarded contract. Unit prices shall be applied, as appropriate, to compute the total value in the scope of the work all in accordance with the Contract Documents. Bidder acknowledges that quantities are approximate only and are given as the basis for comparison of Bids. The Owner may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient. An increase or decrease in the quantity of any item will not be regarded as sufficient grounds for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work. The quantities shown on the Bid Form are for the base bid only. It is the responsibility of the Contractor to apportion the cost of unit price items to the base bid listed using information in the Contract Documents. The cost for all unit price items shall be included within the base bid.

Bidder agrees to perform all work described in the Bidding Documents for the unit prices set forth in the Bid tabulation. Work may be required to be performed at night, weekends, or on holidays and no separate bid prices will distinguish for the time of work.

Each Bidder must acknowledge that subcontractors are only to be used with the express written permission of Union County.

Contractors shall be responsible for always providing the minimum required personnel and equipment during the project as indicated in each bid item. If the Contractor is unable to meet the minimum requirements, the bid item will not be paid at the approved rate. The rate may be paid at a proportional amount based on the percentage of equipment/personnel actually provided.

The pricing shall include all costs to the Contractor including, without limitation, fuel, travel, transport, hauling, permits, overhead, profit, taxes, insurance, lube, and service requirements, etc.

Provide the following information:

General Contractor's License Number: _____

Secretary of State ID Number _____

Attachments to this Bid:

The following items are submitted and made a condition of this Bid:

- List of Proposed Subcontractors.
- List of Proposed Suppliers.

For furnishing all new materials, labor and equipment that may be incidental to and for the construction of sanitary sewer facilities as specified and outlined below:								
ITEM				**DESCRIPTION**	**QUANTITY**		**UNIT PRICE**	**TOTAL**
1				**FOR <u>RESETTING</u> EXISTING FRAMES AND COVERS AS SPECIFIED, INCLUDING COMPLETE RESTORATION OF PAVED OR UNPAVED AREAS, COMPLETE IN PLACE.**				
	A.			MANHOLES IN PAVED AREAS	1	EA		
	B.			MANHOLES IN UNPAVED AREAS	1	EA		
2				**FOR <u>REPLACING</u> EXISTING MANHOLE FRAMES AND COVERS WITH NEW FRAMES AND COVERS, AS SPECIFIED, INCLUDING COMPLETE RESTORATION OF PAVED OR UNPAVED AREAS, COMPLETE IN PLACE.**				
	A.			MANHOLES IN PAVED AREAS				
		1)		WITH 24-INCH DIAMETER SOLID COVERS	1	EA		
		2)		WITH 24-INCH DIAMETER CAM-LOCK WATERTIGHT COVERS	1	EA		
	B.			MANHOLES IN UNPAVED AREAS				
		1)		WITH 24-INCH DIAMETER SOLID COVERS	1	EA		
		2)		WITH 24-INCH DIAMETER CAM-LOCK WATERTIGHT COVERS	1	EA		
3				**FOR <u>RAISING</u> EXISTING MANHOLE COVERS WITH CONCRETE GRADE RINGS, HEIGHT OF ADJUSTMENT AS NOTED, AS SPECIFIED, INCLUDING COMPLETE RESTORATION OF PAVED OR UNPAVED AREAS, COMPLETE IN PLACE.**				
	A.			MANHOLES IN PAVED AREAS				
		1)		0 TO 1 VERTICAL FOOT	1	EA		
		2)		FOR EACH FOOT OVER 1 VERTICAL FOOT, (ADD TO ITEM A(1) ABOVE)	1	VF		
	B.			MANHOLES IN UNPAVED AREAS				

		1)		0 TO 1 VERTICAL FOOT	1	EA		
		2)		FOR EACH FOOT OVER 1 VERTICAL FOOT, (ADD TO ITEM B(1) ABOVE)	1	VF		
4				**SEAL FRAME TO MANHOLE WITH SEALANT COMPOUND, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
5				**FOR INSTALLING INFLOW DISHES, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
6				**REBUILD BENCH AND INVERT IN EXISTING MANHOLES, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
7				**GROUT CHIMNEY WITH 1-INCH THICK CEMENTITIOUS COATING, AS SPECIFIED, COMPLETE IN PLACE.**	1	VF		
8				**GROUT JOINT WITH 1-INCH THICK CEMENTITIOUS COATING, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
9				**GROUT HOLE WITH CEMENTITIOUS REPAIR MORTAR, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
10				**GROUT PATCH REINFORCING STEEL WITH CEMENTITIOUS REPAIR MORTAR, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
11				**INJECTING CHEMICAL GROUT INTO MANHOLE COMPONENT TO REPAIR LEAKS, ANY LOCATION, AS SPECIFIED, COMPLETE IN PLACE.**				
	A.			MANHOLE JOINT (UP TO 2 GALLONS OF CHEMICAL GROUT)	1	EA		
	B.			MANHOLE FRAME (UP TO 2 GALLONS OF CHEMICAL GROUT)	1	EA		
	C.			MANHOLE CRACK (UP TO 2 GALLONS OF CHEMICAL GROUT)	1	EA		
	D.			MANHOLE HOLE (UP TO 2 GALLONS OF CHEMICAL GROUT)	1	EA		
	E.			MANHOLE PIPE CONNECTION (UP TO 2 GALLONS OF CHEMICAL GROUT)	1	EA		
	F.			ADDITIONAL CHEMICAL GROUT BEYOND 2 GALLONS	1	GAL		

12				**FOR INSTALLING 1-INCH THICK CEMENTITIOUS MORTAR ON EXISTING MANHOLE WALLS & BENCHES, AS SPECIFIED, COMPLETE IN PLACE.**				
	A.			ANY SPECIFIED MATERIAL				
		1)		MANHOLES IN PAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
		2)		MANHOLES IN UNPAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’DIAMETER	1	VF		
	B.			HYDROGEN-SULFIDE RESISTANT MATERIAL, AS SPECIFIED				
		1)		MANHOLES IN PAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
		2)		MANHOLES IN UNPAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
13				**FOR INSTALLING 2-INCH THICK CEMENTITIOUS MORTAR ON EXISTING MANHOLE WALLS & BENCHES, AS SPECIFIED, COMPLETE IN PLACE.**				
	A.			ANY SPECIFIED MATERIAL				
		1)		MANHOLES IN PAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
		2)		MANHOLES IN UNPAVED AREAS				
			a)	4’ DIAMETER	1	VF		

			b)	5’ DIAMETER	1	VF		
	B.			HYDROGEN-SULFIDE RESISTANT MATERIAL, AS SPECIFIED				
		1)		MANHOLES IN PAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
14				**FOR INSTALLING 125 MIL EPOXY ON EXISTING MANHOLE WALLS & BENCHES, AS SPECIFIED, COMPLETE IN PLACE.**				
	A.			HYDROGEN-SULFIDE RESISTANT MATERIAL, AS SPECIFIED				
		1)		MANHOLES IN PAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
		2)		MANHOLES IN UNPAVED AREAS				
			a)	4’ DIAMETER	1	VF		
			b)	5’ DIAMETER	1	VF		
15				**FOR INSTALLING 1-INCH THICK CEMENTITIOUS MORTAR ON EXISTING WET WELL INTERIOR SURFACES, AS SPECIFIED, COMPLETE IN PLACE.**	1	SF		
16				**FOR INSTALLING 125 MIL EPOXY ON EXISTING WET WELL INTERIOR SURFACES, AS SPECIFIED, COMPLETE IN PLACE.**	1	SF		
17				**FOR CLEANING AND TELEVISING EXISTING SEWERS, AS SPECIFIED**				
	A.			EXISTING 4 INCH OR 6 INCH DIAMETER SERVICE LATERALS	1	EA		
	B.			EXISTING 8 INCH DIAMETER MAIN SEWERS	1	LF		
	C.			EXISTING 10 INCH OR 12 INCH DIAMETER MAIN SEWERS	1	LF		

18				**FOR INSTALLING CURED-IN-PLACE PIPE LINING, AS SPECIFIED, ANY REQUIRED INSTALLED LINER THICKNESS, LOCATION AS LISTED, COMPLETE IN PLACE.**				
	A.			IN PAVED AREAS				
		1)		8" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		2)		10" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		3)		12" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		4)		REMOVING PROTRUDING SERVICE CONNECTIONS VIA AN INTERNAL ROBOTIC CUTTER PRIOR TO INSTALLING CURED-IN-PLACE PIPE LINING OR AS NECESSARY TO COMPLETE CCTV, ANY SERVICE LATERAL MATERIAL, ANY SIZE LATERAL, AS SPECIFIED, COMPLETE IN PLACE.	1	EA		
	B.			IN UNPAVED AREAS				
		1)		8" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		2)		10" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		3)		12" DIAMETER SEWER, ANY REQUIRED INSTALLED LINER THICKNESS	1	LF		
		4)		REMOVING PROTRUDING SERVICE CONNECTIONS VIA AN INTERNAL ROBOTIC CUTTER PRIOR TO INSTALLING CURED-IN-PLACE PIPE LINING OR AS NECESSARY TO COMPLETE CCTV, ANY SERVICE LATERAL MATERIAL, ANY SIZE LATERAL, AS SPECIFIED, COMPLETE IN PLACE.	1	EA		

19				**FOR RECONNECTING EXISTING ACTIVE SERVICE LATERALS TO NEW CURED-IN-PLACE PIPE LINING VIA AN INTERNAL REMOTE CUTTER, AS SPECIFIED, COMPLETE IN PLACE.**	1	EA		
20				**CLEANOUT REPAIRS CONSISTING OF REPLACING CLEANOUT CAPS, ADAPTERS, INSERTS, ETC. AS SPECIFIED.**	1	EA		
21				**FOR PERFORMING BYPASS PUMPING USING 6-INCH PUMPS, COST PER DAY PER 6-INCH PUMP, WITH ALL NECESSARY PIPING, ALL OTHER BYPASS PUMPING TO BE CONSIDERED INCIDENTAL TO THE WORK WITH COSTS INCLUDED IN OTHER BID ITEMS**	1	EA		
				BID TOTAL (ITEMS 1-21)				
*				**MOBILIZATION WILL BE COMPENSATED AT 2% OF THE SUB-TOTAL OF THE INDIVIDUAL PROJECT WORK ASSIGNMENT**				
**				**CONTINGENCY ALLOWANCE WILL BE 5% OF THE SUB-TOTAL OF THE INDIVIDUAL PROJECT WORK ASSIGNMENT**				

11 APPENDIX B – BID SUBMISSION FORM

IFB No. 2024-048 Sewer Repair & Rehabilitation

SUBMIT WITH BID

This Bid is submitted by:

Company Legal Name: _____

Representative Name: _____

Representative Signature: _____

Representative Title: _____

Address: _____

City/State/Zip: _____

Email Address: _____

Phone Number: _____

Website Address: _____

It is understood that Union County reserves the right to reject any and all Bids, to make awards according to the best interest of the County, to waive formalities, technicalities, to recover and re-bid this project. Bid is valid for 120 calendar days from the bid due date and is submitted by an executive of the company that has authority to contract with Union County, NC.

Name: _____

Title: _____

Signature: _____

Date: _____

12 APPENDIX C – ADDENDUM AND ANTI-COLLUSION FORM

IFB No. 2024-048 Sewer Repair & Rehabilitation f

SUBMIT WITH BID

Please acknowledge receipt of all addenda by including this form with your Bid. Any questions or changes received will be posted as an addendum on www.co.union.nc.us and/or www.ips.state.nc.us. It is your responsibility to check for this information.

Addendum No.	Date Downloaded

I certify that this Bid is made in good faith and without collusion with any other offeror or officer or employee of Union County.

Company Name: _____

Name: _____

Title: _____

Email Address: _____

Signature: _____

Date: _____

13 APPENIX D – BID SECURITY SAMPLE

IFB No. 2024-048 Sewer Repair & Rehabilitation

An executed Bid Security must be submitted with Bid. Refer to Section 4.4 for instructions.

A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent [5%] of Bidder's maximum Bid price and in the form of a deposit of cash, cashier's check or certified check on some bank or trust company insured by the Federal Deposit insurance Company, or a bid bond executed by corporate surety licensed under the laws of North Carolina.

SAMPLE BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:
Description *(Project Name and Include Location)*:

BOND

Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

14 APPENIX E – PERFORMANCE AND PAYMENT BOND SAMPLE

IFB No. 2024-048 Sewer Repair & Rehabilitation

Do Not Submit with Bid

Bonds shall be in a form substantially consistent with this sample.

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: **UNION COUNTY**
500 N. Main Street, Suite 600
Monroe, North Carolina, 28112

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*: Jesse Helm Park Playground Equipment (IFB 2024-071)

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within

two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

SAMPLE PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: **UNION COUNTY**
500 N. Main Street, Suite 600
Monroe, North Carolina 28112

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*: Jesse Helms Park Playground Equipment (IFB 2024-071)

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

    5.1 Claimants who do not have a direct contract with the Contractor,

        5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2 Pay or arrange for payment of any undisputed amounts.

    7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

15 APPENDIX F – TEMPLATE CONTRACT

IFB No. 2024-048 Sewer Repair & Rehabilitation

Do Not Submit with Bid

-----For informational purposes only. -----

STATE OF NORTH CAROLINA

AGREEMENT

COUNTY OF UNION

1. AGREEMENT. This agreement ("Agreement") is entered into on _____, by and between UNION COUNTY, a political subdivision of the State of North Carolina ("Union"), and [Contractor's full legal name], ("Contractor"), whose business address is _____.

2. INDEPENDENT CONTRACTOR. Contractor shall be an independent contractor in all its activities pursuant to this Agreement. Neither Contractor nor any of its employees are to be considered Union's employee or agent for any purpose including, but not limited to, the accrual of any employee benefits. Contractor is not authorized to represent Union or otherwise bind Union in any dealings between Contractor and third parties. Any employees furnished by Contractor under this Agreement shall be deemed to be Contractor's employees exclusively.

3. SCOPE OF THE WORK. Contractor shall furnish all labor, equipment, tools, materials, supplies, transportation, tests and supervision required to complete in a workmanlike manner the work described in the [*Scope of Services or if attaching the full IFB, state the IFB # and the IFB title*], which is attached hereto and incorporated herein by reference ("Work"). Union is not financially committed by this agreement to purchase any minimum amount of services.

4. PERIOD OF PERFORMANCE. This Agreement shall commence as of the date first written above and shall continue until the earlier of the completion and acceptance of the Work or _____ [*total maximum time period from execution of the Agreement*]. Contractor shall promptly commence Work and shall achieve [substantial or final (*whichever is used in the solicitation/bid form*)] completion of the Work within _____ (___) days from Contractor's receipt of notice to proceed from Union.

5. PAYMENT FOR WORK. Union shall pay Contractor [*state the lump sum or hourly rate or unit pricing*] for Work, as set forth in the Contractor's bid, which is attached hereto and incorporated herein by reference. Payment for work satisfactorily completed shall be made within thirty (30) days of receipt of invoice by Union's finance office. Contractor shall submit documentation supporting its entitlement to payment as required by Union, and Union shall have no obligation to pay Contractor unless and until Union has received such documentation. All payments shall be conditioned upon appropriation by the Union County Board of Commissioners of sufficient funds for each request for services.

6. LICENSING REQUIREMENTS. Contractor represents and warrants that it is and shall remain properly licensed at all times in the performance of Work.

7. PERMITS AND LICENSES. Unless otherwise agreed in writing in advance by Union, Contractor shall obtain and pay for all licenses and permits that are required for it to perform Work.

8. COMPLIANCE WITH LAWS/COMPLIANCE WITH RULES AND POLICIES OF UNION. In performing the services pursuant to this Agreement, Contractor shall comply with all laws, rules, regulations, ordinances, codes, standards, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction. Contractor also shall comply with all rules and policies of Union.

9. INSURANCE. Contractor shall comply with the insurance requirements set forth in Exhibit A, attached and incorporated herein by reference.

No workers' compensation insurance shall be obtained by Union concerning Contractor or the employees of Contractor. Contractor shall comply with the workers' compensation law concerning Contractor and the employees of Contractor.

10. TAXES. Contractor shall be responsible for paying all taxes, fees, assessments and premiums of any kind payable on its employees and operations. Contractor shall substantiate, on demand by Union, that all taxes and other charges are being properly paid.

Pursuant to N.C.G.S. § 105-164.14, Union is eligible for sales and use tax refunds on all materials which become a permanent part of the construction. Contractor agrees to provide Union such documentation as may be necessary to meet the requirements of the North Carolina Department of Revenue regarding requests for refund of sales and use taxes. Such requirements include those described in the North Carolina Department of Revenue Sales and Use Tax Technical Bulletins § 18-2(F), outlined below:

> To substantiate a refund claim for sales or use taxes paid on purchases of building materials, supplies, fixtures, and equipment by a contractor, Union must secure from a contractor certified statements setting forth the specific required information. A "certified statement" is a statement signed by a contractor's Union, a corporate officer of a contractor, or an employee of a contractor who is authorized to provide information set forth in the statement. The certified statement must include all of the following information:
>
> a. The date the property was purchased;
>
> b. The type of property purchased;
>
> c. The cost of property purchased and the amount of sales and use taxed paid thereon;
>
> d. The vendor from whom the property was purchased;
>
> e. The project for which the property was purchased;
>
> f. If the property was purchased in the State of North Carolina, the county to which it was delivered, or, if the property was not purchased in the State of North Carolina, the county in which the property was used; and
>
> g. The invoice number of the purchase.
>
> In the event Contractor makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total

amount of the invoices, and the State and local sales and use taxes paid thereon. Such statement must also include the cost of any tangible personal property withdrawn from Contractor's warehouse stock and the amount of State and local sales or use tax paid thereon by Contractor. Any local sales or use taxes included in Contractor's statements must be shown separately from the State sales or use taxes. Contractor's statements must not contain sales or use taxes paid on purchases of tangible personal property purchased by Contractor for use in performing the Contract which does not annex to, affix to or in some manner become a part of the building or structure that is owned or leased by a governmental agency and is being erected, altered or repaired for use by a governmental entity as defined by N.C.G.S. § 105-164.14(c). Examples of property on which sales or use tax has been paid by Contractor and which shall not be included in Contractor's certified statement are scaffolding, forms for concrete, fuel for the operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals. Similar certified statements by Subcontractors must be obtained by Contractor and furnished to Union.

Contractor shall submit notarized sales tax certificates which meet the requirements detailed above with each Application for Payment. Payment will not be made until the sales tax certificate(s) have been submitted to Union. Union is the recipient of sales tax refunds and no such funds shall be provided to Contractor, or claim made by Contractor therefor.

11. WARRANTY OF WORK. Contractor warrants that all Work shall be new, unless otherwise agreed in this Agreement, and of good quality and performed in a good and workmanlike manner. Contractor shall, at its own expense, at the request of Union, promptly replace or repair any defective or deficient Work for a period of one year after completion of Work. The express warranty contained in this section shall not diminish any of Union's rights against Contractor with respect to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations other than specifically to correct Work.

12. SAFETY. Contractor shall establish and enforce safe working procedures at all times during its performance of Work in accordance with all federal, state and local laws, ordinances, rules and regulations pertaining to safety.

13. AGE LIMITS. No employee of Contractor under the age of 18 shall be permitted on property owned or leased by Union.

14. CLEANUP. Contractor shall keep its work areas clean of debris and excess materials, and at the end of each day will leave its work areas in broom-clean condition. If Contractor fails to clean up as required herein, Union may clean up and deduct the cost from Contractor's payment.

15. LIABILITY. Contractor agrees to protect, defend, indemnify and hold Union County, its officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands,

obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this agreement and/or the performance hereof that are due, in whole or in part, to the negligence of the Contractor, its officers, employees, subcontractors or agents. Contractor further agrees to investigate, handle, respond to, provide defense for, and defend the same at its sole expense and agrees to bear all other costs and expenses related thereto.

16. [*Include this section only if required by the IFB. If not required by IFB, delete this section and insert the word "RESERVED" in its place.*] PERFORMANCE AND PAYMENT BONDS. Contractor shall furnish to Union performance and payment bonds, each in an amount at least equal to the lump sum stated in Section 5 herein, as security for the faithful performance and payment of all of Contractor's obligations under this Agreement. The bonds shall remain in effect until one year after the date when final payment becomes due.

17. [*Include this section only if required by the IFB. If not required by IFB, delete this section and insert the word "RESERVED" in its place.*] LIQUIDATED DAMAGES. Contractor and Union recognize that time is of the essence and that Union will suffer financial loss if the Work is not completed within the times specified in Section 4 herein. The parties also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by Union if the Work is not completed on time. Accordingly, instead of requiring any such proof, Union and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Union _____ for each day that expires after the time specified in Section 4 herein for substantial completion until the Work is substantially complete.

18. DEFAULT/TERMINATION. If Contractor fails or refuses to supply sufficient and properly skilled labor, equipment or materials, or fails in any respect to diligently prosecute Work, or otherwise is in default or breach of any term of this Agreement, Union may terminate this Agreement upon 24 hours' written notice. In the event of such termination, Contractor immediately will stop work and remove its employees from Union's property. Union may complete the Work in whatever way it determines best, and at completion of the Work shall pay Contractor for the value of the Work performed by Contractor (excluding profit) but unpaid prior to the termination, less any costs incurred by Union to correct any deficiencies or defects attributable to Contractor's work.

19. TERMINATION FOR CONVENIENCE. Union may terminate this Agreement at any time upon three (3) days' written notice to Contractor. Such termination shall be effective in the manner specified in such written notice. Upon a termination for convenience, Union shall pay Contractor for Work performed to the date of termination. Contractor shall accept such payment in full and final payment and shall make no claim of any kind against Union, including but not limited to any claim for any additional payment.

20. ASSIGNMENT. Neither this Agreement, nor any payments to be earned pursuant to this Agreement, may be assigned by Contractor without the prior written consent of Union.

21. NO WAIVER. Union's not insisting upon strict compliance with any of the provisions of this Agreement, or not exercising any of its options provided herein, shall not be

construed as a waiver of its right thereafter to require such compliance or to exercise any such options.

22. E-VERIFY. E-Verify is the federal program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program, used to verify the work authorization of newly hired employees pursuant to federal law. Contractor shall ensure that Contractor and any subcontractor performing work under this Agreement: (i) uses E-Verify if required to do so by North Carolina law; and (ii) otherwise complies with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. A breach of this provision by Contractor will be considered a breach of this Agreement, which entitles Union to terminate this Agreement, without penalty, upon notice to Contractor.

23. ENTIRE AGREEMENT. This Agreement represents the entire agreement of the parties, and may not be modified except in writing signed by both parties.

24. GOVERNING LAW. This Agreement shall be construed and enforced in accordance with the laws of the State of North Carolina. The parties to this agreement confer exclusive jurisdiction of all disputes arising hereunder upon the General Courts of Justice of Union County, North Carolina.

25. AUTHORITY. Each signatory below warrants that it has the corporate or other organizational power and authority to execute, deliver and perform this Agreement. Each signatory further warrants that the execution, delivery and performance by it of the Agreement has been duly authorized and approved by all requisite action of the party's management and appropriate governing body.

IN WITNESS WHEREOF, the parties hereto, acting under authority of their respective governing bodies, have hereunto set their hands and seals and caused this Agreement to be duly executed, this the day and year first above written.

UNION COUNTY	[CONTRACTOR'S FULL LEGAL NAME]
By: _____ (SEAL) Brian W. Matthews, County Manager	By: _____ (SEAL)
	This instrument has been preaudited in the manner required by The Local Government Budget and Fiscal Control Act.
Approved as to Legal Form _____	_____ Deputy Finance Officer

EXHIBIT A

INSURANCE REQUIREMENTS

I. At Contractor's sole expense, Contractor shall procure and maintain the following minimum insurances with insurers authorized to do business in North Carolina and rated A-VII or better by A.M. Best, or as otherwise authorized by the Union County Risk Manager.

A. WORKERS' COMPENSATION
Statutory (coverage for three or more employees) limits covering all employees, including Employer's Liability with limits of:

$500,000	Each Accident
$500,000	Disease - Each Employee
$500,000	Disease - Policy Limit

B. COMMERCIAL GENERAL LIABILITY
Covering Ongoing and Completed Operations involved in this Agreement.

$2,000,000	General Aggregate
$2,000,000	Products/Completed Operations Aggregate
$1,000,000	Each Occurrence
$1,000,000	Personal and Advertising Injury Limit

C. COMMERCIAL AUTOMOBILE LIABILITY

$1,000,000 Combined Single Limit - Any Auto

D. PROFESSIONAL LIABILITY

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Professional Liability Insurance for a period of two (2) years following termination of the Agreement.

E. POLLUTION LIABILITY INSURANCE

$1,000,000 Claims Made

Contractor shall provide evidence of continuation or renewal of Pollution Liability Insurance for a period of two (2) years following termination of the Agreement.

F. NETWORK SECURITY & PRIVACY LIABILITY (CYBER)

$1,000,000 Claims Made
$3,000,000 Aggregate Limit

Contractor shall provide evidence of continuation or renewal of Technology Errors & Omissions Insurance for a period of two (2) years following termination of the Agreement.

G. ABUSE AND MOLESTATION INSURANCE

$300,000 Per Claim
$300,000 Aggregate Limit

II. ADDITIONAL INSURANCE REQUIREMENTS

A. The Contractor's General Liability policy shall be endorsed, specifically or generally, to include the following as Additional Insured:

UNION COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED WITH RESPECTS TO THE GENERAL LIABILITY INSURANCE POLICY.

Additional Insured status for Completed Operations shall extend for a period of not less than three (3) years from the date of final payment.

B. Before commencement of any work or event, Contractor shall provide a Certificate of Insurance in satisfactory form as evidence of the insurances required above.

C. Contractor shall have no right of recovery or subrogation against Union County (including its officers, agents and employees).

D. It is the intention of the parties that the insurance policies afforded by contractor shall protect both parties and be primary and non-contributory coverage for any and all losses covered by the above-described insurance.

E. Union County shall have no liability with respect to Contractor's personal property whether insured or not insured. Any deductible or self-insured retention is the sole responsibility of Contractor.

F. Notwithstanding the notification requirements of the Insurer, Contractor hereby agrees to notify County's Risk Manager at 500 North Main Street, Monroe, NC 28112, within two (2) days of the cancellation or substantive change of any insurance policy set out herein. Union, in its sole discretion, may deem failure to provide such notice as a breach of this Agreement.

G. The Certificate of Insurance should note in the Description of Operations the following:

Department: _____
Contract #: _____

H. Insurance procured by Contractor shall not reduce nor limit Contractor's contractual obligation to indemnify, save harmless and defend Union County for claims made or suits brought which result from or are in connection with the performance of this Agreement.

I. Certificate Holder shall be listed as follows:

Union County
Attention: Risk Manager
500 North Main Street
Monroe, NC 28112

J. If Contractor is authorized to assign or subcontract any of its rights or duties hereunder and in fact does so, Contractor shall ensure that the assignee or subcontractor satisfies all requirements of this Agreement, including, but not limited to, maintenance of the required insurances coverage and provision of certificate(s) of insurance and additional insured endorsement(s), in proper form prior to commencement of services.

16 APPENDIX G – REFERENCE DOCUMENTS

IFB No. 2024-048 Sewer Repair & Rehabilitation

Do Not Submit with Bid

-----For informational purposes only. -----

The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work, including Union County Water's Water and Sewer specifications and all referenced documents and details outlined as part of this contract.

Reference the following for detailed information:

Section 01015 – Control of Work

Section 01300 – Submittals

Section 01380 – Photographs and Videos

Section 01510 – Maintenance of Flow in Existing Sewers and Drains

Section 01570 – Traffic Control

Section 02750 – Cured-In-Place-Pipe (CIPP) Lining

Section 02754 – Cured-In-Place-Pipe Point Repairs (CIPP)

Section 02756 – Lateral Service Connection Full Wrap Seal

Section 02761 – Video Inspection and Cleaning of Sanitary Sewers

Section 02768 – Monolithic Manhole Lining Systems

Section 02985 – Seeding, Sodding and Landscaping

Section 15004 – Manhole Rehabilitation

Section 330130 – CCTV Inspection of Sanitary Sewers

Union County Manhole Asset Data Sheet

SECTION 01015

CONTROL OF WORK

PART 1 GENERAL

1.01 CONTRACTOR'S CAPABILITIES

A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Agreement. If at any time such personnel appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of existing easements, except by written permission of the Owner.

B. When necessary to notify the property owner or tenant of any impact of construction activity, entry onto the land shall only be made by a Foreman, or more senior person, of the Contractor. All Foreman, and those ranking above Foreman, shall carry laminated photo identification cards bearing their name, position, Contractor name, and local day time and after hours phone number of the Contractor. This identification shall be produced, whether or not requested, anytime a Foreman or more senior person enters private land to communicate with the property owner or tenant.

C. The Contractor will contain his work activities within the public road right-of-ways and public utility easements as shown on the plans. Any contractor activities outside these easements and right-of-ways will be considered work on private property. Work on private property may require the contractor to obtain from the impacted property owner, a release that holds the County harmless against claim for damages resulting from the contractor's activities on private property. Any specific work or service performed by the contractor on behalf of the property owner shall be noted in the release document. The release shall be signed and dated by the legal owner of the property and shall be witnessed and dated by the Contractor's representative. The contractor is responsible for retaining the original release. The Contractor shall provide a copy of the release to the Engineer prior to request for payment on the subject project.

1.03 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor, shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as

limiting the length of open trench and prohibiting stacking excavated material in the street. All open excavations within State secondary road rights-of-way shall not remain open overnight. At the discretion of the Engineer, excavation in other areas shall be closed at the end of each work day.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night where such obstacles are readily accessible to the public.

1.04 TEST PITS

A. Test pits for the purpose of locating all known and unknown underground utilities or structures in advance of the construction shall be excavated and backfilled by the Contractor at no additional cost. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.05 MAINTENANCE OF TRAFFIC

A. Unless Contractor obtains written permission to close a road from an agency with jurisdiction over the road in question, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the agency with jurisdiction over the road. The Contractor is in no way relieved of liability for maintaining safe conditions regardless of approval of his work by others.

B. Detours around construction will be subject to the approval of the agency with jurisdiction over the road. The Contractor shall make all necessary traffic control submittals to the agency with jurisdiction for review and approval. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations, and periods when traffic is being detoured will be strictly controlled by the agency with jurisdiction over the road. The Contractor is in no way relieved of liability for maintaining safe conditions because detours are approved by others.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches. At the Contractor's expense, night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

D. Signs and signing procedures in roads shall conform fully to all applicable Federal, State, and Local codes.

1.06 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials. All curbing shall be restored by the Contractor in a condition equal to the original construction and in accordance with the best modern practice. Full lengths of curbing shall be replaced.

C. Along the location of this work all fences, walks, and other physical features except trees, bushes, and shrubbery shall be protected and restored in a thoroughly workmanlike manner by the Contractor. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be re-graded and restored to their original condition by sodding the area with a like kind grass.

D. Trees within the project easements at the request of the Engineer or those close to the project easements shall be boxed or otherwise protected against injury by the Contractor. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

1.07 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, known or unknown, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.

B. Protection and temporary removal and replacement of existing utilities and structures as described in this section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Proposal, or as extra work under the General Conditions.

C. If, in the opinion of the Engineer, permanent relocation of a utility owned by the municipality is required and the relocation is not already noted on the Drawings, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under the General Conditions. If relocation of a privately owned utility is required, the municipality will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the municipality and Utility, and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays, and legal holidays) before excavating in any public way.

1.08 MAINTENANCE OF FLOW

A. The Contractor shall at his own cost, provide for the flow of sewers, drains, and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow. See Section 01510 for additional requirements relative to maintaining sanitary sewer flow.

1.09 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

1.10 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

1.11 CONTRACTOR'S RESPONSIBILITY TO SUPPLY MATERIALS AND PERFORM WORK AT HIS EXPENSE

A. An attempt has been made while writing this Specification to state the Contractor's responsibilities for supplying materials and performing work under this Contract. All supply of materials and performance of work stated or implied to be the Contractor's responsibility shall be supplied and/or performed by the Contractor and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

1.12 PUBLIC NOTIFICATION

A. The Owner will notify all residences, property owners, and businesses within the project areas prior to the start of work on the project. Ten (10) days before the start of work in each area the Contractor shall place a notice at the front door of each residence in that area advising the homeowners of the current schedule and advising of the Contractor's emergency telephone number. The Contractor shall coordinate and cooperate with the Owner on the most appropriate way to notify businesses in the area. The text of the notices shall be approved by the Owner in advance.

1.13 DISPOSAL OF MATERIALS

A. Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

B. Contractor shall comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal.

1.14 TEMPORARY WATER SERVICE

A. The Contractor shall obtain prior approval from Union County Public Works before using the local public water supply and shall comply with all Federal, State, and local laws and regulations concerning water drawn from a public water supply. The Contractor shall provide an approved backflow prevention device and may be provided with a flow metering device for the purposes of measuring the quantity of water used by the Contractor. Water will be provided free of charge. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted water use. Hydrants shall only be operated under the supervision of Union County Public Works personnel.

1.15 COMPLAINT RESOLUTION

A. The Contractor must provide a supervisor to be available by phone 24-hours a day, 7-days a week to answer calls related to the Contractor's work and job site.

B. The Contractor shall respond immediately when called with emergency situations involving their work.

C. Non-emergency complaints regarding the Contractor's work/workmanship shall be responded to within 24-hours.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, Construction Schedules, and Submittal Schedules as defined in the General Conditions. Detailed submittal requirements are specified in the technical specifications sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.02 SHOP DRAWINGS, WORKING DRAWINGS, PRODUCT DATA, SAMPLES, PRECONSTRUCTION VIDEO

A. Shop Drawings

1. Shop drawings include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.

2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractors shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the Work.

C. Working Drawings

1. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, pedestrian bridges, temporary traffic and signage plans, forming and false work; and for such other work as may be required for construction but does not become an integral part of the Project.

2. Working drawings shall be prepared and sealed by a registered Professional Engineer, currently licensed to practice in the State of North Carolina. The Contractor shall submit a letter of certification from the Professional Engineer stating that he/she has prepared the designs and has verified that the materials/ equipment have been installed as designed. No working drawings or calculations/computations relating to the working drawings shall be submitted to the Engineer unless specifically requested in writing.

D. Samples

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

E. Pre-Construction Audio/Video Taping

1. Submit pre- and post-construction video photography taping per Section 01380.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications

B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each submittal transmittal sheet for shop drawings, product data and samples at the time of submittal of said drawings, product data and samples to the Engineer.

C. Each submittal shall be transmitted by a standard transmittal sheet which shall fully describe the transmitted data and include a listing of all items within the submittal.

D. The Contractor shall utilize a 10-character submittal identification numbering system in the following manner:

1. The first character shall be a D, S, P, M, or R, which represents Shop/Working Drawing and other Product Data (D), Sample (S), Preliminary Submittal (P), Operating/Maintenance Manual (M), or Request for Information (R).

2. The next five digits shall be the applicable Specification Section Number.

3. The next three digits shall be the numbers 001-999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

4. The last character shall be a letter, A-Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3d submission, etc. A typical submittal number would be as follows:

D-03300-008-B

D	=	Shop Drawing
03300	=	Specification Section for Concrete
008	=	The eighth initial submittal under this specification section
B	=	The second submission (first resubmission) of that particular shop drawing

E. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

F. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

G. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

H. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal, appropriately coded, will be returned within 30 calendar days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings shall be submitted electronically via email or memory stick to the Engineer.

2. Product Data shall be submitted electronically via email or memory stick to the Engineer.

D. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contractor identification.

4. The names of:

a. Contractor
b. Supplier
c. Manufacturer

5. Identification of the product, with the specification section number, page and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Contractor certification statement and identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8-in x 3-in blank space for Contractor and Engineer stamps.

E. Facsimiles or copies of facsimiles will not be accepted as submittals.

F. After review of shop and working drawings, Engineer will transmit an electronic copy of the submittal to the Contractor.

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following codes.

Code 1 - "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 - "APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 - "APPROVED AS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 - "APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 - “NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 - "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

Code 7 - "RECEIPT ACKNOWLEDGED" is assigned to acknowledge receipt of a submittal that is not subject to the Engineer’s review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.

Codes 1 through 5 designate the status of the reviewed submittal with Codes 6 showing there has been an attachment of additional data. Code 7 will be used as may be necessary.

E. Resubmittals will be handled in the same manner as the initial submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Not Approved" until resubmitted. The Engineer may, at his/her option, provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

G. Repetitive Review

1. Shop drawings and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the Engineer's then prevailing rates. The Contractor shall reimburse the Owner for all such fees invoiced to the Owner by the Engineer. Submittals are required until approved.
2. Any need for more than one resubmission, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.

H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.

I. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

J. Request For Information (RFI) shall be submitted on a standard form provided by the Engineer. RFI's shall indicate their importance to the timely completion of the project. RFI's will be processed as a shop drawing with 30 days allowed for review time.

1.06 DISTRIBUTION

A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed 4.

1.07 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other Sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the State of North Carolina and that he/she has been employed by (Name of Contractor) _____ _____ to design_____ _____ in accordance with Specification Section _____ for the (Name of Project) _____ _____. The undersigned further certifies that he/she has performed the design of the _____ _____, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the (Insert Name of Owner) _____ _____ or Owner's representative with five working days following written request therefor by the Owner.

_____
P.E. Name

_____
Signature

_____
Address

_____
Contractor's Name

_____
Signature

_____
Title

_____
Address

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SECTION 01380

PHOTOGRAPHS AND VIDOES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor materials, equipment, and incidentals required to videotape and photograph the project area, as directed by the Engineer and as specified herein, prior to, during and after construction work.

1.02 COST OF PHOTOGRAPHY

A. The cost of the photography shall be a subsidiary obligation of the Contractor, and no separate payment will be made.

1.03 AUDIO/VIDEO DVDS

A. DVD recordings shall not be made more than 5 days prior to construction or after completion. All DVDs and written records shall be immediately submitted to and become the property of the Owner.

PART 2 PRODUCTS

2.01 AUDIO/VISUAL RECORDING

A. The audio/video recording shall be of professional quality, DVD format.

B. The audio-visual system and the procedures employed in its use shall be such as to produce a finished product that will meet professional standards. The video portion of the recording shall produce bright, sharp, clear pictures with accurate colors and shall be free from distortion or any other form of picture imperfection. All video recordings shall by electronic means display on the screen the time of day, the month, day and year of the recording. This time and date information must be continuously and simultaneously generated with the actual recording. The audio portion of the recording shall be of high clarity and be free from distortion. Professional, quality equipment shall be used in the recording firm’s studio.

2.02 PHOTOGRAPHS

A. Color photographs shall be taken on digital media with a minimum of eight mega-pixel resolution.

B. Files shall indicate the date, name of contract, and the location where the photograph was taken.

C. Images shall not be compressed.

PART 3 EXECUTION

3.01 VIDEO RECORDING

A. The recordings shall contain coverage of all visible features within the construction zone of influence. These features shall include, but not be limited to, all roadways, pavement, retention ponds, railroad tracks, curbs, driveways, sidewalks, culverts, head-walls, retaining walls, landscaping, trees, fences, visible utilities, structures and all buildings. Panning, zoom-in and zoom-out rates shall be sufficiently controlled to maintain a clear view of the subjects.

B. In general the views will comprise a 360° panorama every 100 feet of sewer length, at every manhole, and designated close-up views.

3.02 PHOTOGRAPHS

A. Photograph areas that could be impacted by construction activities including, but not limited to, material staging, ingress/egress, utility structures, buildings, and other visible features.

B. One (1) digital copy of each photograph shall be delivered to the Owner.

END OF SECTION

SECTION 01510

MAINTENANCE OF FLOW IN EXISTING SEWERS AND DRAINS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to maintain wastewater and storm drainage flow in all public and private pipes, including individual service connections, during construction.

B. Construct and maintain all temporary bypass sewers and drains and be responsible for all bypass pumping of sewage and drainage that may be required to prevent backing up of sewage and to allow proper inspection, rehabilitation, testing, or drainage during pipe replacement and/or rehabilitation. There shall be no spillage during the by-pass pumping. If spillage occurs, the Contractor shall immediately remove and dispose of all offensive matter spilled during the by-pass pumping at his own expense.

1.02 SUBMITTALS

A. The Contractor shall submit to the Engineer, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of flow interruption. All procedures for maintaining flows must meet the approval of the Owner and Engineer.

B. The Contractor shall prepare a specific, detailed description of the proposed pumping system (Bypass Pumping Plan). The Bypass Pumping Plan shall be submitted and approved prior to the mobilization of any of the equipment included in the Bypass Pumping Plan. The Bypass Pumping Plan shall outline all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This Bypass Pumping 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 herein. No construction shall begin until all provisions and requirements have been reviewed and accepted by the Engineer. The plan shall include but not be limited to the following details:

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, location and method of installation of discharge piping.

7. Bypass pump sizes, capacities, and number of each size to be provided on site including primary all primary and secondary pumping units.

8. Any temporary pipe supports and anchoring requirements.

9. Access plans to all bypass pumping locations indicated on the drawings.

10. Emergency plan for adverse weather and flooding for the cleaning phase and the lining phase of the work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 MAINTENANCE OF FLOW IN EXISTING SEWERS AND DRAINS

A. When bypass pumping is required the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage or drainage around the section in which work is to be performed. The by-pass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event.

B. Flows from private, commercial and industrial users shall be handled by the Contractor during rehabilitation of the sewer system without interruption.

C. The Contractor shall be required to repair at his own expense any damage to public or private property caused by his operations.

D. Should damage of any kind occur to the existing drains or sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer.

E. The Contractor shall not be permitted to overflow, bypass, pump or by any other means convey drainage to any land, street, storm drain or water course.

F. Any and all flow maintenance activities shall in no way impede traffic flow. Traffic flow must be maintained at all times.

G. The Contractor shall immediately notify the Owner should a sanitary sewer overflow occur and take the necessary action to recover, remove and mitigate in an approved manner the spillage to the satisfaction of the Owner and/or other governmental agency. If sewage is spilled onto public or private property, the Contractor shall washdown; cleanup and disinfect the spillage to the satisfaction of the Owner and/or other governmental agency.

H. The Contractor is responsible for costs, including fines, for maintaining flow in sewers.

END OF SECTION

SECTION 01570

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish, install, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow during construction.

B. All traffic control shall be in strict accordance with the requirements of the North Carolina Department of Transportation (NCDOT), and agency with jurisdiction over the road.

C. The Contractor shall prepare a Traffic Management Plan (TMP). The TMP will follow NCDOT's Guidelines for Transportation Management Plan Development, NCDOT's current edition of the "North Carolina Supplement to the MUTCD, Part VI and the State Policy and Procedure for Traffic Control Through Construction Work Zones" or other specific guidance from the agency having jurisdiction over the road.

1.02 SUBMITTALS

A. The Contractor shall submit to the NCDOT or agency with jurisdiction a detailed traffic control plan, including all temporary changes in traffic patterns, detailed drawings of the required traffic control equipment, a list of street or road closures and detours, etc. for each location of work. The traffic control plans must be approved by the NCDOT or agency with jurisdiction before any work will be allowed. The Contractor shall submit the traffic control plan for each work area at least 30 days prior to working in the area to provide time for review and comments from the NCDOT or agency with jurisdiction. Work shall also be coordinated with the Police Department, Fire Department, and other public safety agencies.

B. The Contractor shall submit to the NCDOT or agency with jurisdiction a notification that construction will be commencing within their right of way. The notification should be submitted in writing at least 30 days prior to commencing work in the respective agencies right of way.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 TRAFFIC CONTROL

A. The Contractor shall fully implement the traffic control plan as approved by the NCDOT or agency with jurisdiction. The traffic control devices shall be in place prior to performing any work within the roads. The Contractor shall maintain all traffic control equipment and monitor the traffic control measures. The traffic control measures shall be modified as deemed necessary by the Contractor, the NCDOT or agency with jurisdiction. The Contractor shall fully cooperate with the NCDOT or agency with jurisdiction officials during inspections of the traffic control measures. The Contractor shall remove temporary equipment and facilities when no longer required and restore grounds to the original or to specified conditions.

B. Night work and weekend work may be permitted by the NCDOT or agency with jurisdiction if requested by the Contractor. The NCDOT or agency with jurisdiction may restrict work in thoroughfares as necessary.

C. The Contractor shall notify all property owners at least 72 hours in advance of any work which will interfere with access to their residence or place of business.

D. No road shall be closed to traffic without the prior consent of the Engineer, the agency responsible for the road and the local Police Department. All standards of the governing agency shall be strictly followed.

3.02 CONSTRUCTION PARKING CONTROL

A. The Contractor shall control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, or construction operations.

B. The Contractor shall monitor parking of construction personnel's private vehicles, maintain free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads or in not-designated areas.

END OF SECTION

SECTION 02750

CURED-IN-PLACE PIPE (CIPP) LINING

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to provide for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube, which is formed to the original conduit by use a hydrostatic head or air pressure. The resin is cured using either hot water under hydrostatic pressure or steam within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting.

1.02 RELATED WORK

A. CIPP Point Repair Section 02754
B. Full Service Wrap Lateral Repairs Section 02756
C. Manhole Rehabilitation is included in Section 02763
D. Monolithic Manhole Lining Systems Section 02768

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Manufacturer's product data, including physical properties, surface preparation, repair, application, curing, and field quality control procedures.

2. Manufacturer and applicator qualifications as specified in paragraph 1.05 below.

3. Diameter, depth (rim to invert), and material for each manhole.

4. Design data and specification data sheets listing all parameters used in the design and applicable provisions of ASTM.

5. All design calculations shall be sealed by a Registered Professional Engineer in the State of North Carolina.

6. A list of all municipal installations performed by the manufacturer and Contractor over the past 5 years along with the contact name, telephone number, and brief description of work performed.

B. Submit to the Engineer, within 10 days of the Effective Date of the Agreement, the name of the supplier (manufacturer), installer and a list of materials to be furnished.

C. Submit a step-by-step description of the methods, practices, intervals, etc. to be used in the application and curing requirements of this specification section.

D. Test Reports

1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract were manufactured and tested in accordance with the ASTM Standards specified herein.

1.04. REFERENCED STANDARDS

A. This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.05 QUALIFICATIONS

A. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer with their bid for review and approval.

1. The Contractor shall be certified by the product manufacturer to install the CIPP systems.

2. For a Product to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 100,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.

3. For a Contractor to be considered as Commercially Proven, the Contractor must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least 5 (five) years active experience in the commercial installation of the product bid. In addition, the Contractor must have successfully installed at least 1,000,000 feet of the same product bid in wastewater collection systems and a minimum of 50,000 of thirty (30) inch or greater in diameter. Field Supervisor/Foreman: Minimum five (5) years as a foreman/superintendent for a cured-in-place lining crew (installing actual product included with this bid/project), and a minimum of 300,000 lineal feet of cured-in-place lining, diameters up to, and including, twenty-three (23) inch *(Engineer shall select appropriate experience requirement based upon work included with project. If work includes work in both diameter ranges please include both clauses)* ***or*** Minimum of five (5) years as a foreman/superintendent for a cured-in-place lining crew, a minimum of 50,000 lineal feet of cured-in-place lining of twenty-four (24) inch or greater, installed under his/her supervision. Such experience shall include the actual product, by trade name, CONTRACTOR proposes to install. Acceptable documentation of these minimum installations must be submitted to the Owner.

4. For a product and installer to be Commercially Proven, the installer must own and operate a legally permitted permanent facility to impregnate the CIPP tubes. To ensure the Owner all installed products will meet the minimum product quality control standards set forth by the manufacture, all CIPP liners shall be impregnated by the approved product's licensed installer that is performing the work. No pre-impregnated CIPP products will be accepted from a third-party vendor without written pre-approval from the owner. Please provide a copy of your permits for this facility with the bid.

5. Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be approved without independent third party testing verification.

6. Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9001. Proof of certification shall be required for approval.

7. Proposals must be labeled clearly on the outside of the proposal envelope, listing the product name and Contractor being proposed. Only proposals using pre-approved products and Contractors will be opened and read. Proposals submitted on products and/or from Contractors that have not been pre-approved will be returned unopened.

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

9. The Contractor shall provide a list of work crews/resources available to document the ability to complete this work without undue delay.

10. The Owner reserves the right to disapprove the use of the Contractor based on insufficient submitted documentation.

1.06 GUARANTEE

A. All CIPP installed shall be guaranteed by the Contractor for a period of two years from the date of acceptance. During this period, all defects discovered, as determined by the Owner or Engineer, shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Such repair or replacement shall include the cost of removal and reinstallation. After 21 months following substantial completion of the CIPP, the Owner/Engineer may inspect all of this work to ensure proper performance. If any deficiencies are found during these inspections, the Contractor shall repair them at no additional cost to the Owner.

1.07 QUALITY ASSURANCE

A. The supplier shall be responsible for the provisions of all test requirements specified in the above referenced ASTM Standards as applicable. In addition, CIPP products to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all lining products and materials approved for this Contract shall be borne by the Owner.

B. Inspections of the products and materials may also be made by the Engineer or other representatives of the Owner after delivery. The products and materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Materials rejected after delivery shall be marked for identification and shall be removed from the job at once.

C. All CIPP materials shall be from a single manufacturer. The supplier shall be responsible for the provisions for all test requirements specified in ASTM Standards as applicable.

D. Inspections of the CIPP material may be made by the Engineer or other representatives of the Owner after delivery. The CIPP material be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample of the CIPP material may have been accepted as satisfactory at the place of manufacture. CIPP material rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.08 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Extra care may be necessary during cold weather construction. Any lining product or material damaged in shipment shall be replaced as directed by the Engineer.

B. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, the lining products shall be adequately packaged and protected. The CIPP products shall be stored in a manner as recommended by the manufacturer.

D. CIPP product shall be stored, shipped and handled according to their material safety data sheet and the Manufacturer’s recommendations. Any CIPP materials damaged in shipment shall be replaced at no additional cost as directed by the Engineer

E. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

1.09 SAFETY AND SITE CONDITIONS

A. The CONTRACTOR and SUBCONTRACTOR shall comply with and enforce all Federal, State, and Local safety regulations. The Contractor’s personnel shall be certified for confined space entry.

PART 2 PRODUCTS

2.01 THE TUBE

A. The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5, reinforcing fibers may be included. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

B. The wet out Tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness, per section 5.6.

C. The Tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during installation.

D. The inner or outer layer of the Tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.

E. 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.

F. 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.

G. Seams in the Tube shall be stronger than the non-seamed felt.

H. The outside of the Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

2.02 THE RESIN

A. Resin - The resin system shall be a corrosion resistant polyester or vinyl ester and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

2.02 CIPP STRUCTURAL REQUIREMENTS

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

B. The Contractor must submit long-term testing for flexural creep in accordance with ASTM D2990 of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by the ASTM D2990 testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

C. The enhancement factor 'K' to be used in 'Partially Deteriorated' design conditions shall be assigned a value of 7.

D. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

E. The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

MINIMUM PHYSICAL PROPERTIES

		Cured Composite	
Property	Test Method	Min. Per ASTM F1216	Enhanced Resin
Modulus of Elasticity	ASTM D790	250,000 psi	400,000 psi
Flexural Stress	ASTM D790	4,500 psi	4,500 psi

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

Design Safety Factor	= 2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design (*as determined by Long-Term tests described in paragraph 5.2*)	=50% - 75%
Ovality*	= 2%
Enhancement Factor, k	= 7
Groundwater Depth (above invert)*	= ft.
Soil Depth (above crown)*	= ft.
Soil Modulus**	= psi

Soil Density**	= 120 pcf
Live Load**	= H20 Highway
Design Condition (partially or fully deteriorated)***	= ***

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

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

*** Based on review of video logs, conditions of pipeline can be fully or partially deteriorated. (See ASTM F1216 Appendix) The Owner will be sole judge as to pipe conditions and parameters utilized in Design.

G. 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.

PART 3 EXECUTION

3.01 RESPONSIBILITIES FOR INCIDENTAL ITEMS

A. It shall be the responsibility of the Owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

B. Cleaning of Sewer Lines - The Contractor shall clean, remove, and dispose of all internal debris out of the sewer line that will interfere with the installation of CIPP in accordance with Section 02761.

C. Bypassing Sewage - The Contractor shall provide for the flow of sewage around the section or sections of pipe designated for repair. Bypass pumping shall be in accordance with Section 01510.

D. Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. Inspections shall be performed in accordance with Section 02761.

E. Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion or pull-in installation, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

F. Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented and shall, as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

1. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.

2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

G. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

3.02. CURED-IN-PLACE PIPE (CIPP) INSTALLATION

A. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

B. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:

1. Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction.

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

C. Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

D. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

E. Curing shall be accomplished by utilizing either hot water under hydrostatic pressure or steam in accordance with the manufacturer's recommended cure schedule.

3.03 REINSTATEMENT OF BRANCH CONNECTIONS

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

3.04 TESTING REQUIREMENTS

A. Curing shall be accomplished by utilizing either hot water under hydrostatic pressure or steam in accordance with the manufacturer's recommended cure schedule.

B. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

C. 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.

D. CIPP Field Samples - When requested by the Owner, the Contractor shall submit test results from past field installations in North America of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 5.5 have been achieved in previous field applications.

3.05 INSPECTION

A. Curing shall be accomplished by utilizing either hot water under hydrostatic pressure or steam in accordance with the manufacturer's recommended cure schedule.

B. For each work order released, one CIPP sample for each diameter shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in Table 1 of the applicable ASTM.

C. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as calculated in paragraph 5.6 of this document.

D. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

3.06 CLEAN-UP

A. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

B. 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.

3.07 PAYMENT

Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed. Progress payments will be made monthly based on the work performed during that period.

END OF SECTION

SECTION 02754

CURED-IN-PLACE PIPE POINT REPAIRS (CIPP)

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to provide for the reconstruction of short lengths of pipelines and conduits by the installation of resin-impregnated flexible tube which is inflated in a short length of the pipeline to form a hard, impermeable, corrosion resistant pipe within a pipe. When cured, the cured-in-place-pipe (CIPP) must be formed to the original conduit. This reconstruction process can be used in a variety of gravity applications such as sanitary sewers and storm sewers.

1.02 RELATED WORK

A. CIPP Lining Section 02750
B. Full Service Wrap Lateral Repairs Section 02756
C. Manhole Rehabilitation is included in Section 02763
D. Monolithic Manhole Lining Systems Section 02768

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Manufacturer's product data, including physical properties, surface preparation, repair, application, curing, and field quality control procedures.

2. Manufacturer and applicator qualifications as specified in paragraph 1.05 below.

3. Design data and specification data sheets listing all parameters used in the design and applicable provisions of ASTM.

4. All design calculations shall be sealed by a Registered Professional Engineer in the State of North Carolina.

5. A list of all municipal installations performed by the manufacturer and Contractor over the past 5 years along with the contact name, telephone number, and brief description of work performed.

B. Submit to the Engineer, within 10 days of the Effective Date of the Agreement, the name of the supplier (manufacturer), installer and a list of materials to be furnished.

C. Submit a step-by-step description of the methods, practices, intervals, etc. to be used in the application and curing requirements of this specification section.

D. Test Reports

1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract that were manufactured and tested in accordance with the ASTM Standards specified herein.

1.04. REFERENCED STANDARDS

A. This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.05 QUALIFICATIONS

A. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer with their bid for review and approval.

1. The Contractor shall be certified by the product manufacturer to install the CIPP Point Repair systems.

2. The Contractor or subcontractor performing the work of this section shall be employees of the company manufacturing the CIPP Repair System components, or shall be licensed by the system manufacturer. The Manufactured System must have a minimum of a five (5) year history of satisfactory performance with a minimum of 500 installations. The contractor or subcontractor shall have a minimum of two (2) years of continuous experience installing CIPP Spot Repairs in pipe of similar size, length and configuration as proposed in this project. In addition, the contractor or subcontractor's onsite superintendent must have installed over 100 CIPP laterals of like condition for this geographic area and have a minimum of 5 years of CIPP industry experience.

3. Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be approved without independent third party testing verification.

4. Proposals must be labeled clearly on the outside of the proposal envelope, listing the product name and Contractor being proposed. Only proposals using pre-approved products and Contractors will be opened and read. Proposals submitted on products and/or from Contractors that have not been pre-approved will be returned unopened.

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

6. The Contractor shall provide a list of work crews/resources available to document the ability to complete this work without undue delay.

7. The Owner reserves the right to disapprove the use of the Contractor based on insufficient supporting documentation.

1.06 GUARANTEE

A. All CIPP Point Repairs installed shall be guaranteed by the Contractor for a period of two years from the date of acceptance. During this period, all defects discovered, as determined by the Owner or Engineer, shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Such repair or replacement shall include the cost of removal and reinstallation. After 21 months following substantial completion of the CIPP, the Owner/Engineer may inspect all of this work to ensure proper performance. If any deficiencies are found during these inspections, the Contractor shall repair them at no additional cost to the Owner.

1.07 QUALITY ASSURANCE

A. The supplier shall be responsible for the provisions of all test requirements specified in the above referenced ASTM Standards as applicable. In addition, CIPP products to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all lining products and materials approved for this Contract shall be borne by the Owner.

B. Inspections of the products and materials may also be made by the Engineer or other representatives of the Owner after delivery. The products and materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Materials rejected after delivery shall be marked for identification and shall be removed from the job at once.

C. All CIPP materials shall be from a single manufacturer. The supplier shall be responsible for the provisions for all test requirements specified in ASTM Standards as applicable.

D. Inspections of the CIPP material may be made by the Engineer or other representatives of the Owner after delivery. The CIPP material be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample of the CIPP material may have been accepted as satisfactory at the place of manufacture. CIPP material rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.08 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Extra care may be necessary during cold weather construction. Any lining product or material damaged in shipment shall be replaced as directed by the Engineer.

B. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, the lining products shall be adequately packaged and protected. The CIPP products shall be stored in a manner as recommended by the manufacturer.

D. CIPP product shall be stored, shipped and handled according to their material safety data sheet and the Manufacturer’s recommendations. Any CIPP materials damaged in shipment shall be replaced at no additional cost as directed by the Engineer

E. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

1.09 SAFETY AND SITE CONDITIONS

A. The Contractor and Subcontractor shall comply with and enforce all Federal, State, and Local safety regulations. The Contractor's personnel shall be certified for confined space entry.

PART 2 PRODUCTS

2.01 THE CIPP POINT REPAIR TUBE

A. The Point Repair Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5, reinforcing fibers may be included. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

2.02 THE RESIN

A. The quantity of resin used for tube resin impregnation shall be sufficient enough to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation through the entire length of the felt tube, the point of vacuum shall be no further than 10 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 10 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube.

B. Resin - The resin system shall be a corrosion resistant polyester or vinyl ester and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

2.03 CIPP STRUCTURAL REQUIREMENTS

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

B. The Contractor must submit long-term testing for flexural creep in accordance with ASTM D2990 of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by the ASTM D2990 testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

C. The enhancement factor 'K' to be used in 'Partially Deteriorated' design conditions shall be assigned a value of 7.

D. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

E. The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

MINIMUM PHYSICAL PROPERTIES

		Cured Composite	
Property	Test Method	Min. Per ASTM F1216	Enhanced Resin
Flexural Strength	ASTM D790	250,000 psi	300,000 psi
Flexural Stress	ASTM D790	4,500 psi	4,500 psi

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

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

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

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

*** Based on review of video logs, conditions of pipeline can be fully or partially deteriorated. (See ASTM F1216 Appendix) The Owner will be sole judge as to pipe conditions and parameters utilized in Design.

G. The CIPP design shall assume no boding to the original pipe wall.

H. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

I. The wet out tube shall have a relatively uniform thickness that when compressed at installation pressers will equal or exceed the calculated inimum design thickness.

PART 3 EXECUTION

3.01 RESPONSIBILITIES FOR INCIDENTAL ITEMS

A. It shall be the responsibility of the Owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

B. Cleaning of the Sewer Main - The Contractor shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Owner shall also provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment facility to which the debris would have arrived in absence of the cleaning operation. If any hazardous or toxic materials are encountered during this project, the Owner will be responsible for the removal and disposal of the materials.

C. Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The Owner may require a detail of the bypass plan to be submitted.

D. Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Owner.

E. Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion or pull-in installation, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

F. Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

    1. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.

2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

G. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

3.02. CURED-IN-PLACE PIPE (CIPP) POINT REPAIR PREPARATION AND INSTALLTION

A. Flushing - Prior to rehabilitation using the short liner, the sewer segment will be flushed using a hydraulically propelled high velocity jet sprayer. The pipe must be clean and free from debris and encrustations. The tube shall be thoroughly wet out with the catalyzed resin using a vacuum impregnation process.

B. Tube Orientation - The tube shall be properly oriented and loaded into the Carrier Train or Plug Assembly and subsequently winched to the damaged area and positioned by closed circuit TV camera guiding the installation. The installation shall follow by inflating the bladder or plug to the recommended psi required to fully expand the CIPP against the existing host pipe.

C. Variations - Variations from true line and grade may be inherent because of the conditions of the original piping. The finished CIPP should be continuous over the length of the repair area plus one foot extending into structurally sound pipe.

3.03. RESIN IMPREGNATION – (WET OUT)

The quantity of resin used for tube resin impregnation shall be sufficient enough to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation through the entire length of the felt tube, the point of vacuum shall be no further than 10 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 10 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube.

3.04 FLOW CONTROL

Bypass pumping will only be used as necessary. Otherwise, flow-through bladder plugging will be in use.

3.05 FINISHED PRODUCT

The CIPP Point Repair shall overlap the repair location by at least one foot (1') on either side, while providing a smooth transition from the host pipe to the repair. The remaining portion of the liner shall be free of any defects that would affect the integrity or strength of the repair and be both smooth and continuous. The cured liner shall be a minimum of two feet (2').

3.06 REINSTATEMENT OF BRANCH CONNECTIONS

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

3.07 CLEANING AND TELEVISION INSPECTION

A. The installation shall be inspected by closed-circuit television immediately following the cleaning. The television camera shall be specifically designed and constructed for sewer inspection with the capacity for radial viewing (360°) to allow proper inspection of service lateral connections. The radial view camera must be solid state color and have remote control of the rotational lens. The camera shall be capable of viewing the complete circumference of the pipe. The camera is an auto iris type with remote controlled manual override. The camera light head shall include a high-intensity side viewing lighting system to allow illumination of internal sections of lateral sewer connections. Lighting for the camera shall illuminate the entire periphery of the sewer for a distance of 15 feet ahead of the camera. The documentation of the pipe condition is recorded on DVD format, accompanied by CCTV reports generated in the NAASCO required format.

B. 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.

3.08 PAYMENT

Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed. Progress payments will be made monthly based on the work performed during that period.

END OF SECTION

SECTION 02756

LATERAL SERVICE CONNECTION FULL WRAP SEAL

PART 1 GENERAL

1.01 SCOPE OF WORK

It is the intent of this specification to provide for the structural re-construction of 4" thru 6" diameter service laterals and a water tight interface connection seals in 6-inch through 27-inch main line pipes, normally without excavation, by the installation of a one piece resin impregnated, flexible, non-woven felt liner installed into the existing lateral connection utilizing a pressure apparatus positioned in the main pipe. Curing shall be accomplished by use of ambient cure resin or other approved methods to cure the resin into a hard impermeable Cured-In-Place-Pipe (CIPP). When cured, the liner shall have a watertight connection seal at the main pipe and extend over the length of the service lateral in a structural pipe-within-a-pipe.

1.02 RELATED WORK

A. CIPP Lining Section 02750
B. CIPP Lateral Repairs Section 02754
C. Manhole Rehabilitation Section 02763
D. Monolithic Manhole Lining Systems Section 02768

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Manufacturer's product data, including physical properties, surface preparation, repair, application, curing, and field quality control procedures along with Materials Safety Data Sheets. (MSDS)

2. Long creep test data confirming the resin system's 50 year design life in accordance with ATSM D2990.

3. Chemical resistance in accordance with ASTM F1216.

4. Certificate of Compliance in accordance with ASTM F1216

5. Manufacturer and applicator qualifications as specified in paragraph 1.05 below.

6. Design data and specification data sheets listing all parameters used in the design and applicable provisions of ASTM.

7. All design calculations shall be sealed by a Registered Professional Engineer in the State of North Carolina.

8. A list of all municipal installations performed by the manufacturer and Contractor over the past 5 years along with the contact name, telephone number, and brief description of work performed.

B. Submit to the Engineer, within 10 days of the Effective Date of the Agreement, the name of the supplier (manufacturer), installer and a list of materials to be furnished.

C. Submit a step-by-step description of the methods, practices, intervals, etc. to be used in the application and curing requirements of this specification section.

D. Test Reports

1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract are manufactured and tested in accordance with the ASTM Standards specified herein.

1.04. REFERENCED STANDARDS

A. This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM D5813 – Standard Specification for Cured-in-Place Thermosetting Resin Sewer Piping Systems, ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.05 QUALIFICATIONS

A. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer with their bid for review and approval.

1. The Contractor shall be certified by the product manufacturer to install the CIPP Lateral Repair systems.

2. The Contractor or subcontractor performing the work of this section shall be of the company installing the CIPP Lateral Lining system components, or shall be licensed by the system manufacturer. The Manufactured System must have a minimum of a five (5) year history of satisfactory performance with a minimum of 25,000 CIPP lateral installations. The contractor or subcontractor contracted to perform the work shall have a minimum of five (5) years of service continuous experience installing CIPP Lateral Lining in pipe of similar size, length and configuration as proposed in this project. In addition, the contractor or subcontractor contracted to perform the work shall have successfully installed 15,000 CIPP laterals as the Contractor of record for a given project in a wastewater collection system application. The on-site Superintendent of the lateral lining contractor or subcontractor contracted to perform the work shall have installed a minimum of 5,000 CIPP laterals of like condition for this geographic area and have a minimum of five (5) years of CIPP industry experience. Qualified Contractors and Products must have confirmed experience with lateral rehabilitation lengths no less than those specified in this contract.

3. Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be approved without independent third party testing verification.

4. Proposals must be labeled clearly on the outside of the proposal envelope, listing the product name and Contractor being proposed. Only proposals using pre-approved products and Contractors will be opened and read. Proposals submitted on products and/or from Contractors that have not been pre-approved will be returned unopened.

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

6. The Contractor shall provide a list of work crews/resources available to document the ability to complete this work without undue delay.

7. The Owner reserves the right to disapprove the use of the Contractor based on insufficient supporting documentation.

1.06 GUARANTEE / WARRANTY

A. All CIPP Lateral Repairs installed shall be guaranteed by the Contractor for a period of five (5) years from the date of acceptance. During this period, all defects discovered, as determined by the Owner or Engineer, shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Such repair or replacement shall include the cost of removal and reinstallation. After 21 months following substantial completion of the CIPP, the Owner/Engineer may inspect all of this work to ensure proper performance. If any deficiencies are found during these inspections, the Contractor shall repair them at no additional cost to the Owner.

B. In no event shall the Contractor's liability for warranties hereunder exceed the purchase price paid by the Owner for the Contractor's work and materials.

C. The warranty set out above shall be void and of no effect in the event that (i) the Contractor is not notified of claim of defect within the five (5) year period provided above; (ii) the Contractor is not provided timely unrestricted access to the site at which the claimed defect is located in order to investigate and/or repair, adjust or replace the work or materials claimed to the defective or the Contractor is not provided suitable working conditions to perform such investigation, repair, adjustment or replacement; (iii) any materials or work exposed to chemicals or substances other than those listed in the Specification to the Agreement as accepted by the Contractor; (iv) site conditions or pipeline, conduit or access way conditions are other than those disclosed to and accepted by the Contractor; (v) the Owner's site, pipeline, conduit or access ways are cleaned or modified in a manner not disclosed in writing to and accepted in writing by the Contractor in advance of commencement of the Contractor's work or tampered with prior to, during or after completion of the Contractor's work; or (vi) the site at which the work is performed or the materials provided by the Contractor are otherwise abused or misused.

1.07 QUALITY ASSURANCE

A. The supplier shall be responsible for the provisions of all test requirements specified in the above referenced ASTM Standards as applicable. In addition, CIPP products to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all lining products and materials approved for this Contract shall be borne by the Owner.

B. Inspections of the products and materials may also be made by the Engineer or other representatives of the Owner after delivery. The products and materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Materials rejected after delivery shall be marked for identification and shall be removed from the job at once.

C. All CIPP materials shall be from a single manufacturer. The supplier shall be responsible for the provisions for all test requirements specified in ASTM Standards as applicable.

D. Inspections of the CIPP material may be made by the Engineer or other representatives of the Owner after delivery. The CIPP material be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample of the CIPP material may have been accepted as satisfactory at the place of manufacture. CIPP material rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.08 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Extra care may be necessary during cold weather construction. Any lining product or material damaged in shipment shall be replaced as directed by the Engineer.

B. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, the lining products shall be adequately packaged and protected. The CIPP products shall be stored in a manner as recommended by the manufacturer.

D. CIPP product shall be stored, shipped and handled according to their material safety data sheet and the Manufacturer's recommendations. Any CIPP materials damaged in shipment shall be replaced at no additional cost as directed by the Engineer

E. Any CIPP product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

1.09 SAFETY AND SITE CONDITIONS

A. The Contractor and Subcontractor shall comply with and enforce all Federal, State, and Local safety regulations. The Contractor's personnel shall be certified for confined space entry.

PART 2 PRODUCTS

2.01 MATERIALS GENERAL REQUIREMENTS

A. Liner and resin will meet the requirements of ASTM F1216, F1743, and D5813.

B. Owner shall obtain samples of the dry weather sewerage flow to be analyzed for temperature and chemical content should lateral installations be in an industrial area(s) subject to possible flows other than domestic sewage. This analysis shall be supplied to the installer for this information.

2.02 CIPP LATERAL MATERIALS

A. The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit specified by the Owner. Allowance shall be made for circumferential stretching during insertion. The liner shall be a joint-less polyester felt "tube" that will create a watertight seal at the main pipe interface.

B. The length shall be a distance to effectively span from the lateral connection at the main pipe or to the desired termination location in the service lateral pipe. For the purpose of this specification, the termination point shall be a distance within 18-inches of the intersection of a cleanout or property line. When required, an overlap method is performed with a pull-in-process installation from a cleanout or access point back to the main pipe. In either case, the lateral liner must provide a watertight seal at the main pipe and a structural repair of the lateral over the specified length. The installer shall verify the lengths in the field before impregnation of the resin.

C. Unless otherwise specified, this installer shall furnish a specially designed, unsaturated, Polyester or Vinylester resin and catalyst system compatible with the cured-in-place process that provides cured physical strengths specified herein.

D. An attached lateral drawing.

2.03 PHYSICAL STRENGTH

A. The CIPP structural performance of the finished cured-in-place-pipe must be adequate to accommodate all anticipated loads throughout its design life. No cured-in-place- pipe reconstruction technology will be allowed that requires bonding to the existing pipe for any part of its structural strength. Only resin saturation using vacuum impregnation will be allowed.

B. Design Methods are to be derived from traditionally accepted pipe formulas for various loading parameters and modes of failure. All equations will be modified to include ovality as a design parameter. The design method shall be submitted to the Engineer for approval.

C. The CIPP lateral pipe shall conform to the minimum structural standards as listed below:

MINIMUM PHYSICAL PROPERTIES

Property	Test Method	Cured Composite min. per ASTM F1216	Cured Composite (250,000 psi Resin)
Flexural Strength	ASTM D-790	250,000 psi	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi	4,500 psi

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

PART 3 EXECUTION

3.01 RESPONSIBILITIES FOR INCIDENTAL ITEMS

A. It shall be the responsibility of the Owner to locate and designate all manhole access laterals open and accessible for the work, and provide rights of access to these laterals. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

B. Cleaning of the Sewer Main - The Contractor shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Owner shall also provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment facility to which the debris would have arrived in absence of the cleaning operation. If any hazardous or toxic materials are encountered during this project, the Owner will be responsible for the removal and disposal of the materials.

C. Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The

pump and bypass lines shall be of adequate capacity and size to handle the flow. The Owner may require a detail of the bypass plan to be submitted.

D. Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Owner.

E. Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion or pull-in installation, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a lateral repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

F. Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

1. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.

2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

G. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

3.02. CURED-IN-PLACE PIPE (CIPP) LATERAL REPAIR PREPARATION AND INSTALLTION

A. Flushing - Prior to rehabilitation using the short liner, the sewer segment will be flushed using a hydraulically propelled high velocity jet sprayer. The pipe must be clean and free from debris and encrustations. The tube shall be thoroughly wet out with the catalyzed resin using a vacuum impregnation process.

B. Tube Orientation - The tube shall be properly oriented and loaded into the Carrier Train or Plug Assembly and subsequently winched to the damaged area and positioned by closed circuit TV camera guiding the installation. The installation shall follow by inflating the bladder or plug to the recommended psi required to fully expand the CIPP against the existing host pipe.

E. Variations - Variations from true line and grade may be inherent because of the conditions of the original piping. The finished CIPP should be continuous over the length of the repair area plus one foot extending into structurally sound pipe.

3.03 INSTALLATION AND LATERAL LINING

A. The Installer shall designate a location where the liner will be vacuum impregnated prior to installation. The Installer shall allow the Owner to inspect the materials and resin saturation (wet-out) procedure. A catalyst system compatible with the resin and liner shall be used.

B. The wet-out liner shall be loaded inside a pressure apparatus above ground, utilizing a hydrophilic sealant (or equivalent) on the backside of the connection to enhance a watertight seal. Also, a Silicate Resin or a two-part 100% solid epoxy (reference ASTM C-881) shall be applied to the lateral interface to enhance adhesion against the host pipe. The pressure apparatus, with an end attached to a robotic device, shall be winched through the main pipe to the service connection. The robotic device, together with a television camera, will be used to position the pressure apparatus' inversion elbow at the service connection opening. Air pressure, supplied to the pressure apparatus through an inversion hose, shall be used to invert the wet-out liner through the lateral pipe to the cleanout/access point or "Right of Way" point. The inversion head will be adjusted to be of sufficient pressure to cause the impregnated liner to invert completely in the lateral pipe and hold the liner tight to the pipe wall. Care shall be taken during the curing process so as not to overstress the liner.

C. Curing – In most circumstances, an ambient-temperature curing resin system will be utilized.

D. Initial cure shall be deemed to be completed when inspection of the exposed portions of the CIPP appear to be hard and sound. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the installation process.

E. Cool-down – The Installer shall cool the hardened CIPP to a temperature to approximately 100^0 F before relieving the pressure in the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

F. Finish – The finished CIPP shall be a watertight connection seal at the main pipe and extend continuous over the entire length of the service lateral and be free of dry spots, lifts, and delamination. This continuous one piece structural pipe-within-a-pipe shall not inhibit the closed circuit television (CCTV) post video inspection of the main or service lateral pipes.

G. Testing – For every 50 laterals, one flat plate sample shall be taken and sent to a 3rd party test laboratory for confirmation of short term flexural modulus and strength properties in accordance with ASTM F1216. The test results shall meet or exceed the values used in the design of the CIPP lateral liner.

H. During the warranty period, any defects which will affect the integrity or strength of the CIPP liner shall be repaired at the Installer's expense in a manner mutually agreed upon by the Owner and the Installer.

I. After the work is completed, the Installer will provide the Owner with a digital video showing the completed work including the restored conditions.

3.04 FLOW CONTROL

Bypass pumping will only be used as necessary.

3.05 CLEANING AND TELEVISION INSPECTION

A. In accordance with Section 02761.

B. 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.

3.06 PAYMENT

A. Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed. Progress payments will be made monthly based on the work performed during that period.

END OF SECTION

SECTION 02761

VIDEO INSPECTION AND CLEANING OF SANITARY SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies video inspection and cleaning of existing and new sanitary sewers.

1.02 QUALITY ASSURANCE

A. Referenced Standards: This Section incorporates by reference the latest revision of the following documents. These references are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.

Reference	Title
NASSCO	National Association of Sewer Service Companies

B. Qualifications:
1. Firm: specializing in CCTV inspections for a minimum of two years.
2. Operators: Certified by the National Association of Sewer Service Companies (NASSCO) under the Pipeline Assessment and Certification Program (PACP).

1.03 SUBMITTALS

A. Procedures: Section 01300.

B. Qualifications.

C. Work Plan

D. Camera to be used.

E. CCTV video recordings.

F. Sanitary Sewer Overflow Documentation

1.04 CCTV EQUIPMENT

A. Shall include video cameras, remote operated vehicle (ROV), power sources, recording equipment, and cables and ancillary equipment necessary to perform the CCTV inspection.

B. Shall be designed to perform CCTV inspections at the lengths required.

C. Inspection shall use a color closed circuit television (CCTV) camera and document the inspection with a digital video that includes location, time and date information and video title information.

D. CCTV assembly, including ROV, camera, and appurtenances shall be suitable for insertion into the pipe through pipe openings of 15-inch diameter or less.

E. Assembly shall be capable of navigating the pipe encountered in the collections system. The range of the ROV and camera from the access point shall be a minimum of 2,000 feet.

F. Have either a laser or equivalent measuring tool to confirm the diameter and roundness of the pipe.

1.05 WORK PLAN

A. Consists of the following:
   1. Pipelines to be videoed.
   2. Access points and lengths of the pipelines to be videoed.
   3. Schedule of the work of this Section integrated other preceding and succeeding work.

1.06 SANITARY SEWER OVERFLOW DOCUMENTATION

A. Consists of the following:
   1. Cause of SSO.
   2. Date, time, and estimate of overflow volume.
   3. Property owner's name, address, phone number, and email address.
   4. Date and time cleanup activities were completed including a description of work performed.

1.07 RECORDING FORMAT

A. Video recording equipment shall provide a continuous color digital recording in MPEG 4 format with audio annotation.

B. Video files shall have a minimum resolution of 800 x 600 pixels and an interlaced frame rate of 24 frames per second. The video shall be continuous from one end of the pipeline to the other.

C. Video shall be in accordance with NASSCO PACP format and contain screen information showing, at a minimum, the pipe segment inspected, date and time, distance from the entry point, and station along pipe.

D. Digital video recording quality shall allow digital photographic images to be recorded of selected pipe areas from the video.

E. Each video recording copy shall be submitted on a portable media device with USB connection. The portable media device shall become property of the County upon submittal.

F. Recordings shall not require proprietary software in order to be viewed.

PART 2 PRODUCTS (NO USED)

PART 3 EXECUTION

3.01 ACCESS

A. Do not enter manholes or collection system piping without coordination with Owner or Engineer and full deployment of confined space entry procedures as required.

3.02 CCTV INSPECTIONS

B. Owner or Engineer shall be present during CCTV inspection.

C. Provide a continuous CCTV video recording of the pipe with audio annotation using the pan, tilt and zoom functions that records:
   1. Entire periphery of the pipeline for the entire length inspected.
   2. Pipe joint for each joint along the entire length inspected.
   3. Interior pipe markings at each end of each pipe segment.
   4. Areas of corrosion and other features.
   5. Camera shall be positioned in center of pipe.
   6. Estimate pipe grade.

D. CCTV operator shall record areas to the extent required.

E. During CCTV inspection, lighting intensity, zoom, pan, and tilt features shall be used and adjusted to minimize glare and provide clearly legible and in-focus video:
   1. Camera lens shall be kept clear of condensation and debris.

F. Distance shall be recorded from entry point for a true measurement of the length of the pipe segment. Length shall be recorded in English units of measure and the video display readout shall display units to one-tenth of a foot.
   1. Camera cable shall be retracted to remove slack and to ensure an accurate footage reading.
   2. Cable footage counter shall be accurate to plus or minus two feet per 1,000 feet.

3.03 PIPELINE CLEANING

A. Provide cleaning of gravity pipelines 6 inches diameter and greater.

B. Clean pipeline between manholes prior to CCTV inspection and prior to CIPP lining.

C. Clean next downstream segment prior to CCTV inspection.

D. Cleaning shall result in a pipeline free of roots, grease, or other debris.

E. Cleaning equipment shall be specifically designed for cleaning sewers and may include high velocity water jet equipment or mechanical equipment such as power buckets or rodders. Equipment used shall be selected based on conditions present at the time work commences.

F. Cleaning operations shall commence at the upstream end of the sewer.

G. All debris shall be collected and properly disposed of at approved locations.

H. Debris shall be collected at the manhole immediately downstream of the section being cleaned. Passing material from upstream to downstream sewer pipe segments is not permitted.

I. Take all necessary precautions to avoid damage or flooding of public or private property.

J. Cleanup required due to flooding shall be to the satisfaction of the property owner at the expense of the Contractor. Cleanup shall be completed with four (4) hours of any flooding or overflow event.

END OF SECTION

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SECTION 02768

MONOLITHIC MANHOLE LINING SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to install and test manhole monolithic cementitious lining system for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, repair of voids and restoration of the structural integrity of the manhole as a result of applying a monolithic liner to the wall and bench surfaces of brick, concrete or any other masonry construction material. Lining should extend from invert to top of cone, as specified.

A. The Contractor shall accurately field measure and size each individual manhole. The Contractor is reminded that each existing sewer manhole designated to receive the monolithic lining may have a different configuration and varying field dimensions. All field measurements shall conform to the requirements of the monolithic lining manufacturer.

B. The manhole lining shall not be installed until other manhole rehabilitation as specified on the drawings and in Section 02763 – Manhole Rehabilitation work is complete.

C. Procedures for manhole preparation and cleaning are included in specification Section 02763 – Manhole Rehabilitation.

D. The Contractor is advised that the presence or absence of leakage through manhole walls noted on the manhole inspection reports and as seen in the Contractor's independent inspection of manholes prior to bidding is dependent upon the ground water levels and conditions at the time of the inspections. High ground water levels in the project area typically occur in the winter months (December through March) but will vary with rainfall in any given year. The Contractor shall reflect his/her assumptions and judgments on leakage through manhole walls based on this information in the unit prices bid for lining manholes. All leakage shall be stopped prior to lining manholes. No additional payment will be made to the Contractor for repairing leaks not visible prior to bidding or sewer rehabilitation.

1.02 RELATED WORK

A. Manhole rehabilitation is included in Section 02763

B. Maintenance of flow in existing sewers is included in Section 01510

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Manufacturers product data, including physical properties, surface preparation, repair, application, curing, and field quality control procedures.

2. Manufacturer and applicator qualifications as specified in paragraph 1.05 below.

3. Diameter, depth (rim to invert), and material for each manhole.

4. A list of all municipal installations performed by the manufacturer and Contractor over the past 5 years along with the contact name, telephone number, and brief description of work performed.

B. Submit to the Engineer, within 10 days of the Effective Date of the Agreement, the name of the supplier (manufacturer), installer and a list of materials to be furnished.

C. Submit a step-by-step description of the methods, practices, intervals, etc. to be used in the application and curing of the monolithic lining system to meet the requirements of this specification section.

D. Test Reports

1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract were manufactured and tested in accordance with the ASTM Standards specified herein.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

2. ASTM C-150 – Standard Specification for Portland Cement

3. ASTM C267 - Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings

4. ASTM C-293 - Test Method for Flexural Strength of Concrete

5. ASTM C-321 - Test Method for Bond Strength of Chemical-Resistant Mortars

6. ASTM C-496 - Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

7. ASTM C-579B - Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing

8. ASTM C-596 - Test Method for Drying Shrinkage of Mortar Containing Portland Cement

9. ASTM C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

10. ASTM C-1244 11 (2017) - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

11. ASTM D2240-05 (2010) Standard Test Method for Rubber Property Durometer Hardness

12. ATSM F2414-04 (2009) Standard Practice for Rehabilitation of Sewers Using Chemical Grouting

13. ASTM D4787-13 Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

14. ASTM D7234-12 Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

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

1.05 QUALIFICATIONS

A. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer with their bid for review and approval.

1. The Contractor shall be certified by the product manufacturer to install the monolithic lining systems.

2. The Contractor and/or applicator shall have a minimum of 5 years experience and 500 manholes in performing this type of specialized work. Provide name of project, project location, rehabilitation techniques utilized/lining system utilized, owner name, and owner contact information for sufficient projects to document the above specified experience.

3. The Contractor shall provide a list of work crews/resources available to document the ability to complete this work without undue delay.

4. The Owner reserves the right to disapprove the use of the Contractor based on insufficient qualifications.

1.06 GUARANTEE

B. All monolithic lining placed shall be guaranteed by the Contractor for a period of two years from the date of acceptance. During this period, all defects discovered in the monolithic lining, as determined by the Owner or Engineer, shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Such repair or replacement shall include the cost of removal and reinstallation. After 21 months following substantial completion of the manhole lining, the Owner/Engineer will inspect all of this work to ensure proper performance. If any deficiencies are found during these inspections, the Contractor shall repair them at no additional cost to the Owner.

C. The Contractor is responsible for stopping all leaks prior to the installation of the monolithic lining system.

1.07 QUALITY ASSURANCE

A. The supplier shall be responsible for the provisions of all test requirements specified in the above referenced ASTM Standards as applicable. In addition, all monolithic lining products to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all lining products and materials approved for this Contract shall be borne by the Owner.

B. Inspections of the lining products and materials may also be made by the Engineer or other representatives of the Owner after delivery. The lining products and materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Lining materials rejected after delivery shall be marked for identification and shall be removed from the job at once.

C. The Contractor shall obtain the services of the cementitious manhole liner manufacturer's field service technician, who has complete knowledge of manhole rehabilitation, to advise and assist the cementitious manhole lining installation and provide instruction to the Contractor for rehabilitation of the first five (5) manholes. The field service technician shall be fully qualified and experienced in manhole rehabilitation work including cementitious lining systems.

1.08 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Extra care may be necessary during cold weather construction. Any lining product or material damaged in shipment shall be replaced as directed by the Engineer.

B. Any lining product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, the lining products shall be adequately packaged and protected. The lining products shall be stored in a manner as recommended by the manufacturer.

D. Materials shall be stored, shipped and handled according to their material safety data sheet and the Manufacturer's recommendations. Any materials damaged in shipment shall be replaced at no additional cost as directed by the Engineer

1.09 SAFETY AND SITE CONDITIONS

A. The Contractor shall comply with and enforce all Federal, State, and Local safety regulations. The Contractor's personnel shall be certified for confined space entry.

PART 2 PRODUCTS

The monolithic manhole lining system shall be designed and installed to protect concrete, brick, mortar, and other manhole surfaces from corrosion. The products shall be designed to stop infiltration, root intrusion, and further deterioration in the manhole. The interior surfaces to be protected shall include the walls, benches, inverts, pipe junctions and the chimney (corbel). The table below outlines the different monolithic manhole lining systems and the respective product specification paragraph(s) for each lining system.

Monolithic Manhole Lining System Type	**Specification Paragraph**
Calcium Aluminate Cementitious Liner	2.01.A, B, C, D, E, F, G, H

2.01 CEMENTITIOUS MANHOLE MONOLITHIC LINING SYSTEM

A. The manhole lining system shall be a monolithic calcium aluminate cementitious liner system suitable for use as a trowel- or spray-applied monolithic surfacing in sewer manholes.

B. The minimum thickness for Calcium Aluminate based cementitious lining shall be 1/2-inch thick.

C. The cementitious lining system shall be:

Calcium Aluminate Cementitious Liner

Strong MS-2C
Quadex Aluminaliner
Standard Cement Maximum CA
Permacast CR-9,000
Mainstay ML-CA
SewperCoat
Or equal

The calcium aluminate cementitious liner product shall be used to form a structural monolithic liner covering all interior substrate surfaces and shall have the following minimum requirements:

Minimum Requirements			
Compressive Strength	ASTM C109	28 days	>9000 psi
Tensile Strength	ASTM C496	28 days	>800 psi
Flexural Strength	ASTM C293	28 days	>1500 psi
Shrinkage @90% R.H.	ASTM C596	28 days	0%
Bond	ASTM C882	28 days	>2000 psi
Density, When Applied	-		134 ± 5lbs/ft3
Freeze/Thaw	ASTM C666	N/A	300 cycles no visible damage

The calcium aluminate cementitious liner shall be made with calcium aluminate cement and shall be used according to manufacturer's recommendations. The liner product shall be reinforced with alkaline resistant fiberglass rods or other similar fibers not less than 1/2 inch in length. The material should meet or exceed industry standards and shall not have any basic ingredient that exceeds EPA maximum allowable limits for any heavy metals. Water used to mix product shall be clean and free from contaminants. Questionable water shall be tested by a laboratory per ASTM C-94 procedure. Potable water need not be tested.

D. When cured, the monolithic cementitious lining shall form a continuous, tight-fitting, hard, impermeable surfacing which is suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage.

E. The monolithic cementitious lining shall cover the complete interior of the existing sewer manhole including the benches (shelves). The lining shall effectively seal the interior surfaces of the sewer manhole and prevent any penetration or leakage of groundwater infiltration.

F. The lining shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20debreesF to 100degreesF. Provide test data on shrinkage of the cementitious lining based on ASTM C596.

G. If an internal flexible chimney seal is required, then the lining shall be installed 1-inch below the bottom of the manhole frame. If no internal flexible chimney seal is required, then the lining shall be installed to 2 to 3 inches above the bottom of the manhole frame. The termination of and surface of the lining shall be suitable for proper installation of the manhole frame-chimney seal specified in Section 02763.

H. The cured system shall be continuously bonded to all brick, mortar, concrete, chemical sealant, grout, pipe and other surfaces inside the sewer manhole.

I. Chemical sealants, grouts or patching materials used to seal active manhole leaks, to patch cracks, to fill voids and to otherwise prepare the manhole surface prior to application of the system shall be fully compatible with the system.

J. The system shall provide a minimum service life of 25 years.

PART 3 EXECUTION

3.01 MANHOLE LINING SYSTEMS

A. Cementitious Manhole Lining Installation

1. The Contractor shall notify all property owners who discharge sewage directly to the manhole being surfaced that their service will be discontinued while the lining is being placed, cured and active pipe and service connections reopened. The Contractor shall notify individual property owners at least 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted. This notification shall be coordinated with the distribution of the door hangers.

2. When cured, the monolithic lining shall form a continuous, tight-fitting, hard, impermeable surfacing which is suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage.

3. The monolithic lining shall cover the complete interior of the existing sewer manhole including the benches (shelves) and inverts. The lining shall effectively seal the interior surfaces of the sewer manhole and prevent any penetration or leakage of groundwater infiltration.

4. The lining shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20º F to 100º F. Provide test data on shrinkage of the lining based on ASTM C596.

5. The Contractor shall provide any necessary bypass pumping of sewage flows where and when the rehabilitation work is being performed, as specified in Section 01510.

6. The Contractor shall place covers over invert to prevent extraneous material from entering the sewer lines.

7. The Contractor shall clean each sewer manhole to be surfaced and shall dispose of any resulting material as specified in Section 02763 Manhole Rehabilitation, Part 3.02 and as follows.

a. Coatings that cannot be removed shall be sanded with coarse sand paper to rough the surface sufficient to obtain and insure adequate bonding.

8. The Contractor shall conduct a visual inspection of each manhole after it is cleaned. All active, hydrostatic infiltration leaks shall be plugged or sealed with grout as specified in Section 02763 Manhole Rehabilitation. Remove all loose mortar and rubble of existing benches and inverts. Remove any protruding rubber gaskets between wall seams. Prepare manhole to receive liner if proposed as necessary by reshaping and repairing benches, inverts, and wall where required. Protect all pipe connections. All interior surfaces shall be prepared for the lining system as recommended by the manufacturer.

   a. All cracks and other voids must be repaired and filled with suitable non-shrinking cements, sealants or grouts.

   b. All surfaces shall be clean and structurally sound.

   c. Manhole rungs/steps shall be removed, ground smooth and patched and not replaced. Step removal shall be incidental to the manhole restoration costs.

9. The Contractor shall remove interior drop connections anchored to manhole walls prior to installing the lining system. After installation and proper curing of the lining, the Contractor shall re-install interior drop connections to their condition prior to removal.

10. The cementitious liner mix shall be mixed as specified by the manufacturer for 30 seconds to 1 minute after all materials have been placed in the mixing hopper. Mixing shall be accomplished such that the mix can be sprayed in a continuous manner without interruption until each application is complete.

11. When applying a cementitious lining system the surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated, just prior to application. Materials shall be applied to a minimum uniform thickness, to insure that all cracks, crevices and voids are filled and a relatively smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond.

12. To accommodate the installation of a flexible chimney seal, the lining shall be installed 1-inch below the bottom of the manhole frame. The termination of and surface of the lining shall be suitable for proper installation of the manhole frame-chimney seal.

13. The covers placed over the invert shall be removed and the bench sprayed such that a gradual slope is produced from the walls to the invert with the thickness at the edge of the invert being no less than 1/2 inch. The wall/bench intersection shall be rounded to a uniform radius the full circumference of the intersection.

14. Caution shall be taken to minimize exposure of applied product to sunlight and air movement. At no time shall the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover. In extremely hot and arid climates the manhole shall be shaded while reconstruction is in process. The final application shall have a minimum of four (4) hours cure time before being subjected to active flow. Traffic shall not be allowed over manholes for 24 hours after reconstruction is complete.

15. No application shall be made to frozen surfaces or if freezing is expected to occur inside the manhole within 24 hours after application. If ambient temperatures are in excess of 95 degrees F, precautions shall be taken to keep the mix temperature at time of application

below 90 degrees F. Mix water temperature shall not exceed 85 degrees F. Chill with ice if necessary.

16. After all preparation has been completed the Contractor shall remove all loose material and wash walls again. Any bench, invert or service line repairs shall be made at this time using the quick setting patching mix and shall be used per the manufacturer's recommendations.

3.02 FIELD TESTING AND ACCEPTANCE

A. General

1. The Engineer or Owner may enter the manholes to inspect the benching, invert channels, manhole wall/pipe connections, surface preparation, and other parts of the work. The Contractor shall provide forced air ventilation, gas monitors and detectors, harnesses, lights, etc. for the Engineer or Owner to enter the manhole and perform the inspection in complete accordance with OSHA requirements at no additional cost to the Owner.

2. The finished manhole surface shall be continuous and as free as commercially practicable from significant defects. Any defects which will affect, in the foreseeable future, or warranty period, the integrity or strength of the manhole shall be repaired at the Contractor's expense, in a manner mutually agreed upon by the Engineer and the Contractor.

3. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects in the liner. If any defects are discovered after liner has been installed, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to the Owner. This requirement shall apply for the entire guarantee period.

4. Active infiltration through the lining system be zero.

5. The Contractor is responsible for coordinating testing times with the Engineer schedule as the field representative may be involved in other tasks for scope on this project.

B. Cementitious Manhole Monolithic Lining System

1. The cementitious lining shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole interior. The Contractor shall work with the Field Representative to develop an easy method for measuring the liner thickness. This method should be such that the Field Representative does not have to enter the manhole to measure the thickness. One possible method would be to install pins (such as masonry nail) at four quadrants around the manhole spaced every 4 feet vertically. The pins would protrude slightly less than 1/2 inch from the wall. The lining would be installed to cover the pins, and the Field Representative could verify the thickness by checking that no pins are exposed without entering the manhole. The Contractor may develop other methods. The costs associated with measuring the liner thickness shall be included in the unit bid price. If the thickness of the lining is not uniform or is less than specified, it shall be repaired or replaced at no additional cost to the Owner.

2. The Contractor shall visually verify the absence of leaks and perform a vacuum test. Vacuum test shall be performed as follows:

   a. Vacuum Test - Test all rehabilitated manholes using the vacuum test method, following the manufacturer's recommendations for proper and safe procedures. Vacuum testing of manholes and structures shall be performed after curing of linings. Vacuum testing will not be required on manholes with sewer lines greater than or equal to 15-inches in diameter due to safety concerns. Any visible leakage in the manhole or structure,

before, during, or after the test shall be repaired regardless of the test results. Vacuum test shall be performed in accordance with ASTM C-1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum).

END OF SECTION

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SECTION 02985

SEEDING, SODDING AND LANDSCAPING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Seeding, sodding and landscape planting:
   a. Soil preparation.
   b. Lawn-type seeding
   c. Plants and planting.
   d. Maintenance and new transplanted materials.
   e. Pruning and repairing existing trees.
   f. Replacement of dead or impaired materials at the end of the first growing season.

1.02 QUALITY ASSURANCE

A. Referenced Standards

1. American Standard for Nursery (ASNS)
2. American Society for Testing Materials (ASTM):
   a. D997, Drop Test for Loaded Cylindrical Containers.
   b. D2028, Standard Specification for Cutback Asphalt.
3. Standard Methods of the Association of Official Agricultural Chemists.
4. United States Department of Agriculture, (USDA):
   a. Federal Seed Act

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300 shop drawings, product data, and installation methods. Submittals shall include but are not limited to the following:

1. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of the standards.
   b. Manufacturer’s installation instructions.
   c. Signed copies of the vendor’s statement of seed mixture requirements. stating botanical and common name, place of origin, strain, percentage of purity, percentage of germination, and amount of Pure Live Seed (PLS) per bag.
   d. Type of herbicide to be used during the first growing season to contain annual weeds and application rate.
   e. Source and location of sod, plants, and plant material.

1.04 SEQUENCING AND SCHEDULING

A. Installation Schedule:

Show schedule of when lawn type and other grass areas are anticipated to be planted. Indicate planting schedules in relation to schedule for irrigation system installation, finish grading and top soiling. Indicate anticipated dates Engineer will be required to review installation for initial acceptance and final acceptance

PART 2 PRODUCTS

2.01 MATERIALS

A. Seed Quality:

Seed quality shall be fresh clean, new-crop seed labeled in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect on date of bidding. Provide seed of species, proportions, and minimum percentages of purity, germination, and maximum percentage of weed seed as specified. Approval of all seed for use shall be based on the accumulative total of Pure Live Seed (PLS) specified for each phase of work system shall be a monolithic calcium aluminate cementitious liner system suitable for use as a trowel- or spray-applied monolithic surfacing in sewer manholes.

B. Lawn-Type Seed Mixture:

1. Residential:

BOTANICAL AND COMMON NAME	PERCENT BY WEIGHT (PLS)	MINIMUM PERCENT GERMINATION	MINIMUM PERCENT PURITY
Fescue, Tall, Kentucky 31	70	85	98
Rye Grain	30	90	95

2. Non-Residential (no Fescue):

Annual Rye (August 15 to March 31). Seed at typical rate but should be no more than 20 percent of total mix.

Millet (April 1 to August 15).

Big Bluestem Andropogon gerardii (January 1 to December 31; April 1 to June 1 preferred). Seed rate of 3 LB/AC of PLS.

Indiangrass Sorghastrum nutans (January 1 to December 31; April 1 to June 1 preferred). Seed rate of 3 LB/AC of PLS.

Planting depth should be 1/4 to 1/2 IN below a compact soil surface and then covered with light layer of mulch.

Native grass seed must be obtained as pounds of PLS.

3. Temporary Seed:

A temporary grass cover shall be provided immediately after grading in all disturbed areas that will have permanent grass cover. Provide fresh, clean, new crop seed labels in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect on date of bidding. Provide seed of grass species or mixtures and seed rates suitable to season of year from the following:

SEASON	SPECIES	SEEDING RATE (LBS/AC)
Late Winter-Spring (January 1 to May 1)	Annual Lespedeza Rye (Grain)	50 120
Summer (May 1 to August 15)	Millet (Brown Top)	40
Late Summer-Late Fall (August 15 to December 31)	Rye Grain	120

C. Lawn-Type Seed Mixture:

Mulch For Seeded Areas shall be clean, seed-free, threshed straw of oats, wheat, barley, rye, beans, peanuts, or other locally available mulch material, which does not contain an excessive quantity of matured seeds of noxious weeds or other species that will grow or be detrimental to seeding, or provide a menace to surrounding land. Do not use material which is fresh or excessively brittle, or which is decomposed and will smother or retard growth of grass.

D. Fertilizer:

Commercial fertilizer meeting applicable requirements of state and federal law. Cyanic compound of hydrated lime not permitted in mixed fertilizers:

E. For lawn-type seeding and sod: 10-10-10 analysis.

F. Limestone: Agricultural grade ground limestone containing not less than 88 percent of combined calcium and magnesium carbonates, 100 percent passing a 10-mesh sieve, 90 percent passing a 20-mesh sieve, and 60 percent passing a 100-mesh sieve.

G. Water:

Water free from substances harmful to grass or sod growth. Provide water from source approved prior to use**.**

PART 3 EXECUTION

3.01 SOIL PREPARATION

A. General:

1. Limit preparation to areas which will be planted soon after.
2. Provide facilities to protect and safeguard all persons on or about premises.
3. Protect existing trees designated to remain.
4. Verify location and existence of all underground utilities. Take necessary precaution to protect existing utilities from damage due to construction activity. Repair all damages to utility items at sole expense.
5. Provide facilities such as protective fences and/or watchmen to protect work from vandalism. Contractor to be responsible for vandalism until acceptance of work in whole or in part.

B. Preparation for Lawn-Type Seeding, Sprigging, Plugging or Sodding:

1. Loosen surface to minimum depth of 4 IN. Remove stones over 1-inch in any dimension and sticks, roots, rubbish, and other extraneous matter.
2. Prior to applying fertilizer, loosen areas to be seeded with a double disc or other suitable device if the soil has become hard or compacted.
3. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.
4. Distribute fertilizer uniformly over areas to be seeded:
5. For lawn-type seeding: 30 LBS per 1000 SF.
6. For pasture seeding: 200 LBS per acre.
7. Incorporate fertilizer into soil to a depth of at least 2 IN by disking, harrowing, or other approved methods.
8. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.
9. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture. Roll and rake, remove ridges and fill depressions, as required to meet finish grades.
10. Limit fine grading to areas which can be planted soon after preparation.
11. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.02 INSTALLATION

A. Lawn-Type and Pasture Seeding:

1. Do not use seed which is wet, moldy, or otherwise damaged.
2. Perform seeding work from April 20 to May 15 for spring planting, and August 1 to September 15 for fall planting, unless otherwise approved by Engineer.
3. Employ satisfactory methods of sowing using mechanical power-driven drills or seeders, or mechanical hand seeders, or other approved equipment.
4. Distribute seed evenly over entire area at rate of application not less than 4 LBS (PLS) of seed per 1000 SF, 50 percent sown in one direction, remainder at right angles to first sowing.

5. Stop work when work extends beyond most favorable planting season for species designated, or when satisfactory results cannot be obtained because of drought, high winds excessive moisture, or other factors. Resume work only when favorable conditions develop.
6. Lightly rake seed into soil followed by light rolling or culti-packing.
7. Immediately protect seeded areas against erosion by mulching.
8. Spread mulch in continuous blanket using 1½ tons per acre to a depth of 4 or 5 straws.
9. Protect seeded slopes against erosion with erosion netting or other methods approved by Engineer. Protect seeded areas against traffic or other use by erecting barricades and placing warning signs.
10. Immediately following spreading mulch, anchor mulch using a rolling coulter or a wheat land packer having wheels with V-shaped edges to force mulch into soil surface, or apply evenly distributed emulsified asphalt at rate of 10-13 GAL/1000 SF. SS-1 emulsion in accordance with ASTM D997 or RC-1 cutback asphalt in accordance with ASTM D2028 are acceptable. If mulch and asphalt are applied in one treatment, use SS-1 emulsion with penetration test range between 150-200. Use appropriate shields to protect adjacent site improvements.

3.03 MAINTENANCE AND REPLACEMENT

A. General

1. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance or for a specific time period as stated below, whichever is the longer.
2. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth.

B. Protection of new materials:

1. Provide barricades, coverings or other types of protection necessary to prevent damage to existing improvements indicated to remain. Repair and pay for all damaged items.
2. Replace unacceptable materials with materials and methods identical to the original specifications unless otherwise approved by the Engineer.

C. Seeded or Sodded Lawns:

1. Maintain seeded lawns: 90 days, minimum, after installation and review of entire project area to be planted.
2. Maintenance period begins at completion of planting or installation of entire area to be seeded or sodded.
3. Engineer will review seeded or sodded lawn area after installation for initial acceptance.
4. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, uniform lawn, free of weeds and eroded or bare areas.
5. Lay out temporary lawn watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch.

6. Mow lawns as soon as there is enough top growth to cut with mower set at recommended height for principal species planted. Repeat mowing as required to maintain height. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowing as required to maintain a height of 1½ to 2 IN. Do not mow lower than 1½ inches.
7. Re-mulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.
8. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.
9. Replant bare areas using same materials specified.
10. Engineer will review final acceptability of installed areas at end of maintenance period.
11. Maintain repaired areas until remainder of maintenance period or approved by Engineer, whichever is the longer period.

END OF SECTION

SECTION 15004

MANHOLE REHABILITATION

01. **SCOPE**:

The work specified in this section includes all labor, materials, accessories, equipment and tools necessary for the repair and rehabilitation of sanitary sewer manholes.

02. **MATERIALS**:

A. Patching Material: All non-leaking holes, cracks or voids shall be patched with a quick setting (less than 30 minutes), non-shrink, fiber reinforced, corrosion resistant calcium aluminate or equivalent material that is compatible with the chosen liner system and shall be applied in accordance with the manufacturer's recommendation for basecoat materials. Patch material must meet the following minimum requirements:

Compressive Strength	ASTM C-109	>5000 psi (28 day)
Bond Strength	ASTM C-882	>2000 psi (28 day)
Flexural Strength	ASTM C-293	>1200 psi (28 day)
Tensile Strength	ASTM C-900	>800 psi
Shrinkage	ASTM C-596	0% at 90% R.H.

Cementitious repair mortar shall be QSR Plus manufactured by The Strong Company, Silatec CAM manufactured by A.W. Cook Cement Products, or approved equal.

B. Infiltration Control Material (Chemical Grout): Active leaks and infiltration shall be stopped by injecting a chemical grout through the source to the outside of the manhole. The grout used shall be an acrylamide, acrylic or hydrophobic urethane gel and might require the addition of a shrink control agent, gel reinforcing agent or accelerator. The chemical grout shall be volume stable and have a minimum 28 day compressive strength of 250 psi and a minimum one day strength of 50 psi.

C. Cementitious Liner: The material shall be a 100% calcium aluminate mortar designed to stop infiltration, restore structural integrity, and provide protection against microbiologically-induced corrosion. It shall be spray applied to form a structurally enhanced monolithic liner covering all interior substrate surfaces with the following minimum requirements:

Compressive Strength	ASTM C-109	>8000 psi (28 Days)
Tensile Strength	ASTM C-900	>800 psi
Flexural Strength	ASTM C-293	>1200 psi (28 Days)
Shrinkage @ 90% R.H.	ASTM C-596	<0.08% (28 Days)
Freeze/Thaw	ASTM C-666	No Damage After 300 Cycles
Air Void Content	ASTM C-457	2-4% (7 Days)
Specific Gravity /Absorption Test	ASTM C-642	3-5% (7 Days)

Cementitious liner shall be Quadex Aluminaliner, manufactured by Quadex, Inc.; SewperCoat, manufactured by LaFarge Aluminates, CemTec Silatec CAM, manufactured by A. W. Cook Cement, Inc.; MS-2C and High Performance Mix, manufactured by Strong-Seal Systems; PerpetuCrete CA, manufactured by Protective Liner Systems; or approved equal.

D. Epoxy Liner: The material shall be 100% solids, solvent-free two-component epoxy resin system with select fillers to minimize permeability and provide sag resistance acceptable to the following minimum requirements:

Hardness, Shore D	ASTM D-2240	70
Tensile Strength	ASTM D-638	>7000 psi
Flexural Strength	ASTM D-790	>10000 psi

Epoxy liner shall be Raven 405, manufactured by Raven Lining Systems; Dura-Plate 5900, manufactured by Sherwin-Williams; Perma-shield H2S Series 434 and Perma-glaze Series 435, manufactured by Tnemec; Structure Guard by Quadex; PerpetuCoat M by Protective Liner Systems, or approved equal.

E. Frame/Cone Seal:

1. Applied Seal: Applied seals shall be achieved by applying an aromatic urethane resin compound to the internal surface between the manhole frame and the cone section to stop inflow under the manhole frame. Sufficient material shall be applied to achieve a minimum thickness of 120 mils. The material shall comply with the following requirements:

Hardness	ASTM D-2240	75
Tensile Strength	ASTM D-412	1150 psi
Elongation	ASTM D-442	800%
Adhesive Strength.	ASTM D-903	175 lb/l. inch
Tear Resistance	ASTM D-1004	155 lb/l. inch

The material shall be Flex-Seal Utility Sealant as manufactured by Sealing Systems, Inc. or approved equal.

F. Inflow Collector: The contractor shall supply and install, to the manufacturer's recommendations, manhole inflow collectors as specified hereafter. The completed manhole inflow collector shall be manufactured of corrosion proof 316 stainless steel. The associate valve body and components shall be manufactured from material suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with wastewater collection systems. The inflow collector shall be equipped with a gas relief valve designed to relieve at a pressure of 1 psi and have a water leak down rate not to exceed 5 gallons per 24 hours. The insert gasket shall be made of closed cell neoprene and have a pressure sensitive adhesive on one side and be placed under the insert body rim by the manufacturer. The adhesive shall be compatible with the insert body material so as to form a long lasting bond in either wet or dry conditions of use. The inflow collector shall be equipped with a non-deteriorating lifting strap strong enough to lift a collector full to capacity with water out of the manhole. The lifting strap shall be fastened to the insert body with stainless steel rivets.

The inflow collector shall be RainStopper or approved equal.

G. Water: All water used on this project shall be clean and potable.

03. **EXECUTION**:

A. Patching Holes or Voids: All loose or disintegrated material shall be removed from the area to be patched. Holes or voids around steps, joints or pipes, spalled areas, and cavities caused by missing or broken brick or mortar shall be repaired using patching material conforming to the requirements of Section 02, Part A of these specifications. The patching material shall be mixed

and applied in accordance with the manufacturer's requirements. Active leaks shall be stopped in accordance with Section 03, Part B of this specification.

B. Stopping Active Leaks and Infiltration: All active leaks and infiltration shall be repaired using chemical grout conforming to the requirements of Section 02, Part B. Any areas that show evidence of leakage either active or non-active during inspection shall be injected. At each point of leakage within the manhole structure a hole shall be carefully drilled through the wall to the exterior of the manhole. Grout ports or sealant injection devices shall be placed in these holes in a way as to provide a watertight seal between the holes and the injection device. Chemical grout shall be pumped through the hole until material refusal is recorded on a pressure gauge mounted on the pumping unit. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar and troweled flush with the surface of the manhole wall. The injected section joints, pipe connection, holes, or seams shall be sealed with patching material conforming to the requirements of Section 02, Part A and smoothed flush with the surface of the manhole wall. To prevent the migration of infiltration leaks the Contractor shall comply with the following requirements for points of injection:

1. Pre-cast Section Joint Leaks: A minimum of 4 injection points shall be evenly spaced around the circumference of the manhole joint.

2. Pipe Connection Leaks: A minimum of 2 injection points shall be evenly spaced around pipe connection. Note: Large diameter pipe may require more than 2 injection points.

3. Pipe Invert Leaks: A minimum of 2 injection points, one on each side of trough.

4. Lift Holes / Voids: A minimum of 1 injection point below the center of the lift hole / void.

C. Exposed Rebar / Steel Reinforcing Cleaning and Coating: Rebar or any reinforcing steel exposed or exposed after removal of deteriorated concrete shall be cleaned in accordance with SSPC-SP3. The cleaned steel shall be painted by bush or spray, with a material compatible with the cementitious liner, as approved by the manufacturer of the cementitious liner.

D. Reform/Repair Existing Bench and Invert: Manhole inverts and benches shall be reformed as identified in the plans using the patching material identified in Section 02, Part A. Fast setting hydraulic cement may be used to repair the invert. The patch material shall be applied to the invert and bench at a minimum thickness of ½", extending sufficiently to the wall to tie into the cementitious liner to be applied later. The finished invert and bench shall be troweled to a smooth finish free of any ridges. The bench shall be sloped a minimum of 2 inches from the manhole wall toward the invert to prevent debris build-up on the bench. Repairs on the invert shall not compromise grade. The invert and bench shall be allowed to cure for a minimum of 30 minutes before being subject to active flow; flow shall be bypassed by the requirements of Section 15003: Wastewater Flow Control.

E. Building Bench and Invert: Inverts and benches shall be constructed in manholes with no hard bottom and no defined invert (channel of flow) using the patching material identified in Section 02, Part A. Fast setting hydraulic cement may be used to repair the invert. The bench shall be constructed of brick or block and finished by troweling smooth with patching material. The patching material shall have a minimum thickness of 1". The finished invert and bench shall be troweled to a smooth finish free of any ridges. The bench shall be sloped from the manhole wall toward the invert to prevent debris build-up on the bench. The invert and bench shall be allowed to cure for a minimum of 30 minutes before being subject to active flow; flow shall be bypassed by the requirements of Section 15003: Wastewater Flow Control.

F. Cementitious Liner Application:

1. Surface Preparation: All foreign material shall be removed from the manhole wall and bench using a high-pressure water spray (minimum 3500 psi). Loose or protruding brick, mortar and concrete shall be removed using a mason's hammer and chisel or scraper. All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface. Any holes or voids shall be filled in accordance with Section 03. Part A. The surface to be repaired must be clean and free of any loose materials. Active leaks and infiltration shall be stopped in accordance with Section 03. Part B.

2. Step Removal: Prior to application of the cementitious liner, all steps that are deemed defective or unsafe shall be cut off and ground flush with the manhole wall. The contractor shall be responsible for the removal and disposal of old steps.

3. Liner Application: No application shall be made to frozen surfaces or if freezing is expected to occur inside the manhole within 24 hours after application. If ambient temperatures are in excess of 95 degrees, precautions shall be taken to keep the mix temperature below 90 degrees. For each bag of product, use the amount of water specified by the manufacturer and mix for 30 seconds to 1 minute using equipment per manufacturer's recommendation.

   The surface prior to spraying shall be damp without noticeable free water, but totally saturated. Materials shall be applied using low-pressure spray equipment from the bottom of the wall (including the bench but not invert) to the top (terminating at the frame / cone connection), to a minimum uniform thickness to insure that all cracks, crevices, and voids are filled and a relatively smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond.

   If required to achieve specified thickness, a second application shall be applied. Again, the application shall be from the bottom up using low-pressure spray equipment. The surface is then troweled to a smooth finish being careful not to over trowel so as to bring additional water to the surface and weaken it.

4. Curing: Caution should be taken to minimize exposure of applied product to sunlight and air movement. If application of second coat is to be longer than 15 minutes after completion of first coat, the manhole cover shall be set back in place. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover. The final application shall have a minimum of 4 hours cure time before being subjected to active flow. Flow shall be bypassed by the requirements of Section 15003: Wastewater Flow Control. Traffic shall not be allowed over manholes for 12 hours after application is complete. Refer to Traffic Control Section in Special Provisions Section.

G. Epoxy Liner Application:

When required on the plans, the epoxy liner shall be applied over a back-build of cementitious surface. Exact minimum thicknesses of cementitious back-build will be determined after deteriorated concrete has been removed and paid by the associated back-build thickness line items on the bid schedule. The cementitious liner shall be applied in accordance to Section 03.F of this specification. The epoxy lining shall take place only after the cementitious liner has cured the appropriate length of time as recommended by the manufacturer.

1. Liner Application: Surfaces shall be coated by spray application to a minimum dry film finished thickness of 100 mils including bench (not including invert) and walls (terminating at cone / frame joint). If necessary, subsequent top coating or additional coats should occur no later than the recoat window for the specified

products. Additional surface preparation will be required if this recoat window is exceeded. The coating material must be applied by a Certified Applicator of the coating system manufacturer. Spray application equipment approved by the coating manufacturer shall be used.

H. Frame/Chimney Seal Installation:

1. Applied Seal: All foreign material, bituminous coating, rust or scale build-up, etc. shall be removed from the area to be coated by sandblasting in accordance with the manufacturers requirements. Wire brushing will not be allowed. After the area is cleaned, it must be completely dried prior to application of the seal material. The urethane resin compound shall then be applied from the bottom 3 inches of the frame to the top three inches of the cone, including the grade adjustment area, to a minimum thickness of 120 mils. Application shall be in accordance with the manufacturer's instructions.

I. Cleaning Manhole: Any rocks, pieces of broken pipe or any other debris not desired in the manhole or invert shall be removed and disposed of by methods deemed appropriate by the engineer. The bench and invert shall be pressure washed to remove organic material and return undisturbed wastewater flow to the invert.

J. Plugging Abandoned Line: Abandoned lines shall be filled with non-shrink grout conforming to the requirements of Section 02, Part A. Grout plug shall extend at least 1.5 times the thickness of the manhole wall. **Plugging abandoned lines shall be performed prior to cementitious lining.**

K. Raising Manhole with Pre-Cast Grade Ring: The frame shall be removed from the cone. The top of the cone and bottom of the frame shall be cleaned to new surface. A pre-cast grade ring shall be inserted to raise the manhole with ample butyl rubber mastic applied between the cone and grade ring and the grade ring and the frame. If adjustment is made between the barrel and the cone section, butyl rubber shall be inserted between each joint.

L. Raising Manhole with Steel Grade Adjustment Ring: The frame shall receive a SSPC-SP3 Power Tool Cleaning to remove all rust and loose material. Silicone shall be used to seat the steel grade adjustment ring on the frame. The grade ring shall be secured to the existing frame by four spot welds spaced equal distance around the circumference of the frame. This method shall only be used to raise manholes prior to asphalt overly of the road.

M. Install Flat Top Slab on Existing Square Top Manhole: Existing square top slab, frame, and cover shall be removed. Brick or block courses shall be removed to allow for the installation of new flat top slab to grade. Standard NCDOT approved pre-cast flat top slabs may be used when applicable. Where standard size top slabs will not suffice, a custom pre-cast, NCDOT approved flat top slab shall be installed. Frames shall be bolted to the flat top using SS expansion bolts and butyl rubber mastic. The finished elevation shall be level with the existing or proposed finished grade.

N. Realign and Reset Frame: Manhole frames for manholes not in pavement shall be bolted to the cone section using SS Expansion Bolts. Frame shall have a minimum of 2 bolts (5/8" diameter, 4" in length). Frames shall be sealed to the top of manhole with butyl rubber mastic. Grout shall then be placed, inside and outside, the height of the adjustment.

O. Grouting Bench/Barrel Joint: Bench/Barrel joints shall be repaired with cementitious material conforming to the requirements of Section 02, Part C. Adequate material shall be applied to fill the void between the bench/barrel joint to assure no leakage. The material shall be applied and smoothed to an even thickness around the entire circumference of the joint.

P. Grouting Section Joints: Section joints shall be repaired with cementitious material conforming to the requirements of Section 02., Part C. Material shall be applied to fill any holes, voids, or cracks

at the section joint. The material shall be applied at an even thickness around the entire circumference of the joint and smoothed flush to the surface of the manhole wall.

Q. Grouting Chimney: Manhole chimneys shall be repaired with calcium aluminate cementitious material conforming to the requirements of Section 02, Part C at a minimum thickness of 1 inch. The cementitious material shall be applied and smoothed to an even thickness around the entire circumference of the chimney.

R. Cast in Place Concrete Manhole Base: Cast in place bases shall be installed on the existing benches in manholes where indicated on the manhole repair schedule. ½-inch rebar shall be installed 3-inches into the existing bench on 6-inch centers (rebar length is illustrated in Detail 128). Portland cement shall be used to cast the base at the thickness indicated in the manhole repair schedule.

04. **ACCEPTANCE**:

After the various types of rehabilitation and repair have been completed, the work shall be visually inspected by the Contractor in the presence of the Engineer for compliance with these specifications and the manufacturer's recommendations. The Engineer and Owner shall also inspect the work during the 1-year warranty period. Any leakage or defects in the work shall be corrected by the Contractor at no additional cost to the Owner.

A. Field acceptance of manhole lining system shall be based on the Engineer's evaluation of the appropriate installation of the lining per field inspections. Acceptance shall also be based on the Engineer's evaluation of the curing test data and vacuum testing results, where appropriate, and still photographs of the finished manholes.

B. There shall be no groundwater infiltration or other leakage through the manhole wall after it has been lined. If leakage is found, it shall be eliminated with an appropriate method as recommended by the liner manufacturer and approved by the Engineer at no additional cost to the Owner.

C. All pipe connections shall be open and clear.

D. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects in the lining.

E. If any defective lining is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to the Owner. This requirement shall apply for the entire guarantee period.

F. For each pay request, 20% of the manholes submitted on that pay request shall be inspected via vacuum testing once the liner has sufficiently cured. The vacuum testing shall be accomplished prior to submitting the pay request for the manholes. The manholes inspected shall be chosen by the Engineer or their designated representative and the testing shall be witnessed by the Engineer or their designated representative. For the final pay request, the number of manholes necessary for 20% of the manholes rehabilitated throughout the project shall be so inspected. If 10% or more of the total system manholes fail the vacuum testing due to defects in the liner, the Contractor shall be required to test 100% of the manholes rehabilitated in the project at no additional cost to the Owner. The vacuum testing shall be conducted in conformance with ASTM C1244-02. All detected defects in the liner shall be immediately repaired and the manhole retested until passing. All repair procedures shall follow manufacturer's recommended procedures.

Manholes that are completely rehabilitated using the cementitious liner shall be vacuum tested prior to final acceptance. Vacuum testing shall not be performed earlier than 72 hours after application of the liner. A vacuum of 10 inches of mercury shall be drawn and vacuum pump shut off. With the valves closed, the time shall be measured for which it takes the vacuum to drop to 9

inches of mercury. The manhole shall be approved as passing the test if the time is greater than the values shown below:

Manhole Depth	**Manhole Diameter**		
	48"	**60"**	**72"**
Less than 10'	60 sec	75 sec	90 sec
10'-15'	75 sec	90 sec	105 sec
15'-20'	90 sec	105 sec	120 sec

If the manhole fails the initial test, necessary repairs shall be made with an approved material. Retesting shall continue until the manhole satisfactorily passes the test. All tests shall be performed in the presence of the Owner and/or Engineer.

Where the vacuum test failed due to defects not in the liner (such as cracked pipes or defects in the manhole frame), the Contractor shall note the cause of the failure on the test log and provide a still photograph of the defect. In addition, the Contractor shall provide to the Owner, through the Engineer, a still photograph of all finished manholes with the manhole identification number visible in the photograph (for instance written on a dry erase board) and not obscuring the view of the manhole. The Owner, through the Engineer, shall have final say as to the acceptability of the photographs. If a photograph is deemed unacceptable, the Contractor shall be required, at no additional cost to the Owner, to take additional photographs of the manhole until an acceptable photograph is submitted.

The Contractor will furnish all personnel, facilities, and equipment necessary to conduct the testing. Testing of the manholes shall not be paid for directly, but shall be included in the contract unit price for Manhole Rehabilitation.

G. The cured epoxy lining shall be spark tested for pinholes with a spark tester set at 10,000 volts minimum (100 V per mil). All pinholes shall be repaired according to manufacturer recommendations. All pinholes shall be marked off on surface areas containing pinholes to a point 6 inches beyond all pinholes and patch with epoxy to a minimum additional thickness of 40 mils. Blisters and uncured lining shall be completely removed and the areas recoated with epoxy to a point 6 inches beyond the repair areas at a minimum thickness of 100 mils.

05. **CLEANUP**:

After the work has been completed and accepted, the Contractor shall clean up the entire project area and return the ground cover to its original condition. The Contractor shall dispose of all excess material and debris not incorporated into the permanent installation.

06. **WARRANTY**:

All work shall be certified by the Contractor and manufacturer for specified material properties for a period of one year from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the product or its ability to perform the task for which it was designed shall be repaired at the Contractor's expense in a mutually agreed upon manner.

07. **PAYMENT**:

Payment shall be made at the Contract unit price on items measured and described above. Payment for items incidental to the work, such as preparatory cleaning and root cutting, flow control, vacuum testing, clean-up, etc. shall not be paid for directly but shall be included in the unit cost for each pay

item. (**Note: miscellaneous repairs, including chemical grout injection, made to manholes to be completely rehabilitated using a sprayed liner (cement and / or epoxy) shall not be paid for directly but shall be included in the unit cost for complete rehabilitation.**)

SECTION 33 01 30

CCTV INSPECTION OF SANITARY SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. The Work covered by this section includes furnishing all labor, competent certified technicians, equipment, tools, accessories, materials and incidentals required to perform closed-circuit television (CCTV) inspection of all sanitary sewer lines from manhole to manhole and all service laterals from right-of-way boundary to the mainline/manhole connection. All manholes shall be inspected utilizing a 360-degree image of the interior of the manhole. This specification requires that the pipelines be inspected utilizing the NASSCO Pipeline Assessment and Certification Program (PACP) inspection standards and closed-circuit television techniques, and manholes be inspected utilizing the NASSCO Manhole Assessment and Certification Program (MACP) rating system. This process has been developed to identify and locate any sewer line and/or manhole defects, determine corrective action and perform/document post-correction inspection. All costs associated with CCTV inspection are the responsibility of the Developer/Contractor.

1.02 QUALITY ASSURANCE

A. Referenced Standards: Where materials and methods are indicated in these specifications as being in conformance with a standard specification, it shall refer to the latest edition of the specifications and shall include all interim revisions. Listing a standard specification without further reference indicates the particular material or method shall conform to such listed specification.

1. National Association of Sewer Service Companies (NASSCO):

    a. Pipeline Assessment and Certification Program (PACP®) Reference Manual.
    b. Recommended Specifications for Sewer Collection System Rehabilitation Standard, latest edition.

B. Perform according to NASSCO PACP & MACP standards.

C. QUALIFICATIONS

1. CCTV operator shall be NASSCO PACP & MACP certified.

2. The CCTV operator shall have a minimum 5 years of CCTV experience and shall have completed a minimum of 250,000 linear feet of both CCTV equipment operations and NASSCO PACP & MACP coding.

1.03 SUBMITTALS

A. Procedures: Section 13 00 00

B. CCTV Operator Qualifications:

1. Prior to performing CCTV work, submit CCTV Operator’s qualifications meeting the requirements of Part 1.02 for approval.

C. CCTV Pipeline Video:

1. Submit a digital copy via Union County's file transfer platform of completed narrated color CCTV video identified by project name, Union County project number, NCDEQ permit number, date of inspection, and CCTV operator. Union County will provide credentials and instructions for accessing the file transfer platform upon notification that the CCTV video file(s) are ready to be transmitted to Union County for review.

2. Video shall display, at a minimum, the project name, Union County project number, date of inspection, pipe segment number, upstream/downstream manhole numbers or lateral lot number corresponding to the numbers shown on the project drawings, pipe diameter, pipe material, direction of camera movement, footage counter, and CCTV operator.

D. Manhole 360-degree Images:

1. Submit a digital copy via Union County's file transfer platform of completed 360-degree images of the interior of all manholes via Union County's file transfer platform identified by project name, Union County project number, NCDEQ permit number, date of inspection, and CCTV operator. Union County will provide credentials and instructions for accessing the file transfer platform upon notification that the manhole image file(s) are ready to be transmitted to Union County for review.

2. Images shall display, at a minimum, the project name, Union County project number, date of inspection, manhole number, and CCTV operator.

E. Inspection Logs:

1. Submit inspection logs for each section of sewer line, service lateral, and manhole.

2. Sewer line inspection logs shall be in PACP version 7 format with the following information:

    a. Project name
    b. Union County project number
    c. NCDEQ permit number
    d. Date of inspection
    e. Pipe segment number
    f. Pipe rating
    g. Upstream and downstream manhole numbers corresponding to the manhole numbers shown on the project drawings (sewer mains)
    h. Lateral lot number corresponding to the lot numbers shown on the project drawings (service laterals)
    i. Pipe diameter
    j. Pipe material
    k. Direction of camera movement
    l. CCTV operator information
    m. Stationing, based on distance from start manhole, and location by clock position of service connections
    n. Stationing, based on distance from start manhole and description:
        i. Obstructions
        ii. Structural defects
        iii. Longitudinal and/or circumferential cracking
        iv. Open and/or offset joints
        v. Ovality
        vi. Leakage or evidence thereof
        vii. Break in connections

viii. Protruding connections
ix. Mineral deposits
x. Roots
xi. Previous repairs
xii. Sags
xiii. Any other abnormalities with respect to the sanitary sewer pipe condition

3. Manhole inspection logs shall be in MACP version 7 format with the following information:

a. Project name
b. Union County project number
c. NCDEQ permit number
d. Date of inspection
e. Manhole number
f. Manhole rating
g. Manhole chimney, cone, wall, and bench material
h. Manhole frame and cover type and material
i. Manhole lining material, if applicable
j. Pipe material, diameter, and position
k. CCTV operator information
l. Defect description:
   i. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   ii. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)

PART 2 - PRODUCTS

2.01 TELEVISION INSPECTION EQUIPMENT

A. Furnish all labor, materials, machinery, equipment and incidentals required to perform the CCTV inspection of all sewer lines from manhole to manhole and all service laterals from right-of-way to sewer main/manhole connection.

B. Ensure equipment utilized for CCTV of main lines and service laterals is capable of passing through offset joints up to 1 inch minimum.

C. The camera used for the inspection shall be one specifically designed and constructed for such inspection. Adjustable light source shall be suitable to provide an even distribution of lighting for the camera to allow a clear color picture of the entire periphery of the pipe. The camera shall be capable panning 360° and tilting 270° to facilitate the inspection of all laterals and defects, with optimum picture quality provided by focus and iris adjustment. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700-line resolution color picture. The camera shall be operative in 100 percent humidity conditions. Camera shall be operative in a hazardous and corrosive environment. The camera shall be capable of zooming at least 10:1 for looking further down the pipe or up into the laterals.

D. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of Union County.

E. The television inspection equipment shall have an accurate footage counter that shall display on the monitor the exact distance of the camera from the centerline of the starting manhole. Calibrate the camera footage with above ground tape measure and simultaneous CCTV footage counter.

F. The television inspection equipment shall have an accurate inclinometer that shall display the pipe slope on the screen.

G. The CCTV equipment shall include PACP version 7 compliant software and databases referenced in these specifications.

2.02 MANHOLE INSPECTION EQUIPMENT

A. Furnish all labor, materials, machinery, equipment and incidentals required to take 360-degree images of the interior of manholes.

B. The camera used for the inspection shall be one specifically designed and constructed for such inspection. Light source shall be suitable to provide an even distribution of lighting for the camera to allow a clear color picture of the entire interior of the manhole. Camera shall be operative in a hazardous and corrosive environment.

C. The camera and other components of the imaging system shall be capable of producing picture quality to the satisfaction of Union County.

D. The CCTV equipment shall include MACP version 7 compliant software and databases referenced in these specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of sewer lines and manholes to be inspected based on the approved project drawings.

3.02 PREPARATION

A. Clean pipeline and manholes to remove sludge, dirt, sand, stone, grease, and other materials to ensure clear view of interior conditions.

B. Debris:

1. Intercept flushed debris at next downstream manhole using weir or screening device.
2. Remove and properly dispose of debris off Site.

3.03 CCTV PIPELINE INSPECTION

A. Perform all CCTV inspection using personnel meeting qualifications listed in Section 1.02 of this specification.

B. Move the camera through the line at a uniform speed less than or equal to 20 feet per minute, stopping when necessary to permit proper documentation of the construction features and pipe condition. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.

C. When manually operated winches are used to pull the television camera through the line, use telephones or other suitable means of communication set up between the two manholes of the section being inspected to ensure good communications between members of the crew.

D. Adjust the camera height such that the camera lens is always centered in the pipe being televised. Prior to starting the camera down the line, a tape measure shall be placed at the pipe opening at the upstream manhole to clearly show/verify, on-screen, the pipe diameter of the section of pipe to be televised during the subsequent inspection.

E. Video shall include overlay/text display. Each inspection start shall include overlay display of section details:

1. Project name
2. Union County project number
3. Date of inspection
4. Pipe segment number
5. Upstream/downstream manhole numbers or lateral lot number corresponding to the numbers shown on the project drawings
6. Pipe diameter
7. Pipe material
8. Direction of camera movement
9. Footage counter
10. Inclinometer pipe slope reading
11. CCTV operator

F. A constant display of the project name, start Manhole ID / end Manhole ID, date and distance shall appear on screen. CCTV operator shall move or remove overlay display accordingly so it does not interfere with the inspection review of a particular observation/defect. As an observation/defect is noted, a descriptive text display shall appear for a minimum of 4 seconds.

G. A full 360-degree view of the pipe shall be visible during CCTV inspection.

H. Provide lighting system adequate for good quality video. A reflector in front of the camera may be required to enhance lighting in black pipe.

I. The camera shall be stopped at all service laterals and pan such an angle that an internal view of the service lateral is available. Digital photographs shall be made of any service lateral or deficiency observed in the sewer line and the photograph itself shall contain a brief description of the issue. The descriptions shall also be noted in the inspection condition record within the database. Where other pipe deficiencies are noted, stop the camera to observe the condition, record information and take digital photographs. All digital photos shall be cataloged in the CCTV database and linked to the specific length along the inspection via linkage to the defect record in the database.

J. The CCTV operator shall lateral launch or otherwise provide CCTV video (e.g. push-camera) to inspect conditions of all service laterals conveying to manholes or pipes. The CCTV operator shall, at minimum, obtain video and provide assessment of service lateral conditions to the property line or existing cleanout.

K. Provide a complete television inspection for the upstream and downstream manholes. The CCTV operator shall pan and zoom up the manhole from the invert for each manhole and obtain the best possible image of the manhole including cone and corbel sections and for each pipe connection within each manhole. The CCTV operator shall zoom in on each pipe connection so the photos capture each pipe connection’s size, location, and approximate elevation.

3.04 MANHOLE INSPECTION

A. Perform all manhole inspection using personnel meeting qualifications listed in Section 1.02 of this specification.

B. Images shall include overlay/text display. Each inspection start shall include overlay display of manhole details:

1. Project name
2. Union County project number
3. Date of inspection
4. Manhole number
5. CCTV operator

C. The scanner shall collect a 360-degree image of the interior of the manhole and shall create a point cloud of the manhole interior that can be used to accurately measure the manhole features.

3.05 INSPECTION LOGS

A. All inspections shall use software that is capable of providing complete survey reports in compliance with version 7 of NASSCO PACP/MACP software utilized by Union County.

B. All NASSCO PACP/MACP mandatory fields and any additional available fields requested by Union County or his representative shall be populated during the inspections**.** All reports and/or submittals shall adhere to NASSCO PACP/MACP Standards.

C. Submit inspection logs for each section of sewer line and service lateral.

1. Sewer line inspection logs shall be in PACP version 7 format with the following information:

    a. Project name
    b. Union County project number
    c. NCDEQ permit number
    d. Date of inspection
    e. Pipe segment number
    f. Pipe rating
    g. Upstream and downstream manhole numbers corresponding to the manhole numbers shown on the project drawings (sewer mains)
    h. Lateral lot number corresponding to the lot numbers shown on the project drawings (service laterals)
    i. Pipe diameter
    j. Pipe material
    k. Direction of camera movement
    l. CCTV operator information
    m. Inclinometer pipe slope reading
    n. Stationing, based on distance from start manhole, and location by clock position of service connections
    o. Stationing, based on distance from start manhole and description:
        i. Obstructions
        ii. Structural defects
        iii. Longitudinal and/or circumferential cracking
        iv. Open and/or offset joints
        v. Ovality
        vi. Leakage or evidence thereof
        vii. Break in connections
        viii. Protruding connections
        ix. Mineral deposits
        x. Roots
        xi. Previous repairs
        xii. Sags

xiii. Any other abnormalities with respect to the sanitary sewer pipe condition

2. Manhole inspection logs shall be in MACP version 7 format with the following information:

a. Project name
b. Union County project number
c. NCDEQ permit number
d. Date of inspection
e. Manhole number
f. Manhole rating
g. Manhole chimney, cone, wall, and bench material
h. Manhole frame and cover type and material
i. Manhole lining material, if applicable
j. Pipe material, diameter, and position
k. CCTV operator information
l. Defect description:
   i. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   ii. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)

3.06 INSPECTION SUBMITTALS

A. CCTV operator shall submit one copy of digital videos, digital photographs, evaluation reports, and databases in NASSCO PACP/MACP version 7 format via Union County's electronic file transfer platform.

B. If digital videos are of such poor quality that Union County is unable to evaluate the condition of the sanitary sewer main and service laterals, CCTV operator shall be required to re-televise the sanitary sewer and provide new digital videos of good quality prior to acceptance.

C. All digital videos and data shall become the property of Union County.

D. All reports and/or submittals shall adhere to NASSCO PACP/MACP Standards.

E. Inspection log databases, video files, digital photographs and supporting documentation (PDF, spreadsheets), etc. shall be placed in separate folders on Union County's file transfer platform. Separate subfolders shall not be used to separate video files, etc. under the main folder. All videos, digital photographs, etc. of the same file type should be placed in a single folder in order to provide a single location to access the data.

F. The CCTV and 360-degree imaging equipment/software shall be capable of producing digital still images of all defects in JPEG (.jpg) image format. Provide digital still images of each defect, with a minimum of one independent photo file per defect, construction features and service connections to clearly depict it. More images may be necessary depending upon the condition of the pipe/manhole. The digital images shall have a minimum size/resolution of 620 x 480. The screen captures or digital images shall include an onscreen display with date, sewer main/manhole reach number, footage, and type of defect PACP/MACP Code. The filename of each JPEG (.jpg) shall be in accordance with these specifications.

G. The inspection log database shall be provided with the filename in the following format using upper case letters:

1234_YYYYMMDD.MDB

Where 1234= Union County Project ID, and YYYYMMDD = 8-digit date.

H. The CCTV inspection videos shall be provided with the filename in the following format:

1234_56789_YYYYMMDD.MPG

Where 1234 = Union County Project ID, 56789 = pipe asset ID, and YYYYMMDD = 8-digit date.

I. Digital still images of the pipeline defects shall be provided with the file name based on the video / data file name of the sewer reach in which the image was taken. The name shall be recorded as follows:

1234_56789_HSV_37 _2_YYYYMMDD.jpg

Where 1234 is the Union County project ID, 56789 is the pipe asset ID, HSV is a PACP defect code, 37 is the footage count for the defect location along the pipe, 2 is the sequential defect photo number along the pipe, and YYYYMMDD is the 8-digit date of the inspection.

J. The manhole 360-degree inspection images shall be provided with the filename in the following format:

1234_56789_YYYYMMDD.MPG

Where 1234 = Union County Project ID, 56789 = manhole asset ID, and YYYYMMDD = 8-digit date.

K. Digital still images of the manhole defects shall be provided with the file name based on the video / data file name of the sewer reach in which the image was taken. The name shall be recorded as follows:

1234_56789_SAV_5 _2_YYYYMMDD.jpg

Where 1234 is the Union County project ID, 56789 is the manhole asset ID, SAV is a MACP defect code, 5 is the footage from the top of the manhole of the defect location, 2 is the sequential defect photo number along the manhole, and YYYYMMDD is the 8-digit date of the inspection.

L. Digital files of all field data collection forms should be delivered in PDF format and shall have file names that include the same unique identifier as the database submittal so that they can easily be related to the database and digital photograph/video submittals, if a naming convention is not specified.

3.07 ACCEPTANCE

A. Any of the following observations shall be considered defects:

1. Pipeline:
    a. Obstructions
    b. Any bellies in a joint of pipe will be cause for rejection of the pipe segment
    c. Ovality
    d. Structural defects
    e. Joint separations
    f. Offset joints

g. Chips in pipe ends
h. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.)
i. Break in connections and/or protruding connections
j. Infiltration
k. Roots
l. Debris or other foreign objects inside of pipe.
m. Other obvious deficiencies when compared to Approved Plans, Permits, and/or Minimum Standards.

2. Manhole:
   a. Structural defects (crack, fracture, broken, hole, deformed, collapsed, joint, surface damage, buckling, lining failure, weld failure, point repair, brick work)
   b. Operational & Maintenance defects (deposits, roots, infiltration, obstructions, vermin, grout test & seal)
   c. Other obvious deficiencies when compared to Approved Plans, Permits, and/or Minimum Standards.

B. The Developer shall be notified in writing of any deficiencies revealed by the CCTV inspection that will require repair. After repairs have been made, the line segment(s) shall be re-inspected at the Developer's expense. The CCTV inspection video shall be submitted to Union County for review upon completion of discrepancies.

C. Correction of any and all deficiencies must be corrected prior to acceptance of the project.

END OF SECTION

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Union County Public Works
Manhole Asset Data Sheet

MH ID	Northing	Easting	Rim Elev	Depth	Cover Type	Ground Cover	Dia	Wall Material	Invert Elev.		Inspection Date	Rehab Date	Description of Work			Photographs				Testing Method	Testing Date	Notes
									US	DS			Rehab 1	Rehab 2	Rehab 3	Ground	Invert	Defect	Rehab			