PROJECT MANUAL

FOR

FY20-21 SEWER REHABILITATION PROJECT

PROJECT NO. SW3501

MARCH 2021

TOWN OF CARY
WAKE COUNTY, NORTH CAROLINA

MAYOR:	**HAROLD WEINBRECHT, JR.**
TOWN CLERK:	**VIRGINIA H. JOHNSON**
TOWN MANAGER:	**SEAN R. STEGALL**
DIRECTOR OF UTILITIES DIRECTOR:	**JAMIE REVELS, P.E.**

CERTIFICATION

I HEREBY CERTIFY THAT THE SPECIFICATIONS CONTAINED HEREIN AND THE ACCOMPANYING PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

SIGNED, SEALED, AND DATED THIS 2nd DAY OF MARCH, 2021

BY _____

Mark E. Lambert
Frazier Engineering

Project Name FY20-21 Sewer Rehabilitation Project
Project No.SW3501

FY20-21 SEWER REHABILITATION PROJECT
SW3501

TABLE OF CONTENTS

GENERAL REQUIREMENTS

TECHNICAL SPECIFICATIONS *

INVITATION TO BID

TOWN OF CARY
Cary, North Carolina

Sealed bids must be submitted no later 2:00 p.m. EDT on April 6, 2021

HOW TO SUBMIT BID PROPOSALS:

- Physical Delivery of Bids:

  - The bids may be delivered to the Town of Cary Warehouse at 420 James Jackson Avenue Cary, NC 27513; follow the sign to "Purchasing" then follow the sign for "Deliveries," which will lead to the Warehouse.

  - Delivery such as UPS or FedEx; Deliver to the address below:
    Town of Cary – Warehouse
    420 James Jackson Avenue
    Cary, NC 27513

    Attn: Lynn Brilz, P.E.
    Bid Number #354-UT21-23
    Date Bid is Due 2:00 pm on April 6, 2021

  - United States Postal Service (USPS)
    Town of Cary – Warehouse
    PO Box 8005
    Cary, NC 27512

    Attn: Lynn Brilz, P.E.
    Bid Number #354-UT21-23
    Date Bid is Due 2:00 pm April 6, 2021

NOTE: IT IS THE RESPONSIBILITY OF THE BIDDER TO ENSURE WHICHEVER METHOD OF DELIVERY IS USED THAT THE BID IS RECEIVED ON TIME. LATE BIDS WILL NOT BE OPENED OR ACCEPTED.

The virtual physical bid opening by the Town of Cary will be held at 420 James Jackson Avenue in the purchasing conference room. Members of the public will have the capability to attend the bid openings via a live WebEx meeting. A project manager, engineer/architect (if applicable), and a representative from Purchasing will be in attendance to witness and affirm that all proposals remain sealed until the live bid opening. The project manager will prepare an attendance and bid tab sheet. Purchasing will take attendance of participants on the WebEx and record bid results. Bids will be opened and read publicly for the furnishing of materials, labor, and

equipment for construction of the FY20-21 Sewer Rehabilitation Project, Project No. SW3501. Brief project description is as follows:

±Clean/televise and install CIPP liner in 7,200 feet of 8” sewer; 200 feet of 10” sewer; 500 feet of 12” sewer; 250 feet of 15”/16” sewer; sewer; 1,450 feet of 24” sewer; 7,650 feet of 30” sewer; 50 feet of 36” sewer; 50 feet of 42” sewer; 7,500 feet of 48” sewer; and 2,825 feet of 54” sewer; install 500 VF of cementitious mortar in manholes; various manhole and sewer repairs; bypass pumping of wastewater; and other related sewer rehabilitation work.

Plans, Specifications and Contract documents may be viewed electronically at http://townofcary.contractorsplanroom.com upon registering online after March 3, 2021. The following agencies have been notified of the project: the Associated General Contractors – Raleigh office, McGraw-Hill Construction Dodge, the North Carolina Institute of Minority Economic Development – Durham office, and the CDC News – Cary office after March 3, 2021.

The Town of Cary is not responsible for a Bidder relying on incomplete bid documents.

Contractors offering a proposal on this project must be licensed to do the specified type of contracting in the State of North Carolina. All bids must include a non-collusive affidavit. Contractors offering a proposal on this project must comply, and must ensure that their subcontractors comply, with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes, “Verification of Work Authorization,” and must provide documentation or sign affidavits or any other documents requested by the Town of Cary demonstrating such compliance.

Each proposal shall be accompanied by a bid deposit in the amount of not less than five percent (5%) of the amount of the bid in the form and subject to the conditions provided in the Instruction to Bidders.

The Town of Cary reserves the right to reject any or all proposals.

Jamie Revels, P.E.
Utilities Director

INSTRUCTIONS TO BIDDERS

Each proposal shall be submitted in a sealed envelope, upon blank forms provided in the Project Manual. These proposals shall be plainly marked:

"FY 20-21 Sewer Rehabilitation Project
Town of Cary Project No. SW3501"

The envelope shall also be marked with the Bidder's name, address, North Carolina contractor license number, and name and phone number of a contact person.

Each proposal shall be accompanied by a Bid Bond payable to the Town of Cary for an amount of not less than five percent (5%) of the total amount bid; or in lieu of the Bid Bond, the bidder may offer the bid deposit in the form of a cashier's check, or a certified check on a bank or trust company insured by the FDIC. The bid bond must be executed by a corporate surety licensed in North Carolina. The bid deposit may be held for a period of sixty (60) days pending award of the contract. Notification of award of contract shall be evidence of intent to contract and shall extend time for holding the contractor's bid surety for a time mutually agreed between the Town of Cary and the bidder.

During these unprecedented times Town Hall remains closed until further notice. To ensure that all Bidders are kept up to date on any Addenda, changes, or information notices, please send an e-mail to mlambert@frazier-engineering.com indicating your intention to prepare a Bid for the Project.

A virtual **NON-MANDATORY pre-bid meeting** will be held with the Engineer and Owner at **2:00 p.m., March 23, 2021** to discuss the project and answer pertinent questions. Those who wish to attend the Pre-Bid Meeting must send an email to mlambert@frazier-engineering.com no later than 12:00 PM ET, March 23, 2021 to ensure an invite with the meeting link can be provided. No guarantees shall be made for those who request to attend after the deadline specified herein. Bidders are strongly encouraged to attend and participate in the conference. The Engineer will transmit to all prospective Bidders of record such Addenda, if deemed necessary, in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

The pre-bid meeting will be held via a virtual TEAM meeting. The Project Managers and Engineers/Architects will discuss the project and answer questions via the virtual TEAM meeting. Please join the meeting 30 minutes prior to the opening to allow for the correction of any technical difficulties. All prospective bidders and subcontractors are welcome to attend the pre-bid meeting virtually.

Formal In-Person Public Bid Openings have been postponed. During these unprecedented times, the public can attend the bid opening via a live WebEx meeting. There will be witnesses to confirm that all bids remain sealed until the bid

opening. The bid opening will be **April 6, 2021 at 2:00 PM ET**. The Project Managers, Engineers/Architects (If applicable) and Purchasing Staff will open bids via the live WebEx meeting. Please join the meeting 30 minutes prior to the opening to allow for the correction of any technical difficulties. If you have problems joining or sound issues, contact WebEx and provide them the meeting number. All bidders are welcome to attend the bid opening virtually, which can be accessed via the following credentials:

FY 20-21 Sewer Rehabilitation Project Bid Opening:

https://carync.webex.com/carync/j.php?MTID=m3f02c99cad97223275efe9ec9acfa9cb

Access Code: 129 770 1385

Meeting Password: PsSgCTHm485

The award of the Contract, if it is awarded, will be to the lowest responsive, responsible bidder whose qualifications indicate the award will be in the best interest of the Town of Cary (Owner). The Town of Cary reserves the right to waive technicalities and/or reject any or all proposals.

A Performance Bond and a Payment Bond, each in the amount of one hundred percent (100%) of the contract price, with a corporate surety approved by the Town of Cary, will be required for the faithful performance of the contract. Bidders shall provide certification that performance and payment bond sureties are licensed in North Carolina.

All questions about the meaning or intent of the Contract documents shall be submitted in writing to Mark Lambert, P.E., Project Manager, Frazier Engineering, 6592 Bob White Trail, Stanley, NC 28164. Email questions may be sent to mlambert@frazier-engineering.com. Questions received less than five business days prior to the date for opening of Bids may not be answered. Only questions answered by written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Addenda, when issued, will be posted to the North Carolina Interactive Purchasing System (IPS), www.ips.state.nc.us, and will also be on file at the offices of the Owner and Engineer at least twenty-four hours before bids are opened. It shall be the Bidder's responsibility to make inquiry as to the Addenda issued. All such Addenda shall become part of the Contract Documents and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

SECTION 00300
BID PROPOSAL ("Proposal")

TO: THE TOWN OF CARY, NORTH CAROLINA ("Owner")

FROM: "BIDDER" _____

ADDRESS _____

_____

DATE OF BID _____, 20___

The Bidder hereby signifies that it is his/her/its intention and purpose to enter into a formal Contract with the Town of Cary, North Carolina, to furnish all labor, materials, tools, equipment, apparatus, supplies, and the like required, and to do all the work necessary, for and because of the construction, erection, and/or installation of the proposed "Project":

FY 20-21 Sewer Rehabilitation Project

for the Town of Cary, North Carolina in accordance with the Contract Documents, including Addenda thereto.** There is deposited, herewith, a certified check in the amount of: _____ _____ Dollars ($_____), or a Bid Bond in the amount of five percent (5%) of the total aggregate amount of the Bid, made payable to the Owner, the same to be refunded to the Bidder under the conditions of and in accordance with the terms of this Proposal, which are as follows:

THAT: The Bidder has carefully examined the Plans and Specifications and all other Contract Documents and fully understands them.

THAT: The Bidder has carefully examined the site of the Project and is familiar with the conditions under which the work, or any part thereof, is to be performed and the conditions which must be fulfilled in furnishing and/or installing, erecting or constructing any or all items of the Project.

THAT: The Bidder shall provide all necessary tools, machinery, equipment, apparatus, and all other means necessary to do all the work and shall furnish all labor, materials and all else required to complete such Contract as may be entered into, in the manner prescribed in and in accordance with the terms of the Specifications and the Contract and in accordance with the true intent and meaning thereof, and in accordance with the Plans and/or Drawings and the requirements of the Consulting Engineers under them, in a first class manner.

** Fill in appropriate Addenda number(s):_____

[Terms continued on the following page.]

THAT: The rights of the Owner and the recommendations of the Engineer shall not be questioned in the Award of the Contract.

THAT: It is the intention of the Owner to let contracts on the basis of the Bids received in accordance with G.S. 143-129 and in such manner as the Owner may deem to be for the best interests of the Owner.

THAT: The Owner reserves the right to reject any or all proposals.

THAT: The work under each Section will be awarded under one Contract and that the Owner shall have the right to include such item or items as the Owner may deem to be in the best interests of the Owner.

THAT: On being awarded the Contract, the Bidder shall execute a Performance Bond and a Payment Bond, on the forms included herein, each equal to one hundred percent (100%) of the Contract Price (Contract Sum), as security for the faithful performance of the Contract.

THAT: The Bidder shall submit, in the blank spaces provided, all data, guarantees and other information called for.

THAT: This Proposal shall be signed and submitted in the manner prescribed in the Instructions to Bidders.

THAT: Should this Proposal not be accepted by the Owner, the certified check, in the amount of: _____
Dollars ($_____) or the five percent (5%) Bid Bond, as applicable, deposited herewith shall be returned to the Bidder.

THAT: Should this Proposal be accepted by the Owner and the Bidder fail or neglect to execute the Contract and furnish the required Bonds within ten (10) business days after receiving notifications of the acceptance of the Proposal and/or receipt of the formal Contract and Bond forms, the certified check, in the amount of:_____
_____Dollars ($_____), or the Bid Bond, deposited herewith shall be retained by the Owner as liquidated damages, it being understood that the Owner reserves the right to extend the time allowed for executing the Contract and/or furnishing the Bond in its sole discretion.

THAT: The Bidder shall complete such Contract as may be entered into within the number of consecutive calendar days specified in the Contract from the date of the Notice to Proceed.

THAT: The Bidder proposes to enter into a Contract in accordance with this Proposal, the Plans and Specifications and the Contract Documents included herein, for the prices shown on the following pages.

THAT: The successful bidder shall be required to submit a complete detailed cost breakdown of the Lump Sum Bid Price amount (if project is a lump sum bid) for payment purposes, for approval by the Engineer, prior to the Award of the Contract.

[Terms continued on the following page.]

THAT: It is the intent of these Contract Documents to obtain a Contract based on a Lump Sum Price except where Unit Prices are specifically requested. Where a discrepancy exists between words and numbers in the Bid amount, the written words shall govern. Where a discrepancy exists between unit prices and mathematical computations in the Itemized Proposal, the unit prices and quantities in the Itemized Proposal shall govern.

THAT: The successful bidder shall have all proper Bidder licenses and other applicable licenses required under North Carolina state laws governing their respective trade(s).

THAT: The successful bidder and all subcontractors shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes, "Verification of Work Authorization," and shall provide documentation or sign affidavits or any other documents requested by the Town of Cary demonstrating such compliance.

THE FOLLOWING FORMS AND DOCUMENTATION SHALL BE COMPLETELY FILLED OUT AND SUBMITTED WITH THE BIDS:

1. Bid Bond (using forms provided on pages 00300-3 and 00300-10) or other allowable bid security;
2. Photocopy of Bidder's North Carolina Contractors License;
3. Enter Contractor's License Number where called for in proposal and on the outside of sealed envelope containing the proposal;
4. Statement of Compliance with requirement of the General Conditions that the Bidder will ensure that at least forty (40) percent of the Work is performed with the Bidder's employees (provide statement on bidder's letterhead);
5. Certified List of Major Subcontractors;
6. Bidder's Certificate as to Organization and Authority;
7. Equal Employment Opportunity Addendum;
8. Qualifications of Bidders;
9. Non-Collusive Affidavit;
10. Nondiscrimination Clause.

    Note that the Bid Form will be made available in spreadsheet form. The Contractor may utilize the spreadsheet to complete the Bid Form but must print out and submit the Bid Form in hard copy format. Each page of the Bid Form shall be initialed and dated. The Owner and Engineer are not responsible for any errors, typos, omissions, etc. in the Bid Form. It is the Contractor's sole responsibility to ensure that the spreadsheet is accurate.

BID PROPOSAL

GENERAL CONSTRUCTION
FOR THE

FY 20-21 Sewer Rehabilitation Project
(the “Project”)

TOWN OF CARY
BID FORM
FY20-21 SEWER REHABILITATION PROJECT
PROJECT NO. SW3501

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 CLEANING AND TELEVISING EXISTING SEWERS TO FURTHER EVALUATE THE SEWERS, AS SPECIFIED, ANY REQUIRED CLEANING, ANY LOCATION, ANY LENGTH OF SEWER, COMPLETE IN PLACE, FOR VARIOUS PIPE DIAMETERS.**				
A.	EXISTING 8" DIAMETER MAIN SEWERS	7,200	LF		$0.00
B.	EXISTING 10" DIAMETER MAIN SEWERS	200	LF		$0.00
C.	EXISTING 12" DIAMETER MAIN SEWERS	500	LF		$0.00
D.	EXISTING 15"/16" DIAMETER MAIN SEWERS	250	LF		$0.00
E.	EXISTING 24" DIAMETER MAIN SEWERS				
1)	LIGHT CLEANING	1,300	LF		$0.00
2)	HEAVY CLEANING	150	LF		$0.00
F.	EXISTING 30" DIAMETER MAIN SEWERS				
1)	LIGHT CLEANING	7,000	LF		$0.00
2)	HEAVY CLEANING	650	LF		$0.00
G.	EXISTING 36" DIAMETER MAIN SEWERS	50	LF		$0.00
H.	EXISTING 42" DIAMETER MAIN SEWERS	50	LF		$0.00
I.	EXISTING 48" DIAMETER MAIN SEWERS	7,500	LF		$0.00
J.	EXISTING 54" DIAMETER MAIN SEWERS	2,825	LF		$0.00
2	**FOR PERFORMING POINT REPAIRS TO EXISTING GRAVITY SEWERS (INCLUDING REPLACING SERVICE LATERAL CONNECTIONS AND PIPING) USING PVC PIPE, REPAIR LENGTH AS SPECIFIED BELOW, VARIOUS PIPE DIAMETERS, VARIOUS DEPTHS OF SEWER, BACKFILLING WITH GRANULAR MATERIAL OR FLOWABLE FILL UNDER PAVED SURFACES PER STANDARD DETAIL NO. 5000.01, BACKFILLING WITH EXCAVATED SOIL IN UNPAVED AREAS, INCLUDING COMPLETE RESTORATION OF GRASSED AREAS (RESTORATION OF PAVED AREAS PAID UNDER SEPARATE BID ITEMS), AS SPECIFIED AND IN ACCORDANCE WITH THE DETAILS, COMPLETE IN PLACE.**				
A.	REPAIR TO EXIST 8" DIAMETER SEWERS USING PVC PIPE				
1)	0 TO 10 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 1(a) ABOVE	10	LF		$0.00
2)	10.1 TO 15 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 2(a) ABOVE	10	LF		$0.00
B.	REPAIR TO EXIST 10" DIAMETER SEWERS USING PVC PIPE				
1)	0 TO 10 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 1(a) ABOVE	10	LF		$0.00
2)	10.1 TO 15 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 2(a) ABOVE	10	LF		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
C.	REPAIR TO EXIST 12" DIAMETER SEWERS USING PVC PIPE				
1)	0 TO 10 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 1(a) ABOVE	10	LF		$0.00
2)	10.1 TO 15 FEET DEEP				
(a)	0 TO 12 FEET LONG	1	EA		$0.00
(b)	GREATER THAN 12 FEET IN LENGTH, PAYMENT FOR EACH FOOT OVER 12 FEET, ADD TO ITEM 2(a) ABOVE	10	LF		$0.00
D.	THE ADD ON COST FOR SUBSTITUTING DUCTILE IRON PIPE FOR ANY PIPE WITHIN THIS CONTRACT, AS SPECIFIED, COMPLETE IN PLACE				
1)	8" SEWER	10	LF		$0.00
2)	10" SEWER	10	LF		$0.00
3)	12" SEWER	10	LF		$0.00
E.	INSTALL DIP TEE WITHIN POINT REPAIR SEGMENT AND RECONNECT LATERAL TO TEE (UP TO 6 FEET OF LATERAL)(ANY DEPTH)				
1)	8" DIP TEE				
(a)	WITH 6 FEET OF 4" OR 6" PVC LATERAL PIPE	1	EA		$0.00
(b)	WITH 6 FEET OF 4" OR 6" DIP LATERAL PIPE	1	EA		$0.00
2)	10" DIP TEE				
(a)	WITH 6 FEET OF 4" OR 6" PVC LATERAL PIPE	1	EA		$0.00
(b)	WITH 6 FEET OF 4" OR 6" DIP LATERAL PIPE	1	EA		$0.00
3)	12" DIP TEE				
(a)	WITH 6 FEET OF 4" OR 6" PVC LATERAL PIPE	1	EA		$0.00
(b)	WITH 6 FEET OF 4" OR 6" DIP LATERAL PIPE	1	EA		$0.00
F.	REPLACE EXISTING STORM SEWER WITH NEW LIKE-SIZE RCP STORM SEWER AS NECESSARY DURING ANY EXCAVATIONS (ANY DEPTH)				
1)	12" STORM SEWER	10	LF		$0.00
2)	15" STORM SEWER	10	LF		$0.00
3)	18" STORM SEWER	10	LF		$0.00
4)	21" STORM SEWER	10	LF		$0.00
5)	24" STORM SEWER	10	LF		$0.00
3	**STAND-ALONE CLEANOUT INSTALLATION, EITHER TO REPLACE AN EXISTING CLEANOUT OR TO INSTALL A CLEANOUT WHERE ONE DOES NOT CURRENTLY EXIST, WHERE REQUIRED BY THE ENGINEER, 0'-8' DEEP**				
1)	4" PVC CLEANOUT	5	EA		$0.00
2)	6" PVC CLEANOUT	1	EA		$0.00
4	**REMOVAL OF EXISTING CLEANOUT INCLUDING STANDPIPE, SPLICING IN REPLACEMENT PIPE WHERE STANDPIPE WAS LOCATED, WHERE REQUIRED BY THE ENGINEER, 0'-8' DEEP**				
1)	4" PVC	6	EA		$0.00
2)	6" PVC	1	EA		$0.00
5	**FOR INSTALLING NEW PRECAST CONCRETE MANHOLES WITH A CONE SECTION TOP ON EXIST OR NEW SEWERS, VARIOUS DEPTHS AND SIZES OF SEWERS, COMPLETE RESTORATION, AS SPECIFIED, COMPLETE IN PLACE.**				
A.	4 FOOT DIAMETER MANHOLE UP TO 6 FEET IN DEPTH IN UNPAVED AREAS				
1)	WITH 24" COVER (TYPE 2B)	1	EA		$0.00
2)	WITH 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
3)	ADD ON COST IF MANHOLE IS IN PAVED AREA (ADD ON TO ITEMS A(1) AND A(2) ABOVE)	1	EA		$0.00
4)	PAYMENT FOR EACH VERTICAL FOOT OVER 6 FEET (ADD ON TO ITEMS A(1) AND A(2) ABOVE)	10	VF		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
5)	ADD ON COST IF MANHOLE IS A FLAT-TOP (ADD ON TO ITEMS A(1) AND A(2) ABOVE)	1	EA		$0.00
B.	5 FOOT DIAMETER MANHOLE UP TO 6 FEET IN DEPTH IN UNPAVED AREAS				
1)	WITH 24" COVER (TYPE 2B)	1	EA		$0.00
2)	WITH 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
3)	WITH 36" WATERTIGHT COVER (TYPE 3)	1	EA		$0.00
4)	ADD ON COST IF MANHOLE IS IN PAVED AREA (ADD ON TO ITEMS B(1) AND B(2) ABOVE)	1	EA		$0.00
5)	PAYMENT FOR EACH VERTICAL FOOT OVER 6 FEET (ADD ON TO ITEMS B(1) AND B(2) ABOVE)	10	VF		$0.00
6)	ADD ON COST IF MANHOLE IS A FLAT-TOP (ADD ON TO ITEMS B(1), B(2), AND B(3) ABOVE)	1	EA		$0.00
C.	COST FOR EACH CONNECTING SEWER INCLUDING 10 FEET OF DIP SEWER, ANY LOCATION, ANY DEPTH, ANY MANHOLE DIAMETER				
1)	4" or 6" SERVICE LATERALS	2	EA		$0.00
2)	8" SEWER	2	EA		$0.00
3)	10" SEWER	2	EA		$0.00
4)	12" SEWER	2	EA		$0.00
6	**FOR INSTALLING NEW 6 INCH VENT PIPES AT EXISTING MANHOLES, ANY LOCATION, AS SPECIFIED AND IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DETAILS, COMPLETE IN PLACE. PAYMENT TO BE MADE BASED ON THE VERTICAL HEIGHT INSTALLED MEASURED FROM THE BOTTOM OF THE VENT PIPE TO THE VENT PIPE OPENING.**				
A.	FOR INSTALLING NEW VENT PIPES UP TO 8 VF IN EXISTING PRE-CAST CONCRETE MANHOLES	3	EA		$0.00
B.	FOR INSTALLING NEW VENT PIPES UP TO 8 VF IN EXISTING BRICK OR BLOCK MANHOLES	1	EA		$0.00
C.	PAYMENT FOR EACH VERTICAL FOOT OVER 8 FEET (ADD ON TO ITEMS A OR B ABOVE)	5	VF		$0.00
7	**FOR INSTALLING NEW VENT PIPES ON NEW FLAT-TOPS WITH A VENT CAST IN PLACE IN THE NEW FLAT-TOP, ANY LOCATION, AS SPECIFIED AND IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DETAILS, COMPLETE IN PLACE. PAYMENT TO BE MADE BASED ON THE VERTICAL HEIGHT INSTALLED MEASURED FROM THE BOTTOM OF THE VENT PIPE (AT THE TOP OF VENT CAST IN PLACE IN THE NEW FLAT-TOP) TO THE VENT PIPE OPENING, PAYMENT FOR EACH VERTICAL FOOT**				
A.	8" VENT PIPES	25	VF		$0.00
B.	10" VENT PIPES	25	VF		$0.00
8	**FOR REMOVING EXISTING VENT PIPES AT EXISTING MANHOLES AND PLUGGING THE HOLE WITH CONCRETE, COMPLETE IN PLACE.**	5	EA		$0.00
9	**FOR INSTALLING NEW INTERNAL DROP CONNECTIONS AT EXISTING MANHOLES, VARIOUS DROP PIPE DIAMETERS AND LENGTHS, AS SPECIFIED, COMPLETE IN PLACE.**				
A.	NEW 4-INCH INTERNAL DROP CONNECTION AT EXISTING MANHOLES				
1)	DROP UP TO 6 FEET IN VERTICAL LENGTH, COST PER DROP CONNECTION	5	EA		$0.00
2)	DROP GREATER THAN 6 FEET, PAYMENT FOR EACH VERTICAL FOOT OVER 6 FEET, ADD TO ITEM A1 ABOVE	10	VF		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
10	**MANHOLE REHABILITATION**				
A.	FOR INSTALLING 1" THICK HYDROGEN-SULFIDE RESISTANT CEMENTITIOUS MORTAR ON EXISTING INTERNAL MANHOLE WALLS & BENCHES, AS SPECIFIED, ANY LOCATION, COMPLETE IN PLACE.				
1)	IN EXISTING 4-FOOT-DIAMETER MANHOLES	140	VF		$0.00
2)	IN EXISTING 5-FOOT-DIAMETER MANHOLES	50	VF		$0.00
3)	IN EXISTING 6-FOOT-DIAMETER MANHOLES	170	VF		$0.00
4)	IN EXISTING 7-FOOT-DIAMETER MANHOLES	10	VF		$0.00
5)	IN EXISTING 8-FOOT-DIAMETER MANHOLES	180	VF		$0.00
6)	IN EXISTING 10-FOOT-DIAMETER MANHOLES	10	VF		$0.00
B.	FOR SUCCESSFUL VACUUM TESTING OF INDIVIDUAL MANHOLES AFTER INSTALLATION OF CEMENTITIOUS MORTAR, ANY DIAMETER	20	EA		$0.00
C.	FOR REMOVAL OF EXISTING EPOXY ON EXISTING INTERNAL MANHOLE WALLS AND BENCHES PRIOR TO INSTALLING CEMENTITIOUS MORTAR, AS SPECIFIED, ANY LOCATION, COMPLETE IN PLACE.				
1)	IN EXISTING 4-FOOT-DIAMETER MANHOLES	100	VF		$0.00
2)	IN EXISTING 5-FOOT-DIAMETER MANHOLES	20	VF		$0.00
3)	IN EXISTING 6-FOOT-DIAMETER MANHOLES	10	VF		$0.00
4)	IN EXISTING 7-FOOT-DIAMETER MANHOLES	10	VF		$0.00
5)	IN EXISTING 8-FOOT-DIAMETER MANHOLES	165	VF		$0.00
6)	IN EXISTING 10-FOOT-DIAMETER MANHOLES	15	VF		$0.00
11	**FOR REPLACING EXISTING MANHOLE FRAMES AND COVERS WITH NEW FRAMES AND COVERS, AS SPECIFIED, INCLUDING COMPLETE RESTORATION OF PAVED OR UNPAVED AREAS AS SPECIFIED, COMPLETE IN PLACE.**				
A.	MANHOLES IN PAVED AREAS				
1)	24" COVER (TYPE 1)	1	EA		$0.00
B.	MANHOLES IN UNPAVED AREAS				
1)	24" COVER (TYPE 2B)	1	EA		$0.00
2)	24" WATERTIGHT COVER (TYPE 2A)	40	EA		$0.00
3)	36" WATERTIGHT COVER (TYPE 3)	1	EA		$0.00
12	**FOR REBUILDING EXISTING MANHOLE BENCHES AND INVERT CHANNELS, ANY CONFIGURATION, INCLUDING BYPASS PUMPING, AS SPECIFIED, COMPLETE IN PLACE.**				
A.	IN EXIST 4-FOOT-DIAMETER MANHOLES	1	EA		$0.00
B.	IN EXIST 5-FOOT-DIAMETER MANHOLES	1	EA		$0.00
C.	IN EXIST 6-FOOT-DIAMETER MANHOLES	1	EA		$0.00
13	**FOR REPAIRING MANHOLE INDIVIDUAL AND PRE-CAST JOINT LEAKS, ANY LOCATION, COMPLETE IN PLACE.**	5	EA		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
14	**FOR REMOVING EXISTING FLAT-TOP AND/OR CONE AND INSTALLING NEW PRECAST CONCRETE MANHOLE RISER SECTION(S) AND/OR CONE AND/OR GRADE RING AND/OR FLAT-TOP TO THE SPECIFIED ELEVATION, VARIOUS MANHOLE DIAMETERS AS LISTED BELOW, ANY LOCATION, ANY HEIGHT OF NEW SECTIONS REQUIRED, BACKFILLING WITH GRANULAR MATERIAL OR FLOWABLE FILL UNDER PAVED SURFACES PER STANDARD DETAIL NO. 5000.01, BACKFILLING WITH EXCAVATED SOIL IN UNPAVED AREAS, REMOVAL AND DISPOSAL OF ALL EXISTING MATERIALS OFF-SITE, INCLUDING COMPLETE RESTORATION OF GRASSED AREAS (RESTORATION OF PAVED AREAS PAID UNDER SEPARATE BID ITEMS), AS SPECIFIED AND IN ACCORDANCE WITH THE DETAILS, COMPLETE IN PLACE.**				
A.	EXISTING 4-FOOT-DIAMETER MANHOLES				
1)	REMOVE EXISTING FLAT-TOP AND/OR CONE AND INSTALL NEW 4-FOOT-DIAMETER RISER SECTIONS TO THE SPECIFIED OR REQUIRED ELEVATION, PAYMENT FOR EACH VERTICAL FOOT OF NEW PRECAST RISER INSTALLED	5	VF		$0.00
2)	INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A) WHEN INSTALLING A RISER SECTION IN 14.A.1	1	EA		$0.00
3)	REMOVE EXISTING FLAT-TOP ONLY (NO RISER SECTIONS) AND INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
4)	REMOVE EXISTING FLAT-TOP AND INSTALL 4-FOOT-LONG CONE SECTION WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
B.	EXISTING 5-FOOT-DIAMETER MANHOLES				
1)	REMOVE EXISTING FLAT-TOP AND/OR CONE AND INSTALL NEW 5-FOOT-DIAMETER RISER SECTIONS TO THE SPECIFIED OR REQUIRED ELEVATION, PAYMENT FOR EACH VERTICAL FOOT OF NEW PRECAST RISER INSTALLED	15	VF		$0.00
2)	INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A) WHEN INSTALLING A RISER SECTION IN 14.B.1	3	EA		$0.00
3)	REMOVE EXISTING FLAT-TOP ONLY (NO RISER SECTIONS) AND INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
4)	REMOVE EXISTING FLAT-TOP AND INSTALL 4-FOOT-LONG CONE SECTION WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
C.	EXISTING 6-FOOT-DIAMETER MANHOLES				
1)	REMOVE EXISTING FLAT-TOP AND/OR CONE AND INSTALL NEW 6-FOOT-DIAMETER RISER SECTIONS TO THE SPECIFIED OR REQUIRED ELEVATION, PAYMENT FOR EACH VERTICAL FOOT OF NEW PRECAST RISER INSTALLED	50	VF		$0.00
2)	INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A) WHEN INSTALLING A RISER SECTION IN 14.C.1	12	EA		$0.00
3)	INSTALL FLAT-TOP WITH A 36" WATERTIGHT COVER (TYPE 3) WHEN INSTALLING A RISER SECTION IN 14.C.1	1	EA		$0.00
4)	REMOVE EXISTING FLAT-TOP ONLY (NO RISER SECTIONS) AND INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A)	15	EA		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
D.	EXISTING 7-FOOT-DIAMETER MANHOLES				
1)	REMOVE EXISTING FLAT-TOP AND/OR CONE AND INSTALL NEW 7-FOOT-DIAMETER RISER SECTIONS TO THE SPECIFIED OR REQUIRED ELEVATION, PAYMENT FOR EACH VERTICAL FOOT OF NEW PRECAST RISER INSTALLED	5	VF		$0.00
2)	INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A) WHEN INSTALLING A RISER SECTION IN 14.D.1	1	EA		$0.00
3)	REMOVE EXISTING FLAT-TOP ONLY (NO RISER SECTIONS) AND INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
E.	EXISTING 8-FOOT-DIAMETER MANHOLES				
1)	REMOVE EXISTING FLAT-TOP AND/OR CONE AND INSTALL NEW 8-FOOT-DIAMETER RISER SECTIONS TO THE SPECIFIED OR REQUIRED ELEVATION, PAYMENT FOR EACH VERTICAL FOOT OF NEW PRECAST RISER INSTALLED	5	VF		$0.00
2)	INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A) WHEN INSTALLING A RISER SECTION IN 14.E.1	1	EA		$0.00
3)	REMOVE EXISTING FLAT-TOP ONLY (NO RISER SECTIONS) AND INSTALL FLAT-TOP WITH A 24" WATERTIGHT COVER (TYPE 2A)	1	EA		$0.00
F.	INSTALL 24" INSIDE DIAMETER CONCRETE GRADE RINGS				
1)	4 INCHES IN HEIGHT	2	EA		$0.00
2)	6 INCHES IN HEIGHT	2	EA		$0.00
15	**FOR 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.**	10	EA		$0.00
16	**FOR INSTALLING CURED-IN-PLACE PIPE LINING, AS SPECIFIED, REQUIRED INSTALLED LINER THICKNESS FOR STEAM (LESS THAN 18" ONLY) OR WATER CURED FOR STANDARD FELT LINER OR REQUIRED INSTALLED LINER THICKNESS FOR SEWER DEPTH RANGES FOR UV CURED GRP LINER AS SPECIFIED BELOW, LINER THICKNESS FOR UV CURED GRP LINER TO BE SUBMITTED BY CONTRACTOR, ANY LOCATION, COMPLETE IN PLACE.**				
A.	8" DIAMETER SEWER (PRICE FOR WATER, STEAM, OR UV CURED)				
1)	6.0 mm CIPP FOR WATER/STEAM; 0' TO 20' DEPTH FOR UV	6,900	LF		$0.00
2)	7.5 mm CIPP FOR WATER/STEAM; 20' TO 28' DEPTH FOR UV	300	LF		$0.00
B.	10" DIAMETER SEWER (PRICE FOR WATER, STEAM, OR UV CURED)				
1)	6.0 mm CIPP FOR WATER/STEAM; 0' TO 14' DEPTH FOR UV	100	LF		$0.00
2)	7.5 mm CIPP FOR WATER/STEAM; 14' TO 25' DEPTH FOR UV	100	LF		$0.00
C.	12" DIAMETER SEWER (PRICE FOR WATER, STEAM, OR UV CURED)				
1)	7.5 mm CIPP FOR WATER/STEAM; 0' TO 16' DEPTH FOR UV	400	LF		$0.00
2)	9.0 mm CIPP FOR WATER/STEAM; 16' TO 24' DEPTH FOR UV	100	LF		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
D.	14" DIAMETER SEWER (PRICE FOR WATER, STEAM, OR UV CURED)				
1)	7.5 mm CIPP FOR WATER/STEAM; 0' TO 13' DEPTH FOR UV	100	LF		$0.00
2)	9.0 mm CIPP FOR WATER/STEAM; 13' TO 20' DEPTH FOR UV	100	LF		$0.00
3)	10.5 mm CIPP FOR WATER/STEAM; 20' TO 28' DEPTH FOR UV	50	LF		$0.00
E.	15"/16" DIAMETER SEWER (PRICE FOR WATER, STEAM, OR UV CURED)				
1)	7.5 mm CIPP FOR WATER/STEAM; 0' TO 10' DEPTH FOR UV	100	LF		$0.00
2)	9.0 mm CIPP FOR WATER/STEAM; 10' TO 16' DEPTH FOR UV	100	LF		$0.00
3)	10.5 mm CIPP FOR WATER/STEAM; 16' TO 24' DEPTH FOR UV	50	LF		$0.00
F.	24" DIAMETER SEWER (PRICE FOR WATER OR UV CURED)				
1)	9.0 mm CIPP FOR WATER; 0' TO 10' DEPTH FOR UV - SPECIFIC INSTALLATION - SEE SHEET C-6 OF PLANS	500	LF		$0.00
2)	12.0 mm CIPP FOR WATER; 0' TO 10' DEPTH FOR UV	625	LF		$0.00
3)	13.5 mm CIPP FOR WATER; 10' TO 13' DEPTH FOR UV	325	LF		$0.00
G.	30" DIAMETER SEWER (PRICE FOR WATER OR UV CURED)				
1)	15.0 mm CIPP FOR WATER; 0' TO 10' DEPTH FOR UV	5,750	LF		$0.00
2)	16.5 mm CIPP FOR WATER; 10' TO 12' DEPTH FOR UV	1,400	LF		$0.00
3)	18.0 mm CIPP FOR WATER; 12' TO 14' DEPTH FOR UV	100	LF		$0.00
4)	19.5 mm CIPP FOR WATER; 14' TO 17' DEPTH FOR UV	400	LF		$0.00
17	**FOR INSTALLING FIBERGLASS REINFORCED FELT LINER OR UV GRP CURED-IN-PLACE PIPE LINING, AS SPECIFIED, REQUIRED INSTALLED LINER THICKNESS FOR FIBERGLASS REINFORCED FELT LINER OR EQUIVALENT INSTALLED LINER THICKNESS FOR UV CURED GRP AS SPECIFIED BELOW, LINER THICKNESS FOR UV CURED GRP TO BE SUBMITTED BY CONTRACTOR, ANY LOCATION, COMPLETE IN PLACE.**				
A.	48" DIAMETER SEWER (PRICE FOR FIBERGLASS REINFORCED FELT LINER OR UV CURED GRP LINER)				
1)	16.5 mm FIBERGLASS REINFORCED LINER OR UV CURED GRP EQUIVALENT	3,100	LF		$0.00
2)	18.0 mm FIBERGLASS REINFORCED LINER OR UV CURED GRP EQUIVALENT	2,800	LF		$0.00
3)	19.5 mm FIBERGLASS REINFORCED LINER OR UV CURED GRP EQUIVALENT	900	LF		$0.00
4)	21.0 mm FIBERGLASS REINFORCED LINER OR UV CURED GRP EQUIVALENT	200	LF		$0.00
5)	23.5 mm FIBERGLASS REINFORCED LINER OR UV CURED GRP EQUIVALENT	500	LF		$0.00
18	**FOR INSTALLING UV CURED GRP CURED-IN-PLACE PIPE LINING, AS SPECIFIED, MINIMUM INSTALLED LINER THICKNESS AS SPECIFIED BELOW, LINER THICKNESS FOR UV CURED GRP TO BE SUBMITTED BY CONTRACTOR, ANY LOCATION, COMPLETE IN PLACE.**				
A.	36" DIAMETER SEWER (PRICE FOR UV CURED GRP LINER)				
1)	11.0 mm CIPP	50	LF		$0.00
B.	42" DIAMETER SEWER (PRICE FOR UV CURED GRP LINER)				
1)	11.0 mm CIPP	50	LF		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
C.	54" DIAMETER SEWER (PRICE FOR UV CURED GRP LINER)				
1)	14.0 mm CIPP	825	LF		$0.00
2)	15.0 mm CIPP	1,950	LF		$0.00
19	**CIPP PRODUCT TESTS**	35	EA		$0.00
20	**FOR RECONNECTING EXISTING ACTIVE SERVICE LATERALS TO NEW CURED-IN-PLACE PIPE LINING VIA AN INTERNAL REMOTE CUTTER, AS SPECIFIED, COMPLETE IN PLACE.**	50	EA		$0.00
21	**FOR PERFORMING BYPASS PUMPING AT BLACK CREEK 24"/30", CRABTREE CREEK, AND BLACK CREEK 54", LUMP SUM PAYMENT WILL BE MADE ONCE FOR EACH AREA, PAYMENT WILL BE MADE AFTER THE FIRST BY-PASS IS SET UP AND COMPLETELY FUNCTIONAL IN EACH AREA, ALL OTHER BYPASS PUMPING TO BE CONSIDERED INCIDENTAL TO THE WORK WITH COSTS INCLUDED IN OTHER BID ITEMS**				
A.	BLACK CREEK 24"/30"	1	LS		$0.00
B.	CRABTREE CREEK	1	LS		$0.00
C.	BLACK CREEK 54"	1	LS		$0.00
22	**FOR TREE REMOVAL AND CLEARING OF EASEMENTS AS APPROVED BY THE ENGINEER.**				
A.	TREE REMOVAL (INDIVIDUAL TREES)				
1)	6" TO 18" DIAMETER TREE	10	EA		$0.00
2)	OVER 18" DIAMETER TREE	5	EA		$0.00
B.	EASEMENT CLEARING				
1)	MOBILIZATION TO SITE	3	EA		$0.00
2)	EASEMENT CLEARING PER SQUARE YARD	5,000	SY		$0.00
23	**FOR PERFORMING MISCELLANEOUS RESTORATION WORK AS DEFINED BELOW, AS SPECIFIED, COMPLETE IN PLACE, EXCEPT RESTORATION OF GRASSED AREAS VIA SEEDING AND MULCHING WHICH IS CONSIDERED INCIDENTAL TO THE WORK WITH COSTS INCLUDED IN THE OTHER BID ITEMS AND EXCEPT FOR PAVEMENT RESTORATION WHERE SUCH RESTORATION IS SPECIFICALLY INCLUDED IN OTHER BID ITEMS**				
A.	SAWCUT, REMOVE AND REPLACE ASPHALT PAVEMENT (ANY THICKNESS), ASPHALT AS SPECIFIED IN THE STANDARD SPECIFICATIONS AND DETAILS	50	SY		$0.00
B.	SAWCUT, REMOVE AND REPLACE CONCRETE WALKS AND DRIVES (CONCRETE AS SPECIFIED)				
1)	4-INCH FIBER REINFORCED CONCRETE	10	SY		$0.00
2)	5-INCH FIBER REINFORCED CONCRETE	10	SY		$0.00
3)	6-INCH FIBER REINFORCED CONCRETE	10	SY		$0.00
C.	SAWCUT, REMOVE AND REPLACE CONCRETE CURBS AND GUTTERS, (FIBER REINFORCED CONCRETE), PER LINEAR FOOT OF REPLACEMENT	50	LF		$0.00
D.	REMOVE UNSUITABLE EXCAVATED SOIL AND DISPOSE OF OFFSITE, AND BACKFILL WITH IMPORTED SELECT FILL, ADD TO VARIOUS BID ITEMS WHERE THIS IS REQUIRED AS APPROVED BY THE ENGINEER, COST PER CUBIC YARD OF COMPACTED SELECT FILL INSTALLED	50	CY		$0.00
E.	REMOVE EXCAVATED SOIL AND DISPOSE OF OFFSITE, AND BACKFILL WITH IMPORTED GRANULAR MATERIAL UNDER PAVED ROADS, ADD TO VARIOUS BID ITEMS WHERE THIS REQUIREMENT APPLIES, COST PER CUBIC YARD OF GRANULAR MATERIAL INSTALLED	100	CY		$0.00
F.	INSTALL SOD FOR GRASS RESTORATION, COST PER SQUARE YARD OF INSTALLED SOD	10	SY		$0.00

_____Initial

_____Date

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
G.	INSTALL STONE FOR RESTORING GRAVEL AREAS, COST PER CUBIC YARD OF PLACED STONE	10	CY		$0.00
H.	INSTALL CLASS B RIP-RAP TO STABILIZE STREAM BANKS, COST PER SQUARE YARD OF RIP-RAP PLACED BASED ON THE SPECIFIED 1.5-FOOT-THICK RIP-RAP	50	SY		$0.00
24	**FOR INSTALLATION AND REMOVAL OF STANDARD TEMPORARY STREAM CROSSINGS AS APPROVED BY THE ENGINEER, AS SPECIFIED, COMPLETE IN PLACE.**				
A.	PER DETAIL 04000.11 (1 OF 3)				
1)	INCLUDING FOUR CULVERTS 48" IN DIAMETER (SEE SHEET C-1)	1	LS		$0.00
2)	INCLUDING THREE CULVERTS 60" IN DIAMETER (SEE SHEET C-1)	1	LS		$0.00
3)	INCLUDING TWO CULVERTS 36" IN DIAMETER (SEE SHEET C-4)	1	LS		$0.00
25	**FOR THE WORK DESCRIBED IN STEPS 1 THROUGH 6 ON SHEET C-6, WORK DESCRIBED IN STEP 7 ON SHEET C-6 PAID UNDER OTHER BID ITEMS, AS SPECIFIED, COMPLETE IN PLACE.**				
A.	FOR THE WORK ON STEP 1 ON SHEET C-6, INSTALLATION OF DOGHOUSE MANHOLE, AS SPECIFIED, COMPLETE IN PLACE.	1	LS		$0.00
B.	FOR THE WORK AT MH-SP76518076 DESCRIBED ON STEPS 2 THROUGH 6 ON SHEET C-6, AS SPECIFIED, COMPLETE IN PLACE.	1	LS		$0.00
26	**FOR THE WORK AT MH-SP75511023 DESCRIBED IN NOTES 1 THROUGH 3 ON DETAIL D ON SHEET D-4, WORK DESCRIBED IN NOTES 4 AND 5 ON DETAIL D ON SHEET D-4 PAID UNDER OTHER BID ITEMS, AS SPECIFIED, COMPLETE IN PLACE.**	1	LS		$0.00
27	**FOR REPLACING APPROXIMATELY 35 FEET OF EXISTING DUCTILE IRON PIPE AERIAL CROSSING WITH NEW STEEL PIPE BETWEEN MH-SP76514015 AND MH-SP76514005 AS SHOWN ON DETAIL 07000.18 ON SHEET D-3, AS SPECIFIED, COMPLETE IN PLACE.**	1	LS		$0.00
	SUBTOTAL (ITEMS 1-27)				$0.00
28	**FOR MOBILIZATION TO THE PROJECT SITE, AS SPECIFIED (2% OF SUBTOTAL)**	1	LS		$0.00
	TOTAL (ITEMS 1-28)				$0.00

TOTAL (IN WORDS) _____

_____

_____Initial

_____Date

Bidder_____
(Print)

NOTE: PROPOSAL SIGNATURE REQUIRED ON PAGE 00300-16**.** ALL PROPOSALS MUST BE PROPERLY EXECUTED TO BE CONSIDERED A VALID BID.

CERTIFIED LIST OF MAJOR SUBCONTRACTORS

[

The Bidder, as part of the procedure for the submission of Bids on the Project, submits the following list of Major Subcontractors to be used in the performance of work to be done on said Project. Changes to this list after the Bid opening shall only be as approved by the Owner upon request by the Bidder or as required by the Owner based upon review of Bidder's submittals:

SUBCONTRACTOR (List Type of Work)	SUBCONTRACTOR'S NAME AND ADDRESS
Manhole Rehabilitation:	
By-Pass Pumping:	
Excavation/Point Repairs:	
CIPP:	

It is understood and agreed that, if awarded a Contract, the Bidder shall not make any additions, deletions or substitutions to this certified list without the consent of the Owner.

CERTIFICATION AFFIDAVIT

THE ABOVE INFORMATION IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER UNDERSTAND AND AGREE THAT, IF AWARDED A CONTRACT, THIS CERTIFICATION SHALL BE ATTACHED THERETO AND BECOME A PART THEREOF.

_____
[If Bidder is not an individual, enter entity name here]

By: _____
(Signature)

NAME OF SIGNER: _____
(Please Print or Type)

TITLE OF SIGNER:_____
(Please Print or Type)

DATE: _____

BID SECURITY:

Accompanying this Proposal is a (1)_____ in the amount of (2)_____ Dollars ($_____).

NOTE: (1) Insert the words “bank draft,” “certified check,” “bid bond”, or “cashiers check”, as the case may be.

(2) Amount must be equal to at least five percent (5%) of the total Bid.

BIDDER’S LICENSE:

The Bidder certifies that (he/she/it) is licensed as a Bidder under the specific North Carolina state law regulating his/her/its particular trade and that the number of the license under which he/she/it now operates is_____.

BIDDER’S CERTIFICATION AS TO ORGANIZATION AND AUTHORITY:

The Bidder certifies that the Affidavit of Organization and Authority, like the other documents attached hereto, form an integral part of the Proposal, and the Bidder acknowledges that the Owner will rely on the information provided therein in reviewing the Proposal and awarding a Contract.

LIQUIDATED DAMAGES:

The Bidder agrees, further, that the Owner may retain those amounts indicated in the Contract from the amount of compensation due the Bidder, under the terms of the Contract, for each and every day that the work remains incomplete and/or unsatisfactory beyond the completion date(s) specified in the Notice to Proceed. This amount is agreed upon as the proper measure of liquidated damages the Owner will sustain, per day, by the failure of the Bidder to complete the work within the stipulated time, and it is not to be construed in any sense as a penalty.

The Bidder shall not have or bring a claim against the Owner, or raise as a defense against the imposition of liquidated damages, other construction purportedly impeding Bidder’s progress or timely project completion.

(SIGNATURE PAGE)

Dated _____, 20___.

_____ (SEAL)
Bidder—Legal Entity

By: _____ (SEAL)
(SIGN HERE)

SEAL-if corporation

_____
Printed Name

_____

_____
Address

(___) _____
Telephone No.

Subscribed and sworn to before me this ___ day of _____, 20___

_____
Notary Public

My Commission Expires:

_____

BID BOND

This is a Bid Bond that is subject to the provisions of Article 3 of Chapter 44A of the North Carolina General statutes.

This Bid Bond is executed on _____, 20__.

The name of the PRINCIPAL is _____ (1)

_____ (2)

The name of the SURETY is _____

_____

The TOWN OF CARY, NORTH CAROLINA is the OWNER.

The amount of the Bond is _____

_____ (Dollars) ($_____)

KNOW BY ALL MEN BY THESE PRESENTS, the Principal and Surety above named are hereby held and firmly bound unto the above named OWNER hereinafter called the OWNER in the penal sum of the amount stated above in lawful money of the United States, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain Bid Proposal, attached hereto and hereby made a part hereof to enter into a Contract in writing, for the construction of:

_____

_____

NOW, THEREFORE

(a) If said Bid Proposal shall be rejected; or in the alternate,

(b) If said Bid Proposal shall be accepted and the Principal shall execute and deliver a Contract in the form of Contract attached hereto (properly completed in accordance with said Bid Proposal) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid Proposal, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bid Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid Proposal; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

ATTEST:

_____
(Principal) Secretary
(SEAL)

_____
Principal

BY: _____ (3)

_____
(Address)

_____
Witness as to Principal

_____
(Address)

ATTEST:

_____
Surety

_____
N. C. Resident Agent
(SEAL)

By: _____

_____(4)
(Name)

_____
(Address)

_____
(Phone Number)

_____
Witness as to Surety

_____
(Address)

(1) Insert the correct name of Principal.
(2) Insert whether the Principal is a corporation, a partnership, a limited liability company or an individual.
(3) If Principal is a partnership, all partners should execute the Bid Bond. If Bidder is a limited liability company, all managers (or all members, if the company is member-managed) should execute the Bond.
(4) Provide contact name, address and phone number for bid bond surety.

POWER OF ATTORNEY
(Attach)

BIDDER'S CERTIFICATES
AFFIDAVIT OF ORGANIZATION AND AUTHORITY
SWORN STATEMENT

STATE OF _____)

COUNTY OF _____)

_____ being first duly sworn on oath deposes and says that the Bidder on the attached Bid Proposal is organized as indicated below and that all statements herein made are made on behalf of such Bidder and that this deponent is authorized to make them.

(Fill Out Applicable Paragraph)

CORPORATION:

The Bidder is a corporation organized and existing under the laws of the State of _____, it operates under the legal name of _____, and the full names of its officers are as follows:

President _____
Secretary _____
Treasurer _____

and it does _____ have a corporate seal. The _____ is/are authorized to sign construction proposals and contracts for the company by action of its Board of Directors taken _____, a certified copy of which is hereto attached. (Strike out this last phrase if not applicable.)

PARTNERSHIP:

The Bidder is a [limited/general] partnership consisting of individual/corporate partners as follows:

General Partners	Limited Partners

The partnership does business under the name of :_____

LIMITED LIABILITY COMPANY:

The bidder is a [member-managed/manager-managed] limited liability company consisting of the following individual/corporate members/managers:

Managers	Members

INDIVIDUAL:

The Bidder is an individual whose full name is:

_____

and if operating under a trade name, said trade name is as follows:

_____

The business address of the Bidder is: _____

_____

_____

Its phone number is: _____

The contact person for this Proposal is: _____

_____

Bidder

By: _____

Subscribed and sworn to before me this _____ day of _____, 20__.

_____ _____

Notary Public County

My Commission Expires:

_____

EQUAL EMPLOYMENT OPPORTUNITY ADDENDUM ("ADDENDUM")

During the performance of the Contract the Bidder agrees as follows:

a. The Bidder shall not discriminate against any employee or applicant because of race, color, religion, sex, or national origin. The Bidder shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause.

b. The Bidder shall, in all solicitations or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

c. The Bidder shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract understanding, a notice, to be provided, advising the labor union or worker's representative of the Bidder's commitments under the Equal Employment Opportunity Section of the Contract, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. In the event of the Bidder's noncompliance with the nondiscrimination clauses of the Contract or with any of such rules, regulations, or orders, the Contract may be canceled, terminated, or suspended in whole or in part and the Bidder may be declared ineligible for further OWNER contracts.

e. The Bidder will include the provisions of this Addendum in every subcontract or purchase order unless exempted by rules, regulations, or orders of the OWNER so that such provisions will be binding upon each Subcontractor or vendor.

(Use the following form for execution by a CORPORATION):

_____
Corporate Name

ATTEST:

_____ BY:_____
(Assistant) Secretary (Vice) President

(CORPORATE SEAL)

(Use the following form for execution by a PARTNERSHIP):

_____(SEAL)
Partnership Name

BY: _____(SEAL)
General Partner

(Use the following form for execution by a LIMITED LIABILITY COMPANY):

_____(SEAL)
Company Name

BY:_____(SEAL)
Manager/Member

(Use the following form for execution by an INDIVIDUAL):

BY:_____(SEAL)

WITNESS:

_____

Subscribed and sworn to before me this _____ day of _____, 20__.

_____ _____
Notary Public County

My Commission Expires:

_____

QUALIFICATIONS OF BIDDERS

In order to assist the Owner in determining whether the Bidder is qualified to perform the Work, as set forth in the Contract Documents, the Bidder shall furnish the following information.

1. List of references who are qualified to judge as to his financial responsibility and his experience in work of similar nature to that bid upon:

2. List of previous contracting experience, including dollar values of contracts:

3. List of facilities or equipment that is available for use:

4. Name, residence, and title of the individual who will give personal attention to the work:

5. Financial Statement:

ASSETS

CURRENT ASSETS:

Cash	$_____	
Notes and Accounts Receivable	_____	
Inventories	_____	
PLANT ASSETS:		
Real Estate	$_____	
Machinery	_____	
Good Will, Patents, etc.	_____	$ _____ Total Assets

LIABILITIES:

Notes Payable	$_____	
Accounts Payable	_____	
Accrued Wages	_____	
Other Liabilities	_____	$ _____ Total Liabilities
	EXCESS OF ASSETS OR NET WORTH	$ _____

6. List all Claims, prior and pending, against the Bidder by the Town of Cary, including the resolution of such Claims, if any:

Claim	Date of Claim	Resolution, if any

The existence of unresolved claims against Bidder may disqualify the Bidder from making a Bid Proposal and entering into a Contract with the Town of Cary.

Notes:

A. The above is a suggested form for the Financial Statement, but the Bidder is not required to follow the form explicitly. The Financial Statement submitted must clearly show to the satisfaction of the Owner the Bidder's current financial condition. The Owner reserves the privilege of requiring additional information as to financial responsibility of the Bidder prior to awarding Contract.

B. Bidder shall attach additional pages, if necessary, in order to complete the required information.

C. The Bidder shall submit detailed information required for above Items 1 through 4 with his Bid Proposal package. The information required under Items 5 and 6 may be furnished after Bid Proposals are received if required by the Owner and Engineer to evaluate the qualifications of a prospective Bidder.

NON-COLLUSIVE AFFIDAVIT

State of _____)
) ss.
County of _____)

_____being first duly sworn, deposes and says that:

(1) He/she is the _____
(Owner, Partner, Officer, Representative or Agent)
of _____, the BIDDER that has submitted the attached BID PROPOSAL;

(2) He is fully informed respecting the preparation and contents of the attached BID PROPOSAL and of all pertinent circumstances respecting such BID PROPOSAL;

(3) Such BID PROPOSAL is genuine and is not a collusive or sham BID PROPOSAL;

(4) Neither the said BIDDER nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other BIDDER, firm, or person to submit a collusive or sham BID PROPOSAL in connection with the Contract for which the attached BID PROPOSAL has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any BIDDER, firm, or person to fix the price or prices in the attached BID PROPOSAL or of any other BIDDER, or to fix any overhead, profit, or cost elements of the BID PROPOSAL price or the BID PROPOSAL price of any other BIDDER, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against The Town of Cary, or any person interested in the proposed Contract;

(5) The price or prices quoted in the attached BID are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the BIDDER or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

_____
BIDDER

BY _____

ITS _____
(Title)

Subscribed and sworn to before me this _____ day of _____, 20__.

_____ _____
Notary Public County

My commission expires _____

END OF AFFIDAVIT

NONDISCRIMINATION CLAUSE

It is specifically agreed as part of the consideration of the signing of this Bid Proposal, and the resulting execution of a Contract, that the parties hereto, their agents, officials, employees or servants shall not discriminate in any manner on the basis of age, handicap, race, color, creed, or national origin with reference to the subject matter of the Contract, no matter how remote.

This provision, being incorporated for the benefit of the Town of Cary and its residents, may be enforced as set out in the ordinances of the Town of Cary, enforcement of this provision shall be by action for specific performance, injunctive relief, or other remedy as by law provided.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of the Contract.

(Use the following form for signatures by a CORPORATION):

_____
Corporate Name

ATTEST:

BY: _____

_____ (Assistant) Secretary

_____ (Vice) President

_____ (Printed Name)

_____ (Printed Name)

(Corporate Seal)

(Use the following form for signatures by a PARTNERSHIP):

_____ WITNESS

_____ (SEAL)
Partnership Name

_____ (Printed Name)

BY: _____ (SEAL)
General Partner

(Use the following form for signatures by a LIMITED LIABILITY COMPANY):

_____	_____(SEAL)
WITNESS	Company Name
_____	BY:_____(SEAL)
(Printed Name)	Manager/Member

(Use the following form for signatures by an INDIVIDUAL):

_____(SEAL)

_____
(Printed Name)

_____
WITNESS

_____
(Printed Name)

Subscribed and sworn to before me this _____ day of _____, 20__.

_____	_____
Notary Public	County

My Commission Expires:

_____

NOTICE OF AWARD

TO: CONTRACTOR/BIDDER: _____

ADDRESS: _____

_____

FROM: _____
_____
_____

OWNER: Town of Cary
Cary, North Carolina

PROJECT: _____
_____

You are hereby notified that the Owner has considered the Bid Proposal submitted by you for the above-described project in response to its Notice to Bidders dated _____.

It appears that it is to the best interest of said Owner to accept your Bid Proposal in the amount of: _____ Dollars ($_____). You are therefore hereby notified that your Bid Proposal has been accepted.

The Bidder is required by as a condition of its Award of the Contract to execute and deliver the formal Contract with the Owner and to furnish the required Bidder's Performance and Payment Bonds within ten(10) business days from the date of the delivery of this Notice to you.

If you fail to execute said Contract and to furnish said Bonds within ten (10) business days from the date of delivery of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid Proposal as abandoned and to award the work covered by your Bid Proposal to another bidder, or to readvertise the work or otherwise dispose thereof as the Owner may see fit.

Dated this _____day of _____, 20____.

Town of Cary, North Carolina

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged this _____day of _____, 20_____.

_____
Bidder

By: _____

Title: _____

- END OF SECTION -

Section 00350 - PAY ITEM DESCRIPTIONS

PAY ITEM DESCRIPTION: 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 by the Engineer.

If there is any conflict or inconsistency between the provisions of these PAY ITEM DESCRIPTIONS and any other Specification Section, the provisions of these PAY ITEM DESCRIPTIONS shall prevail.

The Bid includes the following abbreviations:

- LF = linear foot
- VF = vertical foot
- EA = each
- CY = cubic yard
- SY = square yard
- HR = hour
- ACRE = acre
- LS = lump sum

Item 1 - 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 8" through 54" sewers to further evaluate the condition of the sewers as specified. The cleaning and CCTV inspections will be used to identify defects in need of repair and as pre-CIPP installation work. Costs shall include any and all debris encountered in the work regardless of severity and disposing of all debris except as noted below. Costs shall also include submittals of the digital inspections to the Engineer as specified. Further, costs shall include any and all costs associated with accessing the sewers and manholes to perform the work as specified including clearing sewer easements, building access roads, negotiating with property owners, traffic control, complete restoration of areas disturbed by the work, etc. This item includes working in any location. Bid Items are included for cleaning and televising existing 8", 10", 12", 15"/16", 24", 30", 36", 42", 48", and 54" sewers.

The 24" and 30" Black Creek Interceptor was cleaned and televised in 2019/2020 and it is anticipated that there is currently minimal debris. For this area only, there are separate bid items for light and heavy cleaning. Light cleaning is defined as two or less passes with the cleaning jet. Heavy cleaning is defined as three or more passes with the cleaning jet and/or use of mechanical devices such as buckets, root cutters, or power rodders. Payment will not be made for any heavy cleaning unless approved by the Engineer prior to performing the work.

Sewer cleaning and television inspection will be measured and paid for 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 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.

Item 2 - Point Repairs to Existing Sewers: This item includes all materials, equipment, and work required to perform point repairs to existing sewers. Bid Items are included for existing 8", 10", and 12" sewers at various depths. Bid Items are included for a lump sum payment for performing point repairs up to 12 feet in length and payment per linear foot for each foot over 12 feet. When a point repair exceeds 12 feet in length, the Contractor shall be paid for the first 12 feet of the point repair under the lump sum Bid Item and then on a linear foot basis for each foot over 12 feet. The work shall be performed as specified and in accordance with the specifications and details.

The base bid includes using PVC pipe for the repair. If ductile iron pipe is required, the add on cost will be paid using Bid Item 2D. In addition, Bid Item 2D shall be used for substituting ductile iron pipe for any pipe within this contract.

The base bid items include backfilling with the excavated soil. If the excavated soil is not suitable for backfilling or granular material or flowable fill is required for backfilling the trench, payment for removing and disposing of the excavated material offsite and importing the specified material will be paid under a separate bid item.

The base bid items include all required restoration of grassed areas disturbed by the work. Restoration of asphalt pavement, concrete, curbs and gutters, sod and graveled areas shall be paid separately under other bid items.

Bid Item 2E is included for installing ductile iron tees within point repair segments for various pipe diameters at any depth and installing 6 feet of PVC or DIP lateral.

Bid Item 2F is included for replacing existing storm sewer as necessary with new RCP storm sewer that may be encountered/damaged during point repairs or other excavations. Payment will not be made for any storm sewer replacement unless approved by the Engineer prior to performing the repair.

These items further include payment for saw-cutting existing asphalt or concrete (any thickness) and disposing of material, excavation, removal and off-site disposal of existing soil and sewer pipe, installation of new sewer, connections to existing manholes and sewers, bedding, backfilling, compaction, compaction testing by a licensed geotechnical engineer where required, bypass sewage pumping during construction, accessing sewers and manholes as specified, traffic control, compliance with required working hours, coordination with and location of existing utilities, erosion control, and all else incidental thereto for which separate payment is not provided under other Bid Items. This item also includes television inspection after the point repairs are completed to confirm proper installation.

Payment will be made for each point repair at the installed depth. Payment will be made on the basis of the unit price bid.

Payment will not be made for any length outside of the required point repair length as defined by the Engineer unless approved by the Engineer prior to performing the point repair. In addition, no payment will be made for additional repairs located outside of the defined length that are required as a result of the Contractor's work on the defined point repair.

Item 3 - Cleanout Installation: This item includes all materials, equipment, and work required to install cleanouts on existing 4" and 6" PVC service laterals up to 8 feet in depth. The cleanout shall be in accordance with the Standard Specifications and Details. This item includes installing a new cleanout as a stand-alone repair/installation to either replace an existing cleanout or to install a new cleanout where one does not currently exist. The cleanout shall be considered to begin at the wye fitting on the service lateral pipe and shall include the wye, all of the piping/fittings, and cleanout cap required to make up the cleanout and shall include connecting to the existing lateral pipe behind the cleanout with the specified coupling. The cleanout price for a stand-alone cleanout installation shall also include any new service lateral piping as necessary upstream and downstream of the wye fitting to connect the new cleanout to the existing service lateral, including installing the specified couplings on both ends as necessary – use a push on fitting if at all possible on existing PVC laterals.

Item 4 - Cleanout Removal: This item includes all materials, equipment, and work required to remove existing cleanouts on existing 4" and 6" PVC service laterals up to 8 feet in depth. Removal shall include the wye, standpipe, cleanout cap, and all else incidental. New PVC pipe shall be spliced in where the wye/standpipe was previously located on the service lateral and shall include any new service lateral piping necessary upstream and downstream of the wye fitting to connect to the existing service lateral, including installing the specified couplings on both ends as necessary – use a push on fitting if at all possible on existing PVC laterals.

Item 5 - Installation of New Precast Concrete Manholes: This item includes all materials, equipment, and work required to install new 4-foot and 5-foot-diameter precast concrete manholes with various covers as specified. The Bid includes a bid item for installation of manholes up to 6 feet deep as a lump sum payment and an add-on bid item

for each vertical foot of manhole over 6 feet installed. When a manhole exceeds 6 feet in vertical length, the Contractor shall be paid for the first 6 feet of the manhole under the lump sum Bid Item and then on a vertical foot basis for each foot over 6 feet. A bid item is also included for a lump sum payment to install a flat-top instead of a cone section.

This item includes payment for sawcutting existing asphalt or concrete (any thickness) and disposing of material, excavation, removal and off-site disposal of existing soil, sewer pipe and manhole (when replacing existing manholes or junction boxes), complete installation of new manhole including solid or watertight frame and cover, bedding, backfilling with excavated soil and compaction, compaction testing by a licensed geotechnical engineer where required, installing concrete benching and forming invert channel, surveying services as required, bypass sewage pumping during construction, accessing sewers and manholes as specified, traffic control, compliance with required working hours, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas including pavement (paid under the add-on bid item), and all else incidental thereto for which separate payment is not provided under other bid items.

A Bid Item is included for connecting existing sewers and laterals to new manholes with a minimum of 10 feet of new ductile iron pipe for each connecting sewer and connecting the new ductile iron pipe to the existing sewer with a rubber sleeve coupling with stainless steel compression bands and shear rings (Mission ARC, Fernco Strongback, or approved equal). If more than 10 feet of new ductile iron pipe is required, the additional footage over 12 feet in a point repair from Bid Item 2 and the add on cost for ductile iron pipe in Bid Item 2D shall be used.

The bid items for new manholes include backfilling with the excavated soil. If the excavated soil is not suitable for backfilling or granular material or flowable fill is required for backfilling the trench, payment for removing and disposing of the excavated material offsite and importing the specified material will be paid under a separate bid item.

Payment will be made for each manhole installed based on the unit price bid.

Item 6 - Installing New Vent Pipes at Manholes: This item includes all materials, equipment, and work required to install new 6" vent pipes at existing manholes as specified. The required vent elevation will be provided by the Engineer.

This item includes payment for furnishing and installing vent pipes in accordance with the standards and details to the height specified by the Engineer, installing new vent pipes on existing manholes by core-drilling the manhole (if precast) or removing manhole material (if brick or block) and installing the vent pipe per the specifications and details, accessing manholes as specified, coordination with and location of existing utilities, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made for each new vent pipe installed up to 8 vertical feet and then per vertical foot greater than 8 vertical feet installed measured from the bottom of the vent pipe to the vent pipe opening at the unit price bid.

Item 7 - Installing New Vent Pipes at New Flat-top Manholes: This item includes all materials, equipment, and work required to install new 8" or 10" vent pipes at new flat-top sections as specified. The required vent elevation will be provided by the Engineer.

This item includes payment for furnishing and installing vent pipes in accordance with the standards and details to the elevation specified by the Engineer, installing new vent pipes on new vent pipe flanges cast in new flat-tops per the specifications and details, accessing manholes as specified, coordination with and location of existing utilities, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made per vertical foot installed measured from the bottom of the vent pipe (at the top of the vent cast in place in the new flat-top) to the vent pipe opening at the unit price bid.

Item 8 - Removing Existing Vent Pipes at Existing Manholes: This item includes all materials, equipment, and work required to remove existing vent pipes at existing manholes. This item includes payment for any diameter/height vent pipe, any configuration, excavation, removal, and off-site disposal of existing materials,

plugging the vent pipe openings with concrete at the manhole, backfilling and compaction, accessing manholes as specified, complete restoration of the disturbed areas, and for all else incidental thereto for which separate payment is not provided under other bid items.

Payment will be made for each vent pipe removed based on the unit price bid.

Item 9 – Installation of New Internal Drop Connections at Existing Manholes: This item includes all materials, equipment, and work required to install new internal drop connections at existing manholes in accordance with the standard specifications and details. Bid Items are included for new 4" service internal drop connections at vertical lengths up to 6 feet (lump sum payment) and for vertical lengths over 6 feet (cost to be added to the lump sum cost). When an internal drop pipe exceeds 6 feet in vertical length, the Contractor shall be paid for the first 6 feet of the drop under the lump sum Bid Item and then on a vertical foot basis for each foot over 6 feet.

This item includes payment for complete installation of the new internal drop connections including all fittings, connecting the new drop to the existing manholes, installing concrete benching and forming invert channel to accept the new drop pipe as necessary, surveying services as required, bypass sewage pumping during construction, accessing sewers and manholes as specified, traffic control, compliance with required working hours, coordination with and location of existing utilities, erosion control, and all else incidental thereto for which separate payment is not provided under other bid items. This item shall also include complete restoration of grassed areas disturbed by the work. Other restoration shall be paid under other bid items.

Payment will be made for each new internal drop connection installed based on the unit price bid.

Item 10 - Manhole Rehabilitation: This item includes all materials, equipment, and work required to install 1-inch-thick cementitious mortar on existing internal manhole walls and benches. Bid items are included for coating existing 4-foot-diameter, 5-foot-diameter, 6-foot-diameter, 7-foot-diameter, 8-foot-diameter, and 10-foot-diameter manholes (inside diameters) with a hydrogen-sulfide resistant material. 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, accessing manholes as specified, traffic control, compliance with required working hours, 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. Internal 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 in the details. The diameter of the manhole shall be measured at the widest part of the manhole. Manholes that are 4.5 feet or less in diameter at the widest point shall be considered 4-foot-diameter manholes, manholes that are between 4.5 feet and 5.5 feet in diameter at the widest point shall be considered 5-foot-diameter manholes, manholes that are between 5.5 feet and 6.5 feet in diameter at the widest point shall be considered 6-foot-diameter manholes, manholes that are between 6.5 feet and 7.5 feet in diameter at the widest point shall be considered 7-foot-diameter manholes, and manholes that are between 7.5 feet and 8.5 feet in diameter at the widest point shall be considered 8-foot-diameter manholes.

A bid item is also included for successful vacuum testing of manholes. It is anticipated that vacuum testing will not be performed on manholes where by-pass pumping with larger pumps would be required or other extenuating circumstances at the Engineer's discretion. Vacuum testing will generally be required for manholes on smaller diameter sewers where by-pass pumping with smaller pumps is sufficient and/or on manholes where by-pass pumping is already in place. Vacuum tests that fail will not be considered for payment.

A bid item is also included for the complete removal of existing epoxy on existing internal manhole walls and benches prior to installing cementitious mortar. This will be done to properly and completely prepare the manhole

walls for cementitious mortar installation and proper bonding of the mortar to the manhole walls. The Contractor is first required to clean the manhole using a high power jet wash at a minimum of 3500 psi water pressure with the tip of the nozzle a maximum of 4 inches from the manhole wall to remove any epoxy that may be removed using just this method. Any epoxy that is removed using the high power jet wash will not be considered for payment under this bid item and will be considered as part of the preparatory work for installing cementitious mortar. This item includes payment for any and all work required to completely remove the epoxy including grinding, cutting, chiseling, etc. or any other reasonable physical method and also includes disposal of all removed materials.

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

Item 11 - 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 covers in unpaved areas and paved areas as specified and in accordance with the details. There are covers for in the pavement (Type 1) or in unpaved areas (Type 2A, 2B, or 3). Frames and covers shall be Town of Cary standard frames and covers as shown in the details.

This item includes payment for sawcutting existing asphalt or concrete (any thickness) 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 (with imported granular material or flowable fill in paved areas) and compaction, compaction testing by a licensed geotechnical engineer where required, accessing manholes as specified, traffic control, compliance with required working hours, 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 the basis of the unit price bid.

Item 12 - Rebuilding Existing Manhole Benching and Invert Channels: This item includes all materials, equipment, and work required to rebuild existing manhole benching and invert channels as specified and in accordance with the details. Re-built benches shall conform to the standard specifications and details.

This item includes payment for removal and off-site disposal of existing materials, new concrete, accessing manholes as specified, bypass pumping using pumps smaller than 6 inches (if larger pumps are required, coordinate with the Engineer), traffic control, and for all else incidental thereto for which separate payment is not provided under other bid items.

Bid Items are included for rebuilding benches and inverts in existing 4-foot, 5-foot, and 6-foot-diameter manholes. Payment will be made on the basis of the unit price bid.

Item 13 – Repairing Individual and Precast Manhole Joint Leaks: This Item includes all materials, equipment, and work required to repair individual leaks within a manhole and precast manhole joint leaks. This item includes working in any location (unpaved areas or paved areas).

This item includes payment for completely stopping an identified leak within a manhole by injecting the leak location with an injectable grout. For a leak at a precast manhole joint, this includes stopping the leak anywhere within the same joint. This item includes payment for pre-construction inspection of manholes, manhole cleaning as necessary, root removal and grease removal as necessary, accessing manholes as specified, traffic control, compliance with required working hours, 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.

Payment will be made on a lump sum basis at the unit price bid.

Item 14 – Removal of Existing Manhole Flat-Top and/or Cone Sections, Installation of New Pre-Cast Concrete Manhole Riser Sections and/or Cone Section and/or Grade Ring and/or Flat-Top: This item includes all materials, equipment, and work required to remove existing manhole flat-top and/or cone sections and to install new precast concrete riser sections and/or cone section and/or grade ring and/or flat-top to the specified height or required elevation. Bid Items are provided for 4-foot, 5-foot, 6-foot, 7-foot, and 8-foot-diameter manholes. Refer to

the details in the plans. The existing manhole flat-top and/or cone sections may be reused at no additional cost to the Owner or replaced with new components. All new flat-tops shall have a vent pipe cast in per Detail E.

The unit prices bid shall include any required height of new sections and shall include all costs associated with accessing the manholes, sawcutting existing asphalt or concrete (any thickness) and disposing of material, excavation, removal and off-site disposal of existing manhole materials (as appropriate), complete installation of new manhole sections including connecting to the existing manhole walls, bedding, backfilling with excavated soil and compaction, compaction testing by a licensed geotechnical engineer where required, surveying services as required, bypass sewage pumping during construction as required, traffic control, coordination with and location of existing utilities, erosion control, complete restoration of disturbed grassed areas, and all else incidental thereto for which separate payment is not provided under other bid items.

Grade rings shall be M4IN MHG R (4 inch height adjustment) or M6IN MHG R (6 inch height adjustment) as manufactured by Masonry Supply or approved equal.

Payment will be made for the vertical height of new riser section installed or per unit of new flat-top, cone, or grade ring section installed at the unit price bid.

Item 15 – Cutting Protruding Service Connections Prior to Installing Liner Pipe: This item includes all materials, equipment, and work required to cut protruding service connections flush with the existing pipe wall via an internal robotic remote cutter prior to installing cured-in-place pipe lining or as required to complete CCTV inspections as specified. This item includes payment for accessing the sewers and manholes as specified, locating existing service connections, remote cutting of the connections (any lateral pipe material), retrieval and removal of cut pieces of lateral pipe, 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 the basis of the unit price bid in the Bid.

Item 16 – Cured-in-Place Pipe Lining (8" to 30" Sewers): This item includes all materials, equipment, and work required to install cured-in-place pipe lining (CIPP) with standard felt liner or UV cured GRP CIPP in existing 8" through 30" sewers in any location (unpaved or paved areas). Bid Items are included for various CIPP thicknesses (water or steam cured) or sewer depth ranges (UV cured) and diameters. Work shall be as specified and in accordance with the Specifications.

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.

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.

Item 17 – Cured-in-Place Pipe Lining (48" Composite or UV Cured GRP Liner): This item includes all materials, equipment, and work required to install cured-in-place pipe lining (CIPP) with fiberglass reinforced felt liner (composite liner) or UV cured GRP CIPP in existing 48" sewers in any location (unpaved or paved areas). Bid Items are included for various CIPP thicknesses or UV cured GRP equivalent thicknesses. Work shall be as specified and in accordance with the Specifications.

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.

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.

Item 18 – Cured-in-Place Pipe Lining (36", 42", and 54" UV cured GRP Liner): This item includes all materials, equipment, and work required to install UV cured GRP cured-in-place pipe lining (CIPP) in existing 36", 42", and 54" sewers in any location (unpaved or paved areas). Bid Items are included for various UV cured GRP thicknesses. Work shall be as specified and in accordance with the Specifications.

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.

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.

Item 19 – CIPP Product Tests: This item includes all materials, equipment, and work required to perform CIPP product tests. The CIPP product test includes payment for capturing the CIPP sample, preparing the sample for testing, submitting the samples to a testing laboratory, paying the laboratory, and all else incidental thereto for which separate payment is not provided under other bid items.

The CIPP testing shall include determining flexural strength, flexural modulus, tensile strength and thickness of each sample. These four separate individual tests make up one completed CIPP test. Payment will be made for each completed CIPP test at the unit price bid after the test results are submitted to the Engineer.

Item 20 - 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 the basis of the unit price bid in the Bid.

Item 21 – Bypass Pumping: This item includes the cost to provide, operate and maintain a by-pass pumping system at Black Creek 24"/30" Interceptor, Crabtree Creek Interceptor, and Black Creek 54" Interceptor. A lump

sum payment will be made once for each area (Black Creek 24"/30", Crabtree Creek, and Black Creek 54") after the first by-pass is set up and fully functional. This item includes payment for all necessary piping configurations, simultaneous pumping from separate areas when necessary, and all else incidental thereto for which separate payment is not provided under other bid items. All other by-pass pumping to be considered incidental to the work with costs included in other bid items.

The discharge configuration at the North Cary Water Reclamation Facility pump station near Old Reedy Creek Road for bypass of flow from the Black Creek 54" Interceptor is shown on Sheet C-5. There are two locations for the discharge of bypass pumping depending on which sections of sewer in which work is being performed. The cost for all materials, equipment, and work required to install, operate, and maintain the necessary configuration shall be included in the cost bid and no additional payment shall be due.

Item 22 – Tree Removal and Easement Clearing: These items are for the costs for completely removing trees including stumps in order to perform the specified work. The Contractor shall identify trees that need to be removed/cleared, and shall meet with the Engineer on site to review the trees prior to removing. The Engineer must approve the removal of any tree and the extents of any clearing prior to performing the work.

Bid items are included for specific tree removal and for easement clearing. All tree removal and clearing must be approved by and agreed to by the Engineer prior to any work being performed. The Engineer must agree to the limits of all tree removal/clearing and must agree to payment under the specific bid item. In general, the tree removal bid item will be used when only a few individual trees must be removed to perform the work, and the easement clearing bid item will be used when clearing forested/wooded areas for the full width of the sewer easement. The clearing item only pertains to clearing trees/wooded areas and not mowing easements or clearing brush, small trees (generally less than 6" in diameter), saplings and overgrown vegetation – clearing of brush/vegetation/small trees/saplings shall be considered incidental to the work and all costs associated with that clearing shall be included in the various bid items. The Engineer will determine if the tree removal bid item or easement clearing bid item will be used on a case by case basis.

For specific tree removal, payment shall be made for each tree removed including the stump by trunk size range as indicated in the Bid Form. Work shall include felling, cutting, removal and offsite disposal. Contractor has the option in right of ways in wooded areas or other areas (if agreed to by the Engineer and Owner) of grinding up trees and spreading the mulch within the right of way. Measurement of the trunk diameter shall be made approximately 3' above ground. The Contractor must provide a minimum of 60 days notice to the Engineer for specific tree removal.

For easement clearing, payment will be made for mobilizing any and all required equipment for a specific area. Payment will then be further made based on the actual number of square yards that are cleared based on field measurements and as agreed to with the Engineer. The clearing item shall include any and all equipment necessary to completely clear the easement and shall include removing all stumps and removing and disposing of the cleared trees/debris offsite. The Contractor has the option (if agreed to by the Engineer and Owner) of grinding up trees and spreading the mulch within the easement. The Contractor must provide a minimum of 60 days notice to the Engineer for easement clearing.

Payment will be made on the basis of the prices bid.

Item 23A - Asphalt Pavement Restoration: This item includes furnishing all new materials, equipment and labor for saw-cutting (any thickness), removing and disposing of materials offsite, and replacing all pavement (bituminous concrete, penetration and other surface treatments) including roadways and driveways as specified and as directed by the Engineer and in accordance with the Owner's standard specifications and details. Pavement shall be replaced to match existing pavement (any thickness). This pay item includes the asphalt and stone base.

Payment shall be limited to a width equal to the pipe diameter plus 5 feet and to a length equal to the length of the required work plus 6 feet. The Contractor shall not be paid for any restoration outside of these limits. Damage to existing asphalt outside the specified area shall be repaired as directed by the Owner and/or the Engineer, but shall not be considered for payment.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid.

Item 23B – Restoration of Concrete Driveways and Walkways: This item includes furnishing all new materials, equipment and labor for saw-cutting, removing and disposing of materials offsite, and replacing concrete driveways and walkways as specified and as directed by the Engineer. Concrete shall be replaced to match existing driveway or walkway thickness. Bid Items are provided for 4-inch-thick, 5-inch-thick and 6-inch-thick fiber-reinforced concrete. This pay item includes the concrete and stone base as required.

The Engineer shall define the limits for concrete restoration prior to starting the required work. Damage to existing concrete outside the area specified by the Engineer shall be repaired as directed by the controlling agency or as directed by the Engineer, but shall not be considered for payment.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid.

Item 23C – Restoration of Concrete Curb and Gutter: This item includes furnishing all new materials, equipment and labor for sawcutting, removing and replacing concrete curb and gutters to match existing, as specified and as directed by the Engineer, complete in place. Also included in this item is all excavating, forming, stone base material, vibrating, curing, expansion joint material, and all else required to construct the necessary fiber-reinforced concrete curb and gutters.

The Engineer shall define the limits for curb and gutter restoration prior to starting the required work. Damage to parallel curb and gutter outside the area specified by the Engineer shall be repaired as specified, or directed by the controlling agency, but will not be considered for payment.

Payment will be made for each linear foot of new curb and gutter installed at the unit price bid.

Item 23D – Select Imported Soil Backfill: This item includes furnishing all equipment, materials and labor required to provide select imported soil to backfill trenches as directed by the Engineer when the existing soil is not suitable for backfill. Use of select imported soil backfill must be approved by the Engineer and Owner prior to performing the work. The unit price bid for this item shall include removing the existing soil and disposing of it offsite and importing select imported soil material.

Measurement shall be based on volume of material compacted in place. The Engineer shall define limits prior to starting the required work.

Payment will be on a cubic yard basis as measured on a horizontal plane in accordance with the unit price bid.

Item 23E – Stone Backfill: This item includes furnishing all equipment, materials and labor required to provide granular material to backfill trenches under roads and/or as directed by the Engineer when the existing soil is not suitable for backfill or when granular material backfill is required by the controlling agency. Use of granular material backfill must be approved by the Engineer and Owner prior to performing the work. The unit price bid for this item shall include removing the existing soil and disposing of it offsite and importing granular material.

Measurement shall be based on volume of material compacted in place. The Engineer shall define the limits prior to starting the required work.

Payment will be on a cubic yard basis as measured on a horizontal plane in accordance with the unit price bid.

Item 23F - Sod Restoration: This item includes furnishing all equipment, new materials and labor required to remove and replace sod for the entire width disturbed, of same type as existing, or to install new sod, complete in place, as specified and as directed by the Engineer.

The Engineer shall define the limits for sod restoration prior to starting the required work. Damage to existing sodded or grassed areas outside the area specified by the Engineer shall be repaired as directed by the Engineer, but shall not be considered for payment.

Payment will be on a square yard basis as measured on a horizontal plane in accordance with the unit price bid.

Item 23G – Restoration of Gravel Areas: This item includes furnishing all new materials, equipment and labor for providing, installing, leveling and grading stone to restore gravel areas disturbed by the work to equal or exceed preconstruction conditions as specified and as directed by the Engineer. Gravel shall match existing gravel.

The Engineer shall define the limits for gravel restoration prior to starting the required work. Damage to existing gravel outside the area specified by the Engineer shall be repaired as directed by the Engineer, but shall not be considered for payment.

Payment will be made for each cubic yard of stone installed and graded at the unit price bid.

Item 23H – Rip-Rap Stabilization: This item includes furnishing all new materials, equipment and labor for providing and installing rip-rap to stabilize creek banks and other eroded drainage areas as directed by the Engineer. All rip-rap shall be placed 1.5 feet thick as specified and per the Details. This item includes all costs associated with accessing the areas to be stabilized, erosion control, meeting all permit requirements for the restoration work, accommodating/handling the stream/creek flow, preparing the banks for the rip-rap, installing the rip-rap, and completely restoring the areas disturbed by the work.

Payment will be made for each square yard of rip-rap installed (1.5 feet thick) at the unit price bid.

Item 24 – Installation and Removal of Standard Temporary Stream Crossings: This item includes the installation, use, and removal of temporary stream crossings per Details 04000.11 - Sheet 1 of 3. This item includes furnishing all materials, equipment and labor for providing, installing, and removing the temporary stream crossings. The temporary stream crossings must be capable of supporting all equipment that needs access to specific areas approved by the Engineer. Temporary stream crossings that do not properly support the necessary equipment will not be considered for payment. This item includes all costs associated with accessing the areas, installation per the details, erosion control, removal, completely restoring the areas disturbed by the work, accommodating/handling the stream/creek flow during installation, meeting all permit requirements for stream crossings, and all else incidental thereto for which separate payment is not provided under other bid items.

Bid Items are provided for specific creek crossings per Detail 04000.11 - Sheet 1 of 3. This item will be bid on a lump sum basis.

Item 25 – Work on Sheet C-6: This item includes all materials, equipment, and work required to perform work as outlined on Sheet C-6 - Steps 1 through 6. Step 7 on Sheet C-6 will be paid under other bid items.

Bid Item 25A is for Step 1 on Sheet C-6 and includes the installation of a doghouse manhole at the location specified and per the standard details. This item includes excavation, removal and off-site disposal of existing soil, all materials, complete installation of new doghouse manhole including watertight frame and cover (Type 2A), bedding, backfilling with excavated soil and compaction, compaction testing by a licensed geotechnical engineer where required, installing concrete benching and forming invert channel, surveying services as required, bypass sewage pumping during construction, accessing sewers and manholes as specified, compliance with required working hours, coordination with and location of existing utilities, erosion control, complete restoration of disturbed areas, and all else incidental thereto for which separate payment is not provided under other bid items. Payment will be made based on the lump sum price bid.

Bid Item 25B is for Steps 2 through 6 on Sheet C-6 and includes a lump sum payment for by-passing flow from Black Creek around the work area, removing MH-SP76518076, preparing the incoming and outgoing pipes as detailed, installing 24" ductile iron pipe, installing transition couplings, excavation, removal and off-site disposal of existing sewer pipe and manhole, surveying services to install the new sewers, bedding, backfilling/compaction, bypass sewage pumping during construction where required, accessing sewers and manholes as specified, erosion control, accommodating/handling the stream/creek flow during installation, meeting all permit requirements for stream crossings, traffic control, compliance with required working hours, coordination with and location of existing utilities, and for all else incidental thereto for which separate payment is not provided under other bid items. This

item shall also include complete restoration of grassed areas disturbed by the work. Payment will be made on the basis of the lump sum price bid.

Item 26 – Work at MH-SP75511023: This item includes all materials, equipment, and work required to perform work as outlined on Detail D - Notes 1 through 3 (Sheet D-4). Notes 4 and 5 on Detail D (Sheet D-4) will be paid under other bid items. This Bid Item includes a lump sum payment for removing the existing concrete from around the existing 48" sewer to the extent indicated, cutting the 48" sewer and existing CIPP and removing the top half of the pipe and CIPP, rebuilding the bench and invert as indicated, removal and off-site disposal of removed materials as necessary, accessing sewers and manholes as specified, traffic control, compliance with required working hours, coordination with and location of existing utilities, and for all else incidental thereto for which separate payment is not provided under other bid items. This item shall also include complete restoration of grassed areas disturbed by the work.

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

Item 27 – Installation of Aerial Steel Pipe Creek Crossing: This item includes all materials, equipment, and work required to replace the existing aerial pipe creek crossing between MH-SP76514015 and MH-SP76514005 as specified and in accordance with the standard specifications and Detail 07000.18 (Sheet D-3). This Bid Items includes a lump sum payment for the new steel pipe (approximately 35'), transition collars, watertight connection to the existing sewer with a mechanical joint, excavation, removal and off-site disposal of existing sewer pipe, surveying services to install the new sewers, bedding, backfilling with excavated soil and compaction, acceptance testing including televising the new aerial crossing, bypass sewage pumping during construction where required, accessing sewers and manholes as specified, erosion control, accommodating/handling the stream/creek flow during installation, meeting all permit requirements for stream crossings, traffic control, compliance with required working hours, coordination with and location of existing utilities, and for all else incidental thereto for which separate payment is not provided under other bid items. This item shall also include complete restoration of grassed areas disturbed by the work.

Installation of CIPP after the aerial crossing is replaced will be paid under a separate bid item.

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

Item 28 - 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 bid prior to contingency. One half of the amount bid will be paid with the first pay application and the remainder paid with the second pay application. If an amount greater than 2% of the subtotal is entered for mobilization, the difference in the percentage entered and 2% will be paid on the final payment.

Payment will be made according to the lump sum bid.

SECTION 00500
AGREEMENT (CONTRACT)

INSTRUCTIONS TO CONTRACTORS AND REQUIREMENTS AS TO FORM FOR TOWN OF CARY, NC AGREEMENTS

DO NOT REMOVE FROM AGREEMENT

Contractor has been provided two (2) duplicates of the Agreement (or shall create two copies of the electronic version if Contractor has received that from the Town). Each of the two copies shall be signed and returned to the Engineer or Architect for signature by the Owner. One counterpart will be returned to the Contractor after Owner has executed the Agreement and all initial submittals due with the Agreement have been made to Owner. The other counterpart of the Agreement will be retained for the Owner and Engineer or Architect. If the Contractor requires additional copies, he shall notify the Owner, Engineer or Architect upon his Acknowledgement of the Notice of Award.

Please observe the following in executing the attached Agreement:

1. The Owner may contract with four types of legal entities.

   (a) If the Agreement is with an individual, that individual should sign the Agreement exactly as his/her name is set out. If the Agreement is with an individually-owned business, the Agreement should be with the individual owner, and not the named business.

   (b) Execution on behalf of a corporation should be by the president or a vice president. An official other than president or vice president should attach documentation of his/her authority to execute and bind the corporation.

   (c) If the Agreement is with a partnership, all general partners of the partnership should execute the Agreement unless an authorized partner is designated to execute, in which case documentation of such authorization should be attached.

   (d) If the Agreement is with a limited liability company, all managers of the limited liability company should execute the Agreement. If the limited liability company is member-managed, all members should sign the Agreement . If only certain manager(s) or member(s) of the limited liability company are authorized to execute the Agreement, documentation of such authorization should be attached.

2. After signing the Agreement, the appropriate notary's acknowledgement, in the individual, corporate or partnership form should be completed.

3. The Agreement will already be dated as of a certain date when Contractor receives it, which date will aid the Contractor in obtaining the Performance and Payment Bonds. The date of the Bonds must not be prior to the date of the Agreement. The Performance Bond and Payment Bond shall correctly reference the Agreement, including the date assigned to it. The Bonds shall be signed by the Contractor, and its signature shall be acknowledged with the appropriate acknowledgement form. Next, the Bonds, in approved form, must be signed by the authorized agent of the Surety Company issuing the Bonds, and an executed Power of Attorney document authorizing the agent to sign must accompany the Bond Documents.

4. The Bid Form and all other documents submitted with the Bid shall be included with the Agreement. Complete the Acceptance of Notice of Award section on the last page of the Bid Proposal.

5. Page 00500-3: Fill in the Contractor name and address.

6. Pages 00500-6 through 00500-9: Choose the appropriate signature page and complete it in its entirety.

7. Pages 00500-10 through 00500-16: Complete in their entirety.

8. Page 00500-17: Attach the Certificate of Insurance. All parties required to be named as additional insured parties by the Contract Documents in connection with the attached Agreement shall be named on the Certificate of Insurance for each policy.

9. Page 00500-18: The Town shall execute the page evidencing compliance with the Fiscal Control Act prior to sending a counterpart of the Agreement to the Contractor.

10. Pages 00500-19 through 00500-21: Schedule 1 – Identification of Parties and Their Authorized Representatives. The names of all parties intended to act on behalf of the parties in the roles specified in Schedule 1 should be clearly specified in such Schedule by the Contractor and the Town.

11. Once the Town has received and approved the Agreement, the Payment and Performance Bonds and all other required documents, it will send a counterpart of the fully-executed Agreement to the Contractor. Failure to fully complete both required sets of the Agreement and timely provide all the Payment and Performance Bonds will cause delays in the approval by the Owner and therefore delay the issuance of the Notice to Proceed.

AGREEMENT

This Agreement (the "Agreement ") is made as of the ___ day of_____, in the year 20___, by and between the Town of Cary, North Carolina, (the "Owner") and _____ of _____, (the "Contractor").

WITNESSETH

THAT, WHEREAS, an Award of Contract (the "Award") for:

FY20-21 Sewer Rehabilitation Project – Project No. SW3501
Contract No. **N/A**

as prepared by Frazier Engineering, P.A., has recently been awarded to the Contractor by the Owner.

AND WHEREAS, the work to be performed by the Contractor or its subcontractors, and the labor, materials, equipment, apparatus, and supplies to be provided in connection therewith (collectively, the "Work") is more particularly described in the Proposal (the "Proposal") attached hereto.

AND WHEREAS, the aggregate cost of the Work (referred to as either the "Contract Price" or the "Contract Sum") and the individual prices and rates of the various components of the Work that together comprise the Contract Price, are more particularly described in the Proposal.

AND WHEREAS, it was one of the conditions of said Award that a formal contract should be executed by and between the Owner and the Contractor, evidencing the terms of said Award.

NOW THEREFORE, THIS AGREEMENT FURTHER WITNESSETH THAT the Owner and the Contractor represent, warrant, covenant and agree as follows:

It is agreed and understood that the terms and conditions of the following documentation are a part of and parcel to this Agreement to the same extent as if incorporated herein in full [check the applicable documentation]:

X Standard General Conditions of the Construction Contract (EJCDC Document No. C-700, 2007 edition), as supplemented with forms for use under this Agreement by the Supplementary Conditions (as so supplemented, the "General Conditions").

_____ General Conditions of the Contract for Construction (AIA Document A201-2007), as supplemented with forms for use under this Agreement by the Supplementary Conditions (as so supplemented, the "General Conditions").

The Contractor hereby covenants and agrees with the Owner that it will, for a sum equal to the Contract Price, well and faithfully perform, provide and execute the Work in accordance with each and every one of the conditions, covenants, stipulations, terms and provisions contained in the Notice to Bidders/Invitation to Bid, the Instructions to Bidders, the Proposal, the Plans, the Specifications, the General Conditions and the Contract Documents (as that term is defined in the General Conditions), all of which are a part of and parcel to this Agreement to the same extent as if incorporated herein in full.

And the Owner does hereby covenant and agree with the Contractor that it will pay to the Contractor, when due and payable under the terms of the Contract Documents and the Award, the Contract Price, and that it will well and faithfully comply with and perform each and every obligation imposed upon it by said Contract Documents and the terms of said Award.

The Contractor shall commence the Work on the commencement date specified in a written order of the Owner (the "Notice to Proceed"). The Work shall be **finally and fully completed**, so that it is ready for final payment, as evidenced by the Engineer's or the Architect's written recommendation, within 630 CONSECUTIVE CALENDAR DAYS of the commencement date specified in the Notice to Proceed (such deadlines being referred to herein and in the Contract Documents as the "Contract Time" or the "Contract Times"). In the event that the Work is not completed to the standards and degrees required by the Contract Times, or either of them, liquidated damages shall be assessed against the Contractor for each day of delay as described herein below.

The Work as denoted on Sheets C-3 and C-4 of the plans (Crabtree Creek area) shall be **finally and fully completed**, as evidenced by the Engineer's or the Architect's written recommendation, within 240 CONSECUTIVE CALENDAR DAYS of the commencement date specified in the Notice to Proceed. In the event that the Work is not completed to the standards and degrees required by the Contract Times, or either of them, liquidated damages shall be assessed against the Contractor for each day of delay as described herein below.

The Work as denoted on Sheet C-1 of the plans (Black Creek 24" and 30" area) shall be **finally and fully completed**, as evidenced by the Engineer's or the Architect's written recommendation, within 420 CONSECUTIVE CALENDAR DAYS of the commencement date specified in the Notice to Proceed. In the event that the Work is not completed to the standards and degrees required by the Contract Times, or either of them, liquidated damages shall be assessed against the Contractor for each day of delay as described herein below.

LIQUIDATED DAMAGES

The parties recognize and acknowledge that Owner will suffer financial losses if the Work is not completed as required within the Contract Times. They also recognize and acknowledge the delays, expense, and difficulty to both parties that would be involved in proving or contesting the amounts of those losses. Instead of requiring proof of those amounts, it is agreed that if the Contractor shall fail to complete the Work to the standard and degree required within the Contract Times, or either of them, and within any extension of time granted by the Owner in accordance with the General Conditions, then the Contractor shall pay to the Owner **$1,000*/day*** for each calendar day after the Contract Times, or after a relevant extended time if applicable, that the Work remains incomplete to the standard or degree required by the Contract Documents.

If the Contractor shall fail to complete the Work as denoted on Sheets C-3 and C-4 of the plans (Crabtree Creek area) to the standard and degree required, or either of them, within 240 CONSECUTIVE CALENDAR DAYS of the commencement date specified in the Notice to Proceed, and within any extension of time granted by the Owner in accordance with the General Conditions, then the Contractor shall pay to the Owner **$1,000*/day*** for each calendar day after 240 CONSECUTIVE CALENDAR DAYS, or after a relevant extended time if applicable, that the Work remains incomplete to the standard or degree required by the Contract Documents.

If the Contractor shall fail to complete the Work as denoted on Sheet C-1 of the plans (Black Creek 24" and 30" area) to the standard and degree required, or either of them, within 420 CONSECUTIVE CALENDAR DAYS of the commencement date specified in the Notice to Proceed, and within any

extension of time granted by the Owner in accordance with the General Conditions, then the Contractor shall pay to the Owner **$1,000*day*** for each calendar day after 420 CONSECUTIVE CALENDAR DAYS, or after a relevant extended time if applicable, that the Work remains incomplete to the standard or degree required by the Contract Documents.

Payment of the charges described herein shall not excuse or relieve the Contractor for any other liability under the Contract Documents for delay in the progress schedule of the Work, and all other penalties imposed on the Contractor and remedies available to the Owner under the Contract Documents shall remain in full force and effect.

IDENTIFICATION OF PARTIES AND AUTHORIZED REPRESENTATIVES

Various parties to the Contract, and parties who will be acting on another party's behalf from time to time, are identified in Schedule 1 attached hereto. Although certain parties may act on another party's behalf from time to time under the Contract Documents in certain respects (issuing directives, for instance), with respect to most documentation issued under the Contract Documents, the set of people that may bind each party is limited. The proper identification of those specific individuals (through name or title identification) that are entitled and authorized to bind the parties to the various Contract Documents that exist or may be created in connection with this Agreement is critical to the proper administration of this Agreement, and those individuals are specified in Schedule 1 attached hereto.

The parties agree that the persons (specified by names or titles/roles) of signatories to the Contract Documents that are specified on Schedule 1 attached hereto are the only appropriate parties to execute such documentation and bind the parties listed for each such Contract Document to all obligations incurred or acknowledged, and all representations and warranties made, in such documents. To that end, for example, although the Owner is the Town of Cary, as described in Schedule 1, the proper specific individuals (indicated by name or by title) to execute various documents on behalf of the Owner are specified on Schedule 1 attached hereto.

VERIFICATION OF WORK AUTHORIZATION

Contractor represents and warrants that now and continuing for the term of Agreement, Contractor, and all subcontractors, will comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes, "Verification of Work Authorization," and will provide documentation or sign affidavits or any other documents requested by Town demonstrating such compliance.

ELECTRONIC VERSION OF CONTRACT DOCUMENTS

Owner may convert a signed original of the Contract Documents to an electronic record pursuant to a North Carolina Department of Cultural Resources approved procedure and process for converting paper records to electronic records for record retention purposes. Such electronic record of the Contract shall be deemed for all purposes to be an original signed Contract.

IN WITNESS WHEREOF, said Contractor and Owner, being duly authorized, have caused these presents to be signed in their names as of the day and year first above written.

OWNER:

TOWN OF CARY,
a North Carolina municipality

By: _____
Name: per Standard Procedure 146
Title: per Standard Procedure 146

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public in the County and State aforesaid, do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the _____ day of _____, 20___.

_____
Notary Public

[OFFICIAL SEAL]

_____
Printed name of Notary Public

My Commission Expires: _____

[Contractor's Signature, if individual(s)]

CONTRACTOR:

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public of _____ County, State of _____, do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the _____ day of _____, 20__.

_____
Notary Public

My Commission expires: _____

[OFFICIAL SEAL]

IMPORTANT

NOTE: If Contractor is an individual, his/her signature shall be placed above. The signature of the Contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgment.

[OR: Contractor's Signature, if a corporation]

CONTRACTOR:

_____
a North Carolina corporation (SEAL)

Signature:_____
Printed Name: _____
Title: President/Vice President (circle one)

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public of the County and State aforesaid, do hereby certify that _____ personally appeared before me this day and acknowledged that he/she is _____ of _____, a North Carolina corporation, and that, by authority duly given and as the act of the corporation, the foregoing instrument was signed in its name by him/her as its _____.

Witness my hand and official seal, this the _____ day of _____, 20__.

[OFFICIAL SEAL]

_____
Notary Public

_____
Printed name of Notary Public

My Commission Expires: _____

IMPORTANT

NOTE: If the Contractor is a Corporation, the legal name of the Corporation shall be set forth above, together with the signature of the officer or officers authorized to sign Contracts on behalf of the Corporation. If the signature is by an agent other than an authorized officer of the Corporation, a Resolution must be attached hereto. The signature of the Contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgment.

[OR: Contractor's Signature, if a partnership]

CONTRACTOR:
_____,
a [general/limited] partnership (SEAL)

By:_____(SEAL)
Name: _____
Title: General Partner

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public of _____ County, State of _____, do hereby certify that _____, General Partner of _____, a _____ [general/limited] partnership, personally appeared before me this day and acknowledged the due execution of the foregoing instrument as his/her act and deed and as the act and deed of the partnership.

Witness my hand and official seal, this the _____ day of _____, 20__.

_____
Notary Public

My Commission Expires: _____

[OFFICIAL SEAL]

IMPORTANT

NOTE: If Contractor is a partnership, the true name of the firm shall be set forth above, together with the signatures of all the general partners (add more "by/name/title" signature lines beneath the partnership name if there is more than one general partner). If the signature is by an agent other than all general partners, a Resolution must be attached hereto. The signature of the Contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgment.

[OR: Contractor's Signature, if a limited liability company]

CONTRACTOR:

_____,
a limited liability company (SEAL)

By:_____ (SEAL)
Name: _____
Title: Member/Manager

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public of _____ County, State of _____, do hereby certify that _____ a [Member/Manager] of _____, a _____ limited liability company, personally appeared before me this day and acknowledged the due execution of the foregoing instrument as his/her act and deed and as the act and deed of the company.

Witness my hand and official seal, this the _____ day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

[OFFICIAL SEAL]

IMPORTANT

NOTE: If Contractor is a limited liability company, the true name of the firm shall be set forth above, together with the signatures of all the managers (add more "by/name/title" signature lines beneath the company name as necessary). If the signature is by an agent other than all of the managers of the limited liability company (or all of the members, if the company is member-managed), a Resolution must be attached hereto. The signature of the Contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgment.

PERFORMANCE BOND

This Bond is executed on _____, 20___.

The name of the PRINCIPAL is_____(1)

a _____(2)

The name of the SURETY is _____

_____

The TOWN OF CARY, NORTH CAROLINA is the CONTRACTING BODY.

The amount of the Bond is_____

_____Dollars ($_____)

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named CONTRACTING BODY, hereinafter called the "Contracting Body", in the penal sum of the amount stated above in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas, the Principal entered into a certain Agreement with the Contracting Body, dated as of the ____day of _____, 20___ for work described by Plans and Specifications prepared by _____ _____, herein called and referred to as the "Engineers", a copy of said Agreement is hereto attached and made a part hereof for the construction of:

_____

–Project No. _____

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Agreement during the original term of said Agreement and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the Agreement, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Agreement that may hereafter be made, notice of which modifications to the SURETY being hereby waived, then, this obligation is to be void; otherwise it shall remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST:

(Principal) Secretary (SEAL)	Principal By:_____(3) (Address)
Witness as to Principal (Address)	
	Surety By:_____(4) (Name) (Address)
ATTEST: By:_____ [N.C. Resident Agent] (SEAL)	(Phone Number)
Witness as to Surety (Address)	

NOTE: Date of Bond must not be prior to date of Agreement.

(1) Insert the correct name of Contractor.
(2) Insert whether the Contractor is a corporation, a partnership, a limited liability company or an individual.
(3) If Contractor is a partnership, all general partners should execute the Bond. If Contractor is a limited liability company, all managers (or all members, if the company is member-managed) should execute the Bond .
(4) Provide contact name, address and phone number for performance bond surety.

PAYMENT BOND

This Bond is executed on _____, 20__.

The name of the PRINCIPAL is _____(1)

a _____(2)

The name of the SURETY is _____

_____

The TOWN OF CARY, NORTH CAROLINA is the CONTRACTING BODY.

The amount of the Bond is _____
_____Dollars ($_____)

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named CONTRACTING BODY, hereinafter called the "Contracting Body", in the penal sum of the amount stated above in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas, the Principal entered into a certain Agreement with the Contracting Body, dated as of the ____day of _____, 20___ for work described by Plans and Specifications prepared by _____ herein called and referred to as the "Engineers", a copy of said Agreement is hereto attached and made a part hereof for the construction of:

_____
- Project No. _____

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said Agreement, and any and all duly authorized modifications of said Agreement that may hereafter be made, notice of which modifications to the SURETY being hereby waived, then this obligation is to be void; otherwise it shall remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST:

_____
(Principal) Secretary
(SEAL)

_____
Principal

By:_____(3)

_____
(Address)

_____
Witness as to Principal

_____
(Address)

_____
Surety

By:_____(4)
(Name)

ATTEST:

_____
(Address)

By:_____
[N.C. Resident Agent]
(SEAL)

_____
(Phone Number)

_____
Witness as to Surety

_____
(Address)

NOTE: Date of Bond must not be prior to date of Agreement.

(1) Insert the correct name of the Contractor.
(2) Insert whether the Contractor is a corporation, a partnership, a limited liability company or an individual.
(3) If Contractor is a partnership, all general partners should execute the Bond. If Contractor is a limited liability company, all managers (or all members, if the company is member-managed) should execute the Bond.
(4) Provide contact name, address and phone number for payment bond surety.

AFFIDAVIT

(To be attached to all Agreements)

STATE OF)
) SS
COUNTY OF)

_____being first duly sworn on oath deposes and says that s/he is _____ (attorney-in-fact or agent) of _____ (bonding company) surety on the attached Agreement on _____executed by _____(Contractor).

Affiant further deposes and says that no officer, official or employee of the Owner has any interest directly or indirectly, or is receiving any premium, commission fee or other thing of value on account of the same or furnishing of the Bond, undertaking or Contract of Indemnity, Guaranty, Suretyship in connection with the above mentioned Agreement.

Signed_____

Subscribed and sworn to before me this ____ day of _____, 20___.

_____

(Notary Public,_____County,_____)

My Commission Expires_____

RESOLUTION OF CONTRACTOR'S PARTNERS, MANAGERS OR MEMBERS
(Fill in and attach if necessary)

[CORPORATION/PARTNERSHIP/LIMITED LIABILITY COMPANY NAME]

CERTIFICATE OF AUTHORITY

KNOW ALL MEN BY THESE PRESENTS:

That at a meeting of the [board of directors/partners/all members/managers] of [Contractor] a [business corporation/partnership/limited liability company] duly organized under the laws of the State of _____, held on _____, 20___ the following Resolution was adopted, which Resolution is still in effect:

RESOLVED, that [any of] the following:

[insert individual name and title]

be, and they hereby are, authorized to execute any and all documents, including contracts, on behalf of [Contractor] and further that Certificates of Authority setting out this Resolution be prepared and certified by [the Secretary of [Contractor]/all partners/all members/managers] to be used to evidence such authority.

[For a corporation, use the following certification of the Secretary:]

That I am the duly elected and qualified Secretary of [Contractor] and the keeper of records of said company; that the foregoing is a true and correct copy of a Resolution duly adopted at the meeting described above and held in accordance with its charter and bylaws, and that the same is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto affixed by name as Secretary by order of the ___ this __ day of ___, ____.

_____
, Secretary

STATE OF _____
COUNTY OF _____

Subscribed and sworn to before me this the _____ day of _____, 20___.

_____
[SEAL] Notary Public

[For partnership or limited liability company, use the following certification of all partners/members/managers, whose signatures should all appear below or otherwise attached:]

That the following consist of all [partners/members/managers] of [Contractor]; that the foregoing is a true and correct copy of a Resolution duly adopted at a meeting described above and held in accordance with its charter and bylaws, and that the same is now in full force and effect.

_____	_____
Partner/Member/Manager's name	Partner/Member/Manager's signature
_____	_____
Partner/Member/Manager's name	Partner/Member/Manager's signature

[List all partners/members/managers and include signatures for each. Use additional pages as attachments if necessary.]

STATE OF _____
COUNTY OF _____

Subscribed and sworn to before me this the _____ day of _____, 20___.

[SEAL] _____
Notary Public

CERTIFICATE OF INSURANCE/INSURANCE ENDORSEMENTS

(Attach)

[See the General Conditions for specific requirements.]

CERTIFICATE OF PAYMENTS

I hereby certify that I am the legal and duly appointed Financial Officer for the Owner of this project and that provision for the payment of the moneys to fall due under this Agreement has been made by appropriation duly made or by bonds or notes duly authorized, as required by the Local Government and Fiscal Control Act.

BY:_____

TITLE:_____

DATE:_____

SCHEDULE 1

IDENTIFICATION OF PARTIES AND THEIR AUTHORIZED REPRESENTATIVES

USE THIS FORM WHEN REVIEWING CONTRACT DOCUMENTATION TO ENSURE THAT PROPER AUTHORIZATION HAS BEEN GRANTED BY EACH PARTY TO SUCH DOCUMENTATION.

The "Owner" is the **Town of Cary**, a municipal corporation in North Carolina, and its successors and assigns, and is the party for whom the Work is to be performed. Except as otherwise specifically stated in the Contract Documents, neither the Architect nor the Engineer has authority to bind the Owner. Except as otherwise specified below for various contract documentation, the Owner is represented by and may be bound by the Project Manager or the Project Engineer with respect to day-to-day issues and correspondence.

The "Resident Project Representative" is: Lynn Brilz, Town of Cary, Senior Project Manager.

The "Architect" is the Architect or the Architect's authorized representative as identified in Contract Documents. The Architect is **N.A.** and/or any other party identified by the Owner as the Architect for the Work from time to time. In its sole discretion, the Owner may act in the stead of the Architect, exercising any of the rights or responsibilities of the Architect provided under the Contract Documents, so long as the Owner provides notice to the Contractor of its intent to do so. In its sole discretion, the Owner may delegate any of the rights or responsibilities of the Architect to a third party, who, for the purposes of the rights and responsibilities so delegated, shall be governed by the Contract Documents, so long as the Owner provides notice to the Contractor of its intent to do so.

The "Engineer" is **Frazier Engineering, P.A.** and/or any other party identified by the Owner as the Engineer for the Work from time to time. In its sole discretion, the Owner may act in the stead of the Engineer, exercising any of the rights or responsibilities of the Engineer provided under the Contract Documents, so long as the Owner provides notice to the Contractor of its intent to do so. In its sole discretion, the Owner may delegate any of the rights or responsibilities of the Engineer to a third party, who, for the purposes of the rights and responsibilities so delegated, shall be governed by the Contract Documents, so long as the Owner provides notice to the Contractor of its intent to do so.

The Engineer's Consultant is **N.A.** and any other party to a subcontract with Engineer in connection with the Work.

The parties hereby agree that, notwithstanding any provision in the Contract Documents that appears to or in fact grants one party the right to act on behalf of another party, with respect to the documentation below, those individuals named below, personally or by role or title (or any person at a position "higher" than the individual or role named below) (in either event, an "Authorized Party") shall be the only people entitled to execute the documentation for which that individual or role is named. A position is "higher" than another position in a company if the position is an office authorized by law to bind the entity or the latter position reports (directly or through other parties) to the position in question. When an Authorized Party executes a Contract Document for which it is specified as an Authorized Party, such Authorized Party shall be deemed to be acting on behalf of the party for whom it is executing such document, binding such party as to obligations acknowledged and representations and warranties made in such documentation, and no other proof of agency, authority or delegation of power is necessary to so bind such party by the execution of the document by the Authorized Party.

Document	Party to Execute	Person/Role Having Capacity to Sign
Agreement	Owner	Town Manager
	Contractor	_____ [President or Vice-President]
Application for Payment	Contractor	_____
	Resident Pjt. Representative	Lynn Brilz
	Engineer/Architect	Frazier Engineering, P.A.
	Owner	Utilities Director, Utility Engineering Manager, or Utility Engineering Supervisor
Field Order	Engineer/Architect	Frazier Engineering, P.A.
	Owner	Utilities Director
	Contractor	_____
Work Change Directive	Engineer/Architect	Frazier Engineering, P.A.
	Owner	Utilities Director
	Contractor	_____

Document	Party to Execute	Person/Role Having Capacity to Sign
Change Order (Recommendation and Contract Amendment)	Engineer/Architect (Recommend)	Frazier Engineering, P.A.
	Owner (Review [not approve])	Utilities Director
	Contractor (Accept recommendation)	_____
	Contractor (Amend Contract Sum or Price and/or Contract Time or Times)	_____
	Owner (Amend Contract Sum or Price and/or Contract Time or Times)	*in accordance with Town of Cary Standard Procedure #146
[Any other documentation]	Engineer/Architect	Frazier Engineering, P.A.
	Owner	Utilities Director
	Contractor	_____

This Schedule 1 may be revised, amended and/or replaced by a new Schedule 1 identifying other individuals or roles entitled to execute the documentation described herein if the replacement Schedule 1 is signed by each of the parties below. The revised Schedule 1 shall be dated and attached to the Contract Documents, and a copy shall be given to all affected parties. To the extent possible, prior versions of Schedule 1 shall be removed from the Contract Documents when a replacement Schedule 1 is approved.

Town of Cary:

By: _____
Town Manager

Contractor:

_____

By: _____
[President or Vice-President or Owner]

NOTICE TO PROCEED

TO: CONTRACTOR: _____

ADDRESS: _____

_____

FROM: _[fill in name, title and address of appropriate TOC department head]_
_____
_____

OWNER: Town of Cary
Cary, North Carolina

PROJECT: FY20-21 Sewer Rehabilitation Project

PROJECT NO.: SW3501

CONTRACT PRICE/SUM: $_____

You are hereby notified to commence Work on the referenced project on or before _____, 20__ (the "Commencement Date"), and are to finally and fully complete the Work within 630 **CONSECUTIVE CALENDAR DAYS** of the Commencement Date. Your Contract final completion date is therefore _____, 20___.

The Agreement provides for assessment of liquidated damages for each consecutive calendar day after the above established completion date that the Work remains incomplete to the standard and degree required.

OWNER:

TOWN OF CARY, NORTH CAROLINA

By: _____
Name: _____
Title: _____
[Department Director or higher]

DATE:_____

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions supplement either:

____ the "General Conditions of the Contract for Construction", AIA Document A201-2007 (the "AIA"), or

X the "Standard General Conditions of the Construction Contract", EJCDC Document No. C-700, 2007 edition (the "EJCDC"),

whichever is applicable (the "General Conditions"), in connection with the Agreement between the Town of Cary as Owner and _____ as Contractor, as such General Conditions may have already been amended, revised and supplemented by other Contract Documents (as defined in the General Conditions). The attached forms supplement the General Conditions and the Contract Documents by providing forms of documentation to use in connection with the provisions in the General Conditions and Contract Documents regarding written communication among project team members and regarding memorializing Contract Document changes and changes to the Project or the Work. All capitalized terms used but not defined herein shall have the meanings ascribed to them in the General Conditions.

This page left intentionally blank

APPLICATIONS FOR PROGRESS PAYMENT

Each Application for progress payment must include, as a minimum, the following information:

1. Progress payment cover letter as included on page 00800-4.

2. Town of Cary Cover Sheet as included on page 00800-5.

3. Itemized quantity sheet(s) as included on page 00800-6.

4. A Certificate of Sales Tax Paid as included on page 00800-7.
   If no sales tax has been paid in the period, then a certificate should be included stating that no sales tax was paid.

ONLY THOSE PARTIES AUTHORIZED by Section 00500, Schedule 1, of the Contract Documents to execute these forms on behalf of the parties listed in each form may execute the attached forms.

*** * * PUT ON CONTRACTOR'S LETTERHEAD * * ***

DATE: _____

TO: Town of Cary

RE: _____

We hereby certify that the labor and materials listed on this request for payment have been used in the construction of this Work, or that all materials included in this request for payment and not yet incorporated into the construction are now on the site or stored at an approved location with proper insurance to protect these stored materials; and that all lawful charges for labor, materials and the like, covered by previous Certificates of Payment have been paid and that all other lawful charges on which this request for payment is based have been paid for in full or will be paid for in full from the funds received in payment of this request within ten (10) calendar days from receipt of this partial payment from the OWNER; and that all setoffs, fines owed by Contractor (to third parties or to Owner), Liquidated Damages and other reductions in the amount due to Contractor have been properly accounted for in the attached Application for Payment.

CONTRACTOR: _____

BY: _____

TITLE: _____

State of _____
County of _____

Sworn to and subscribed before me this _____ day of _____, 20___.

_____
Notary Public (Seal)

My Commission Expires

_____

APPLICATION FOR PAYMENT

Town of Cary, North Carolina

Project _____

Contractor _____

Project No. _____

Period _____

Payment No. _____

The undersigned Contractor certifies that to the best of its knowledge and belief, all items, units, quantities and prices of all work and material indicated on sheet(s) _____of this periodic estimate are correct; that all Work has been performed and Materials supplied in full accordance with the terms and conditions of the construction Contract Documents between the undersigned as Contractor and the Town of Cary as Owner, dated _____, _____, and all authorized changes thereto; that the following is a true and correct statement of the Contract amount up to and including the last day of the period covered by this estimate; and that no part of the "Amount Due This Estimate" has been received.

Total Contract Amount, Including Change Orders _____

Total Amount Earned, To Date _____ _____ % Earned

Total Setoffs, Fines, Liquidated Damages, To Date _____

Total Owed To Date Minus Setoffs, Etc. (Net Earned) _____

(Proceed if positive; else Payment Application is to account for reduction in setoffs, fines Liquidated Damages and the like: _____)

Retainage _____

Total Net Earned Less Retainage _____

Total Previously Approved _____

Amount Due This Estimate _____

(Equal to Amount Unpaid From Previous Estimate _____ minus Current Amount Due_____)

Balance to Finish, Including Retainage _____

The Contractor further certifies that all claims outstanding as of this date against the undersigned as Contractor for labor, materials, and expendable equipment employed in the performance of said Contract up to the date of this estimate have been paid in full accordance with the requirements of this Contract.

CONTRACTOR_____ BY_____ TITLE_____ DATE_____

APPROVAL FOR PAYMENT: *[Check Section 00500, Schedule 1, for parties authorized to execute below.]*

Resident Project Representative	Engineer/Architect	Town of Cary – Department Director's Title

APPLICATION FOR PAYMENT

Town of Cary, North Carolina

PAYMENT NO. _____
PROJECT _____
PERIOD _____
CONTRACTOR _____

ITEM NO	DESCRIPTION OF ITEMS	UNIT	UNIT PRICE	BID QUANTITIES	CURRENT QUANTITY	QUANTITY TO DATE	CURRENT AMOUNT	CONTRACT AMOUNT	% COMP	AMOUNT EARNED TO DATE

	TOTAL EARNED TO DATE	_____
Minus	TOTAL PAID TO DATE	_____
Minus	RETAINAGE	_____
Minus	OTHER REDUCTIONS	_____
Equals	AMOUNT DUE THIS ESTIMATE	_____

CERTIFICATE OF SALES TAX PAID

PAYMENT NO. _____

PROJECT _____ OWNER - TOWN OF CARY, WAKE COUNTY, NORTH CAROLINA

CONTRACTOR _____ FOR PERIOD _____ **TO** _____

Note: Only items that become part of the building/project that the Town of Cary owns or leases are eligible to be listed. The contractor may not include in the statement items they purchased and used to fulfill the contract but did not become part of the actual constructed project. Items such as scaffolding, concrete forms, fuel for the operation of machinery and equipment, tools, equipment repair parts, equipment rentals and blueprints are not to be included in this statement.

As of January 1, 2017, Repair, Maintenance and Installation (RM) projects are subject to tax for labor and materials.

						TAXES PAID						
VENDOR	**MATERIAL PURCHASED**	**VENDOR'S ADDRESS**	**INVOICE # (MUST BE ATTACHED)**	**DATE**	**INVOICE AMOUNT (Pre-tax)**	**NC STATE TAX (4.75 %)**	**Other State Tax Paid**	**County Tax (2.00%)**	**County Tax (2.25%)**	**TRANSIT TAX (O.50%)**	**TOTAL TAX BILL**	**COUNTY NAME**
											-	
											-	
											-	
											-	
											-	
											-	
											-	
											-	
											-	
					TOTAL TAX	-	-	-	-	-	-	

I hereby certify that the above listed vendors were paid sales tax upon purchases of **building materials** during the period covered by this construction estimate and the property upon which such taxes were paid was or will be used in the performance of this contract. No tax on purchases as listed above in yellow highlighted area is included in this certificate. **All of the materials listed above became a part of or are annexed in the above referenced construction project.**

By _____ _____
Signature *Title*

_____, being duly sworn, certifies that the foregoing statement of sales taxes paid in connection with the referenced Contract is true to the best of his or her knowledge and belief.

Sworn to before me this _____ day of _____, 20 _____
Notary Public

My Commission expires _____, 20

Vendor is to fill out the name of the State and County/ Counties being reported. There may be instances where vendor is from another state and taking materials from inventory. ALL building materials should be reported even if it is another state/county. Currently North Carolina counties with Transit Tax – Durham, Mecklenburg, Orange and Wake.

Blanks are in place for the various rate of tax that may be paid if paying another State and County Tax Rate. North Carolina State Rate = 4.75% Counties in NC vary from 2.00% to 2.25%

Resource for Tax Rates can be found http://www.dornc.com/downloads/gen562bycity.pdf

EXAMPLE - CERTIFICATE OF SALES TAX PAID

In this example, product was shipped to Wake County, NC. Therefore, State of Fla 6% - County 0 Tax - Trans 0 Tax

PAYMENT NO. 4

PROJECT **Make an example** OWNER - TOWN OF CARY, WAKE COUNTY, NORTH CAROLINA

CONTRACTOR ***Genesis*** FOR PERIOD **October 1, 2018** TO **December 31, 2018**

Note: Only items that become part of the building/project that the Town of Cary owns or leases are eligible to be listed. The contractor may not include in the statement items they purchased and used to fulfill the contract but did not become part of the actual constructed project. Items such as scaffolding, concrete forms, fuel for the operation of machinery and equipment, tools, equipment repair parts, equipment rentals and blueprints are not to be included in this statement.

As of January 1, 2017, Repair, Maintenance and Installation (RM) projects are subject to tax for labor and materials.

						TAXES PAID						
VENDOR	MATERIAL PURCHASED	VENDOR'S ADDRESS	INVOICE # (MUST BE ATTACHED)	DATE	INVOICE AMOUNT (Pre-tax)	NC STATE TAX (4.75 %)	Other State Tax Paid	County Tax (2.00%)	County Tax (2.25%)	TRANSIT TAX (O.50%)	TOTAL TAX BILL	COUNTY NAME
Yuneedit	Duct work	1 Way St,Yourtown, PA	9876	12/13/2018	100.00	4.75	-	2.00	-	0.50	7.25	Wake
Yordered	steel	2 Way St, Mytown	6789	12/1/2018	10,000.00	-	600.00	-	-	-	600.00	Lancaster Co, Fla
More Store	Hardwood Flooring	1 Broad Rd., Durham, NC	4321	11/20/2018	1,200.00	57.00	-	-	27.00	6.00	90.00	Durham
Store IT	Thermostat	25 Moriah Rd, Durham, NC	3452	11/1/2018	50.00	2.38	-	-	1.13	0.25	3.75	Orange Co
Buzz Feed	Electrical Box	1 Pig Ln, Coates, NC	2436	12/5/2018	90.00	4.28	-	-	2.03	-	6.30	Harnett Co
											-	
											-	
											-	
											-	
					TOTAL TAX	68.40	600.00	2.00	30.15	6.75	707.30	

I hereby certify that the above listed vendors were paid sales tax upon purchases of **building materials** during the period covered by this construction estimate and the property upon which such taxes were paid was or will be used in the performance of this contract. No tax on purchases as listed above in yellow highlighted area is included in this certificate. **All of the materials listed above became a part of or are annexed in the above referenced construction project.**

By _____ _____
Signature *Title*

_____, being duly sworn, certifies that the foregoing statement of sales taxes paid in connection with the referenced Contract is true to the best of his or her knowledge and belief.

Sworn to before me this _____ day of _____, 20 _____
Notary Public

My Commission expires _____, 20

FIELD ORDER

FIELD ORDER NO.: _____ DATE: _____

PROJECT: _____

RE: _____

_____

TO CONTRACTOR: This Field Order is issued to interpret/clarify the Contract Documents, order minor changes in the work, and/or memorialize trade-off agreements. Both parties hereby agree that the work described by this Field Order is to be accomplished without change in Contract Sum or Price, Contract Time or Times, and/or claims with other costs.

DESCRIPTION: _____

_____

_____

_____

_____

ATTACHMENTS: _____

_____

REFERENCES: _____

_____

RECOMMENDED:	**APPROVED:**	**ACCEPTED:**
By: _____	By: _____	By: _____
Frazier Engineering	Owner	Contractor
(Authorized Signature*)	(Authorized Signature*)	(Authorized Signature*)
Date: _____	Date: _____	Date: _____

[Authorized Signature*: Check Section 00500, Schedule 1, for parties authorized to execute above.]

Distribution:

WORK CHANGE DIRECTIVE

WORK CHANGE DIRECTIVE NO.: _____ DATE: _____

Project: _____

Contractor _____

Engineer/Architect _____

You are directed to proceed promptly with the following change(s):
Description: _____

Purpose of Work Change Directive: _____

Attachments (List documents supporting change): _____

If a claim is made that the above change(s) have affected the Contract Sum or Price or the Contract Time or Times, any claim for a Change Order based thereon will involve one or more of the following methods of determining the effect of the change(s).

Method of determining change in Contract Sum or Price:		Method of determining change in Contract Time or Times:	
☐	Unit Prices ( )	☐	Contractor's records
☐	Lump Sum	☐	Engineer's records
☐	Other _____	☐	Other _____

Estimated (increase/decrease) in Contract Price:

$_____

Estimated (increase/decrease) in Contract Times:

Substantial Completion:_____days;
Ready for final payment: ____days;

If the change involves an increase, the estimated price and times are not to be exceeded without further authorization.

RECOMMENDED:	**APPROVED:**	**ACCEPTED:**
By: _____	By: _____	By: _____
Frazier Engineering	Owner	Contractor
(Authorized Signature*)	(Authorized Signature*)	(Authorized Signature*)
Date: _____	Date: _____	Date: _____

[Authorized Signature*: Check Section 00500, Schedule 1, for parties authorized to execute above.]

WORK CHANGE DIRECTIVE INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Sum or Price or the Contract Time or Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a possible change in the Contract Sum or Price or the Contract Time or Times a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

Engineer or Architect initiates the form, including a description of the items involved and attachments.

Based on conversations between Engineer or Architect and Contractor, Engineer or Architect completes the following:

> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT SUM OR PRICE: Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Sum or Price. If the change involves an increase in the Contract Sum or Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the changed Work when the estimated price is reached. If the Work Change Directive is not likely to change the Contract Sum or Price, the space for estimated increase (decrease) should be marked "Not Applicable."
>
> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT TIME OR TIMES: Mark the method to be used in determining the change in Contract Time or Times and the estimated increase or decrease in Contract Time or Times. If the changes involves an increase in the Contract Time or Times and the estimated times are approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the times or Contractor may stop the changed Work when the estimated times are reached. If the Work Change Directive is not likely to change the Contract Time or Times, the space for estimated increase (decrease) should be marked "Not Applicable."

Once Engineer or Architect has completed and signed the form, all copies should be sent to Owner for authorization because neither Engineer nor Architect alone has the authority to authorize changes in the Contract Sum or Price or the Contract Time or Times. Once authorized by Owner, a copy should be sent by Engineer or Architect to Contractor. The Contract Sum or Price and the Contract Time or Times may only be changed by Change Order signed by Owner and Contractor with Engineer's or Architects' recommendations. *Furthermore, only those parties specified by Section 00500, Schedule 1, of the Contract Documents as being authorized to sign the Work Change Directive Form on behalf of each party may execute a valid Work Change Directive Form.*

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT SUM OR PRICE OR THE CONTRACT TIME OR TIMES. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

CHANGE ORDER

CHANGE ORDER NO.: _____ DATE: _____

Project:_____

Contractor:_____

Engineer/Architect:_____

CONTRACTOR is directed to make the following changes in the Contract Documents.

Description:_____

Attachments:_____

CHANGE IN CONTRACT SUM OR PRICE:	CHANGE IN CONTRACT TIME OR TIMES:
Original Contract Price $_____	Original Contract Times Final Completion:_____ days or dates
Net change from previous Change Orders No. ____ to No. ____: $_____	Net change from previous Change Orders No. ____ to No. ____: _____ days
Contract Sum or Price prior to this Change Order $_____	Contract Times prior to this Change Order Final Completion:_____ days or dates
Net Increase (decrease) of this Change Order $_____	Net Increase (decrease) of this Change Order _____ days
Contract Sum or Price with all approved Change Orders $_____	Contract Times with all approved Change Orders Final Completion:_____ days or dates

RECOMMENDED:	**REVIEWED:**	**ACCEPTED:**
By: _____	By: _____	By: _____
Frazier Engineering	Town of Cary Department Director Title	Contractor
(Authorized Signature*)	(Authorized Signature*)	(Authorized Signature*)
Date: _____	Date: _____	Date: _____

[Authorized Signature*: Check Section 00500, Schedule 1, for parties authorized to execute above.]

CHANGE ORDER NO.: _____

Page ___ of ___

The adjustment in Contract Sum or Price and/or Contract Time or Times stated in this Change Order shall comprise the total price and/or time adjustment due or owed the CONTRACTOR for the work or changes defined in this Change Order. By executing the Change Order, the CONTRACTOR acknowledges and agrees that the stipulated price and/or time adjustments include the costs and delays for all work contained in the Change Order, including costs and delays associated with the interruption of schedules, extended overheads, delay, and cumulative impacts or ripple effect on all other non-affected work under this Contract. Signing of the Change Order constitutes full and mutual accord and satisfaction for the adjustment in Contract Sum or Price or Contract Time or Times as a result of increases or decreases in costs and time of performance caused directly and indirectly from the change, subject to the current scope of the entire work as set forth in the Contract Documents. Acceptance of the waiver constitutes an agreement between OWNER and CONTRACTOR that the Change Order represents an equitable adjustment to the Contract, and that CONTRACTOR waives all rights to file a claim on this Change Order after it is properly executed.

IN WITNESS WHEREOF, the undersigned have caused the execution hereof:

CONTRACTOR (shall be authorized to execute contractin accordance with Section 00500, Schedule 1):

_____

By: _____
Name: _____
Title: _____
Address: _____
Date: _____

ATTEST:

_____
_____ Secretary

[Corporate Seal]

OWNER:

TOWN OF CARY

By: _____
Name: authorized signature per SP-34
Title: title
Date: _____

CHANGE ORDER INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling Contract changes that affect the Contract Sum or Price or the Contract Time or Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect the Contract Sum or Price or the Contract Time or Times.

Changes that affect the Contract Sum or Price or the Contract Time or Times should be promptly covered by a Change Order. The practice of a cumulating change order items to reduce the administrative burden may lead to unnecessary disputes.

If milestones have been listed, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Sum or Price or the Contract Time or Times, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer or Architect initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer or Architect has completed and signed the form, all copies should be sent to Contractor for approval. If the Contractor is a Corporation, an officer (President or Vice-President) of the corporation must sign the change order. If an agent other than an authorized officer of the Corporation signs, a Resolution giving authorization from the Board of Directors must be attached. *In any event, only those parties specified by the 00500 Agreement, Schedule 1, as being authorized to sign the Change Order Form on behalf of each party may execute a valid Change Order Form.* After approval by Contractor, all copies should be sent to Owner for approval. Engineer or Architect should distribute executed copies after approval by Owner.

If a change only applies to the Contract Sum or Price or to the Contract Time or Times, cross out the part of the tabulation that does not apply.

CONTRACTOR'S RELEASE OF OWNER PRIOR TO FINAL PAYMENT

The Contractor, known as _____,

for the construction of Project: _____,

hereby and forever releases the Town of Cary (Owner), its officers, agents, and [Engineers/Architects]: _____, from all past, present, and future claims and liability to the Contractor for anything done or furnished for, relating to, or for any act of neglect of the Owner, its engineers, or any persons relating to or affecting the work.

Contractor's Certification:

Contractor: _____

Authorized Representative: _____

Date: _____

CONSENT OF SURETY COMPANY TO FINAL PAYMENT

PROJECT: _____

OWNER: _____

CONTRACTOR: _____

CONTRACT DATE: _____

TO: _____

_____

_____

_____

In accordance with the provisions of the Contract between the Town of Cary (Owner), and the Contractor, known as _____, the Surety Company, known as _____, on bond of Contractor, hereby approves of the final payment to Contractor, and agrees that final payment to Contractor shall not relieve the Surety Company of any of its obligations to the Owner as set forth in said Surety Company's bond.

In witness whereof, the Surety Company has hereunto set its hand this ____ day of _____ in the year _____.

_____
Surety Company

_____
Signature of Authorized Representative

_____
Typed Name and Title of Authorized Representative

[Seal]

FINAL RECEIPT

Contract: _____

Received this _____ day of _____, 20___ as full and final payment of the cost of all improvements provided for in the foregoing Contract the sum of _____ Dollars and _____Cents, ($_____), in cash (directly or as setoff against fines, Liquidated Damages, or other amounts owed to the Owner), being the full amount accruing to the undersigned by virtue of said Contract, said cash covering and including full payment for all extra work and material furnished by the undersigned in the construction of said improvements, and all incidentals thereto, and the undersigned hereby releases the said _____ from all claims whatsoever growing out of the said Contract.

These presents are to certify that all persons doing work upon or furnishing materials or supplies for said improvements under the foregoing Contract have been paid in full.

The undersigned further certifies that all taxes imposed by Chapter 212, North Carolina Statues (Sales and Use Tax Act), as amended, have been paid and discharged.

_____
CONTRACTOR

By: _____ (Seal)

_____
(Typewritten Name)

STATE OF _____
COUNTY OF_____

Subscribed and sworn to before me this the _____day of _____, 20___.

_____
[SEAL] Notary Public

SECTION 01010

SUMMARY OF WORK AND SPECIAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Project will be used to rehabilitate sewers throughout the Owner's service area as shown on the Drawings. Refer to the Drawings for additional information, requirements, scope of work and sequence of construction.

The work included in this Project may include any of the following work items.

- Cleaning and televising existing sewers to evaluate the sewers, identify defects that need repaired, and determine the final rehabilitation to be performed under this Contract
- Performing point repairs to existing sewers (via excavation) to repair specific sewer defects; point repairs may be stand-alone repairs with no other rehabilitation to that sewer or repairs to facilitate lining the sewer with CIPP
- Replacing sewers from manhole to manhole and installing new manholes (via excavation)
- Lining existing sewers with cured-in-place pipe lining (CIPP)
- Pipe bursting existing sewers
- Rehabilitating service laterals via replacement (excavation)
- Installing new manholes
- Performing various manhole rehabilitation including coating manholes with a specialty cementitious mortar, locating and raising manholes, replacing and adjusting frames and covers, rebuilding benches and inverts, etc.
- Performing miscellaneous work and restoration

The Owner may have emergency situations (such as sewer overflows or backups) that arise during this Contract which may require immediate sewer rehabilitation and may be added to this Contract. The Contractor will be expected to provide services to repair these emergency situations. The emergency situations may be in areas included in this Contract or in sewers not shown on the Drawings. The emergency work may be located anywhere in the Owner's service area.

The Engineer will notify the Contractor of the emergency situations. The Contractor shall immediately terminate work on the current work and proceed to the emergency work. The Contractor shall not be due any

additional money for mobilizing to perform the emergency work but may be granted additional Contract time if so requested by the Contractor in writing and approved by the Engineer. The Contractor shall be paid for the emergency work at the unit prices bid. The Contractor shall begin work on the emergency situation within 2 working days from receiving the work, and rehabilitation shall begin within 4 working days from receiving the work.

B. The Contractor will be paid for the actual work completed. All quantities stipulated in the Bid Form are approximate and are to be used only (1) as a basis for estimating the probable cost of the Work, and (2) for the purpose of comparing the bids submitted for the Work. The actual amounts of work done under unit price items may differ from the estimated quantities. The basis of payment for work shall be the actual amount of work done. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and the estimated amounts shown on the Bid Form – this specification shall take precedence over any other specification(s) related to bid quantities located elsewhere in these Specifications.

   The total value of work shall not exceed the Contract amount unless approved by the Owner in writing (by a change order or written authorization). The Engineer will continuously review the actual quantities and value of work completed with the Contract amount. The Engineer may need to eliminate some of the work so as not to exceed the Contract amount.

C. Conflict or Inconsistency: If there is any conflict or inconsistency between these SPECIAL PROVISIONS and other Specification Sections, the provisions of these SPECIAL PROVISIONS shall prevail. If there is any conflict or inconsistency between the SPECIAL PROVISIONS and the GENERAL CONDITIONS, the SPECIAL PROVISIONS shall prevail.

1.02 PUBLIC NOTIFICATION

A. The Contractor shall continuously notify the public of the work being performed. See Paragraph 4.07.E of the Standard General Conditions.

1.03 WEEKLY WORK SCHEDULES AND WORK COMPLETE FORMS

A. The Contractor shall submit a weekly construction schedule for the upcoming week by noon every Friday. The schedule shall define all construction activities for the week including specific work between specific manholes. If changes occur to the schedule, the schedule shall be immediately updated and resubmitted to the Engineer. The Engineer may request that the construction schedules be

submitted to other agencies such as HOAs, golf courses, etc. Work not scheduled shall not be performed or approved for payment.

B. In addition, the Contractor shall submit to the Engineer work complete forms every Friday. The work complete forms shall document all work completed during the week, including quantities for each bid item, and shall list all equipment used during the week and all personnel on the job each day.

1.04 ACCESS TO THE PROJECT SITES

The work under this Contract will be in easement areas including along creeks, easement areas in yards, in residential roads including HOA-owned private roads, in parking lots, in secondary roads, and/or in major thoroughfares. The Contractor shall be solely responsible for accessing the sewers and manholes to perform the work, including determining access requirements and developing alternate access points as required, removing and replacing to equal conditions moveable obstacles (such as fences), clearing and mowing right-of-ways as required, negotiating with property owners, and restoring all areas disturbed by the work to equal or exceed preconstruction conditions (including repairing ruts, seeding and mulching, replacing moveable objects, etc.). The Contractor is advised that conditions within the easement areas will change throughout the year, and the condition of the easements may be different when the work commences compared to the conditions at the time of bidding. Easement areas will become wet during rainy periods and may become overgrown with brush and vegetation during typical growing periods.

Access shall be along the existing sewer easements or within the existing road rights-of-way and work shall be maintained within the easements and rights-of-way unless otherwise approved by the individual property owners and/or the Owner. The Contractor shall be responsible for negotiating with property owners for such alternate access and shall pay any and all costs associated with such alternate access as specified above. All such negotiations with property owners shall be in writing, and copies of the agreements shall be submitted to the Engineer prior to using the access. The Contractor shall perform preconstruction videoing and photographing prior to any work, including accessing the sewers, as specified further herein.

The Contractor shall submit a proposed plan for accessing the sewers and manholes to the Owner for review and approval. The proposed plan shall be detailed and shall define each access point. The Contractor shall modify the plan as required by the Owner.

The costs for accessing the sewer shall be included in the various unit prices bid. No separate payment will be made for accessing the sewers and manholes.

1.05 TRAFFIC CONTROL

The Contractor shall submit to the Owner a detailed traffic control plan for performing all phases of the work at least two weeks prior to performing the work in residential/secondary roads and three weeks prior to working in major thoroughfares. The traffic control plan shall be specific to each road and each sewer and manhole and shall adhere to the requirements of NCDOT's "Manual on Uniform Traffic Control Devices" (MUTCD). The traffic control plans must be approved and the encroachment permit issued by the Owner and/or NCDOT prior to performing any work on the roads. The traffic control plan shall be modified as necessary in the field, at no additional cost, to accommodate unforeseen traffic control issues and problems and safety concerns as identified by the Contractor, Owner, and/or NCDOT.

The Contractor shall perform and provide all necessary traffic control measures to complete the work. No roads shall be closed for construction activities unless specifically approved in writing by the Engineer. At least one lane of traffic shall be safely maintained at all times while work is in progress. Access to businesses and residences along the roads shall be maintained at all times. All lanes shall be open when work is suspended for one hour or longer. Signs and barricades must be removed from the site when work is no longer being performed, even during short breaks in the work (such as lunch breaks).

The Contractor shall provide all appropriate signage and barricades and shall provide flag persons at all times and places necessary. Traffic control will be strictly enforced in order to provide fire and police protection to the area and access to drives while construction is in progress. Occupants must be notified a minimum of two (2) hours in advance of private drive closings. Closure time will be limited to a maximum of 2 hours. Where businesses have only one means of access, the Contractor shall provide an alternative means of access or perform work during hours when the business is closed.

Traffic control is a mandatory subsidiary obligation under the Contract, and all costs of traffic control shall be included in the various unit prices bid – no separate payment will be made.

1.06 DISPOSAL OF DEBRIS

The Contractor shall be responsible for disposal of all unused or unsuitable trench material excavated or encountered in the work that is not used for completion of the work.

1.07 SHOP DRAWINGS

Shop drawings are required for all materials proposed for installation under this Contract. See Paragraph 6.17 of the Standard General Conditions.

1.08 PRE-CONSTRUCTION VIDEO INSPECTIONS AND PHOTOGRAPHY

The Contractor shall video and photograph all project/work areas (street and off-road areas) prior to performing any work, including accessing the manholes/sewers, to document pre-work conditions in case future complaints arise. See Paragraph 4.07.D of the Standard General Conditions.

1.09 COORDINATION OF CONTRACTORS

The Owner may have additional contractors in the project areas during this contract. These other contracts may pre-date or post-date this contract. The work being performed under these other contracts may include other sewer rehabilitation work or other Owner work (sidewalks, roads, parks, etc.). The contractor shall coordinate his work with any other Owner contractor working in the area. No additional payment will be made for this required coordination.

1.10 SURVEYING REQUIREMENTS

The Contractor is responsible for performing all surveying required for completion of this Project and the various work items included in the Bid. The costs for all surveying shall be included in the various unit prices bid – no separate payment shall be made.

For sewer replacements from manhole to manhole, the Contractor shall survey the sewers at each manhole (sewer in and out at each manhole) for the extent of the replacement work to identify the existing sewer slopes and any elevation changes through the existing manholes. The Contractor shall also survey the next upstream and downstream manholes so that a comprehensive decision can be made on the extent of the required replacement work. The survey information shall be submitted to the Engineer for review and determination of the slope for the new sewer(s). The survey shall be completed and submitted at least two weeks in advance of the replacement work to provide adequate review time for the Engineer.

1.11 SOIL AND EROSION CONTROL

The Contractor shall protect against soil erosion into nearby streams and storm drains at all times. Minimum erosion control requirements shall be as shown on the Drawings (where applicable). The Contractor shall install silt fence along the downstream side of all construction activities and provide inlet protection around all catch basins/storm inlets whether shown on the Drawings or not. Any water removed from excavations during dewatering shall be filtered to remove sediments before being discharged to the creek or the sanitary sewer system (when approved by the Engineer). The Contractor shall add additional erosion control devices throughout construction as deemed necessary and as required by the Owner, Engineer or regulatory agencies.

The erosion control devices shall be installed prior to performing any work including clearing and shall be maintained throughout construction. Construction entrances shall be provided at all off-road work sites. All erosion control devices shall be checked continuously and immediately after rain events. Repairs to erosion control devices shall be made immediately when identified. Silt fences shall remain functional until all restoration has been performed and the restoration is accepted by the Engineer/Owner. An adequate stand of grass will be required prior to removing silt fences. The Contractor shall remove all erosion control devices upon completion of the work and completely restore disturbed areas. Contractor shall obtain the Engineer's approval prior to removing erosion control devices.

As part of the soil and erosion control measures, where practicable, trenches should be filled, covered and temporary seeding applied at the end of each day. Stabilization measures shall be initiated as soon as practicable, but in no case more than 14 days after work has ceased in that area.

1.12 COORDINATION WITH EXISTING UTILITIES

The Contractor shall contact the local utilities locating company to locate existing utilities in the area prior to performing any excavation. The Contractor shall locate existing utilities and facilities not located by the locating company. The Contractor shall closely coordinate with all utility companies.

The Contractor shall be responsible for protecting all existing utilities during the work and shall repair any damage to the satisfaction of the utility owner. If the utility company fixes the damage, the Contractor shall pay for the repair if required.

Some existing utilities may be shown on the Drawings. The locations shown shall be considered approximate only. Most (or all) of the existing utilities may not be shown. The Contractor shall determine actual locations of all utilities within the construction area. The Contractor is advised that the project areas may be congested with existing utilities, and existing utilities will cross sewer trenches and run parallel with sewer trenches. The Contractor shall accommodate and protect all existing utilities regardless of location and shall be responsible for repairing all damage to the utilities – no separate or additional payment shall be made for accommodating and protecting existing utilities.

1.13 UTILITY POLES

The Contractor shall note that the work may be located near existing utility pole and guy wires. The Contractor shall make all necessary arrangements with the various utilities to protect the poles and guy wires and make any necessary relocations of same if field conditions require, as determined by the Engineer and the utility owners, and at no additional cost to the Owner.

1.14 RESTORATION

The Contractor shall be responsible for restoring all areas affected by the work to equal or exceed pre-construction conditions. All restoration work shall be performed in accordance with the standards and specifications.

Restoration work shall be performed daily to restore areas disturbed during that day including pavement. If requested by the Contractor, the Engineer may allow the Contractor to perform the restoration work one day per week (at the end of the work week). However, if complaints are received from the Owner, City, County, State, or residents, the Engineer will require that daily restoration be performed.

1.15 RESTORATION OF GRASSED AREAS

The Contractor shall be responsible for restoring all grassed areas affected by the work to equal or exceed pre-construction conditions. Restoration of grassed areas shall be performed at the end of each day unless otherwise approved by the Engineer. The costs for restoring grassed areas via seeding and mulching including all requirements specified below shall be included in the various bid items - no separate payment will be made. A bid item is included for sod installation. Payment will not be made for the various work items until the restoration is complete and satisfactory to the Engineer unless otherwise approved by the Engineer. The Engineer will consider in such a decision whether the Contractor is using the subject areas for accessing the upstream work in which case the area cannot be restored. Final payment will not be made until all areas are completely restored to the satisfaction of the Engineer and property owner. Refer to the Drawings for additional requirements.

The Contractor shall initially be considered acceptable to perform the restoration work. However, if the Contractor's work is not satisfactory to the Engineer, Owner or property owner(s), the Contractor shall hire a local, professional landscaping company to perform the work at no additional cost to the Owner. The Contractor should consider retaining a local landscaping company during the 1-year warranty period to handle all complaints and warranty issues.

All grassed areas disturbed by the work under this Contract may be either seeded and mulched or sodded. The Engineer/Owner must agree with the choice of restoration recommended by the Contractor prior to any grassing being done (some areas on the Drawings may be designated to have specific type or method of grassing at that location).

1.16 FENCE REPLACEMENT

Existing fences that are disturbed during construction shall be repaired or replaced to a condition equal to or better than the original unless a release is obtained from the property owner and submitted to the Engineer. All fences shall be replaced immediately after construction has cleared the fence line. The costs to remove and replace the existing fences shall be considered incidental to the work and shall be included in the various unit prices bid. If the existing fence is not salvageable and a new section required, as agreed to by the Engineer prior to any work in the area and prior to removing the existing fence, a price shall be negotiated and payment made from the contingency item, as approved and directed by the Engineer. If the Contractor does not obtain the Engineer's approval for new fence material prior to removing the existing fence, the Contractor will be responsible for installing the new fence at no cost to the Owner.

1.17 MAILBOX/STREET SIGN REPLACEMENT

The Contractor, along with the Owner's and/or Engineer's representative(s), will measure all mailboxes and street signs horizontally from edge of pavement and vertically from finish ground prior to removal. The Contractor and the Owner's and/or Engineer's representative(s) will log these measurements at each location to ensure proper replacement. Street signs shall be replaced immediately after construction at that location. Mailboxes shall be replaced by the end of the business day or no more than 2 hours after removal. The cost of this work shall be included in the various bid items – no separate payment will be made.

1.18 EQUIPMENT IDENTIFICATION SIGNS

All motorized construction equipment, trucks, vehicles, and storage trailers, etc. used (owned, leased, rented or borrowed) by the Contractor on this project shall be equipped with a pair of signs to identify the Contractor. The signs shall be permanently or magnetically attached to each side of the equipment at all times.

1.19 TREE PROTECTION

All trees located in the road right-of-way and along the sewer easements shall be protected from damage by this construction. Barriers shall be installed around each tree to remain. The barrier shall be a suitable temporary fence and shall be installed around the drip line of the tree (around the outside of the overhanging tree limbs) unless otherwise approved by the Engineer. No equipment, construction materials, topsoil, fill dirt or any other material shall be placed within the barrier. Nothing shall be nailed or attached to the tree.

Any trees that are damaged shall be repaired as approved by the Engineer. An Arborist, paid for by the Contractor, may be required to recommend repair of severely damaged trees. Recommendations by the Arborist shall be strictly

followed. Severely damaged trees may require replacement with a like-kind tree. Any tree that dies (including during the warranty period) as a result of the work shall be replaced with a like-kind tree including size to the extent possible. Tree replacement shall be approved by and acceptable to the property owner and Engineer.

1.20 CLEANUP WORK

The Contractor shall completely clean up the work site at the end of each day. The cleanup work shall include washing streets with high pressure water, removing debris, and removing stockpiled materials and equipment from the site as necessary. If requested by the Contractor, the Engineer may allow the Contractor to perform the cleaning operations one day per week (at the end of the work week). However, if complaints are received from the Owner, State, or residents, the Engineer will require that daily cleanup be implemented.

1.21 FINAL INSPECTION

A. When all work is completed in a basin or work area, the Engineer will perform an inspection of the work and generate a punchlist of defects, deficiencies and issues for the Contractor to address. The Contractor shall address all deficiencies within 21 days or work will not be allowed to continue on other work areas until the deficiencies are completely addressed.

B. After all work is completed (including all restoration and testing), the Engineer will perform a final inspection of all work in all work areas. The Contractor shall notify the Engineer in writing when the work is complete and ready for final inspection. The final inspection will not be performed if any portion of the work is obviously not complete. A punchlist will be developed by the Engineer to identify defects, deficiencies and issues found during the final inspection that must be repaired by the Contractor prior to final payment. After the Contractor addresses the punchlist to the satisfaction of the Engineer, the final pay estimate for the project can be submitted by the Contractor for payment.

C. The Engineer will also perform periodic inspections of the completed work throughout this Contract. Any deficiencies found shall be corrected by the Contractor promptly. Failure to correct deficiencies promptly may result in payment being withheld.

1.22 ADJACENT STRUCTURES AND LANDSCAPING

The Contractor shall be entirely responsible and liable for all damage or injury as a result of his operations to all public and private property, structures of any kind, and appurtenances thereto during the progress of the work. The cost of protection, replacement in the original location and condition, and payment of

damages for injuries shall be included in the various bid items, and no separate payments will be made.

The Contractor is advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent to and in the vicinity of his operations, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the work shall be performed by and shall be the responsibility of the Contractor.

The Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by his operations. Repairs to or replacement of all damage reasonably attributed to or caused by the construction shall be made to the satisfaction of the affected property owner, the Owner and the Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Engineer.

Prior to the beginning of any excavations or other work, the Contractor shall advise the Engineer of all buildings or structures the project work will affect and any pre-existing conditions that need to be brought to the attention of the Engineer.

Lawn areas shall be left in as good or better condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, maintained, and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in these Specifications. All restoration shall be as specified in these Specifications. The final grade shall match the pre-existing grade as closely as possible unless noted otherwise.

Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good or better condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the property owner and the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate bid item.

1.23 NOISE CONTROL

The Contractor shall minimize noise at all times and shall make reasonable efforts to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated

in a manner to cause the least noise consistent with efficient performance of the Work.

During construction activities on or adjacent to occupied buildings, and when appropriate, the Contractor shall erect screens or barriers effective in reducing noise in the building and shall conduct his operations to avoid unnecessary noise which might interfere with the activities of building occupants. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency or where approved or specified by the Engineer, no work which produces noise shall be done between the hours of 6:00 P.M. and 7:00 A.M., or on Sundays. Dewatering equipment and bypass pumping equipment operating during these times shall be quiet or silent pumps or electric motor driven pumps. If the proper and efficient prosecution of specific and limited work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.

1.24 DUST CONTROL

The Contractor shall take sufficient precautions throughout construction to minimize the amount of dust created. The Contractor shall prevent dust nuisance from his operations or from traffic by keeping roads and/or construction areas clean and sprinkled with water. Construction entrances shall be provided as specified in the standard details.

Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

1.25 SMOKE PREVENTION

The Contractor shall not use equipment which routinely produces substantial visible emissions. Strict compliance with ordinances regulating the production and emission of smoke will be required. No open fires will be permitted unless approved by the local authorities and the Engineer.

1.26 STAGING AREAS

The Contractor shall be responsible for locating, negotiating and paying for staging areas and equipment and material storage areas.

1.27 PARKING

The Contractor shall provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in

connection with the project and as required to avoid any need for parking personal vehicles where they may interfere with public traffic, the Owner's operations, or construction activities.

1.28 PROTECTION OF WORK

The Contractor shall at all times, until final acceptance of the work, provide protection of the work, either new or previously existing, from all hazards involved in his operations.

1.29 SECURITY

The Contractor shall be responsible for protection of the site, and all Work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons. No claim shall be made against the Owner by reason of any act of any employee or trespasser, and the Contractor shall make good all damage to the Owner's property resulting from his failure to provide security measures as specified. The Contractor shall provide insurance to cover the cost of all labor, materials and equipment to be supplied under this Contract until the work is completed, acceptance testing has been performed, and the Owner has accepted the project and it is ready to be placed in service.

1.30 PUBLICITY

All prime contractors and their subcontractors shall submit to the Owner for approval all publicity items, including photographs, relating to the work of this project. The Owner shall approve any and all material prior to release for publication.

1.31 SPECIAL PRECAUTIONS

At all times during the construction of the project and its component parts, the Contractor shall provide, install and maintain proper temporary supports, shoring and bracing to prevent any damage to the work due to all causes.

1.32 WARRANTY PERIOD

The Contractor shall warrant all work and materials installed in this Contract for one (1) year from the date of final acceptance. The date of final acceptance shall be the date that final payment is made to the Contractor. Prior to final acceptance, the Contractor shall submit a written plan on how warranty issues will be addressed, including CIPP issues, manhole issues, and restoration issues.

END OF SECTION

SECTION 01000

DEFINITIONS, ABBREVIATIONS and REFERENCE STANDARDS

(Revised 01-04-02)

PART 1 - DEFINITIONS

A. EASEMENT – An interest in land owned by another that entitles its holder to a specific use.

B. INVERT - The lowest point in the internal cross section of a pipe or other culvert.

C. RIGHT OF WAY - The area that encompasses public streets, sidewalks and utility strips.

D. SUBGRADE - That portion of the roadbed prepared as a foundation for the pavement structure.

PART 2 - ABBREVIATIONS

A. Following is a partial list of abbreviations that may appear in the specifications, and their definitions.

B. A.B.S. Acrylonitrile Butadiene Styrene

C. A.F.F. Above Finished Floor

D. AWG American Wire Gauge

E. BHP Brake Horsepower

F. °C Degrees Centigrade

G. cy or cu. yd. Cubic Yard

H. DIP Ductile Iron Pipe

I. °F Degrees Fahrenheit

J. ft. foot

K. gpd gallons per day

L. gpm gallons per minute

M. HP Horsepower

N. ID internal diameter

O. in. Inches

P. lbs. Pounds

Q. MSL mean sea level

R. O.C. on center

S. OD outside diameter

T. OSHA Occupational Safety and Health Act

U. oz. Ounce

V. P.C. point of curvature

W. P.E. Professional Engineer, registered in North Carolina

X. P.L.S. Professional Land Surveyor, registered in North Carolina

Y. ppm parts per million

Z. psi pounds per square inch

AA. P.T. point of tangency

BB. PVC polyvinyl chloride

CC. P.V.C. point of curvature on vertical curve

DD. P.V.T. point of tangency on vertical curve

EE. Qmax maximum discharge

FF. Qmin minimum discharge

GG. RH relative humidity

HH. sec. Second

II. sq. ft. square feet

JJ. sq. yd. square yard

KK. TDH Total Dynamic Head

LL. VAC volts (alternating current)

MM. VDC volts (direct current)

PART 3 – REFERENCE STANDARDS

A. All materials, products and procedures incorporated into the work shall be in strict accordance with the following codes, standards and specifications. Wherever reference is made to any published standard, code or standard specification, it shall mean the latest edition in effect at the invitation for bids.

B. American Association of State Highway and Transportation Officials (AASHTO)

C. American National Standards Institute (ANSI)

D. American Society of Testing and Materials (ASTM)

E. American Water Works Association (AWWA)

F. Ductile Iron Pipe Research Association (DIPRA)

G. Manual on Uniform Traffic Control Devices for Streets and Highways, as prepared by the National Advisory Committee on Uniform Traffic Control Devices (MUTCD)

H. North Carolina Department of Transportation (NCDOT) Standard Specifications - may be obtained from NCDOT Design Services Unit – Manual Distribution, P.O. Box 25201, Raleigh, NC 27611, phone 919-250-4128.

I. North Carolina Department of Environment and Natural Resources (NCDENR)

J. National Electrical Code (NEC)

K. National Electrical Manufacturers Association (NEMA)

L. Natural Resources Conservation Service (NRCS)

M. Occupational Safety and Health Act (OSHA)

N. Town of Cary (TOC) Standard Specifications and Details - may be obtained from the office of the Engineering Director, Town of Cary Engineering Department, P.O. Box 8005, 316 N. Academy Street, Cary N.C., 27513. Where TOC standard specifications exceed NCDOT standards, the TOC standard specification shall apply.

O. Underwriters Laboratories, Inc. (UL)

END OF SECTION 01000

SECTION 02000
SUBMITTALS
(Revised 1-8-02)

PART 1 – SUBMITTALS

A. General Submittal Requirements

i. Submittals shall meet the requirements of the General Conditions and Supplementary Conditions.

ii. The Contractor shall transmit submittals in sufficient time to allow thorough review by the Engineer.

iii. Submittals shall be accompanied by a letter of transmittal containing the date, project name, Contractor's name, supplier, manufacturer, number and title of submittal, notification of exceptions and/or deviations from the Contract requirements, and any other pertinent data to facilitate review.

iv. The Contractor shall thoroughly check all submittals for accuracy and conformance to the intent of the Contract Documents, and make any necessary changes, prior to submitting them to the Engineer. All submittals shall bear the Contractor's certification stating that they have been so checked. **This certification shall include the following 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." SUBMITTALS WITHOUT THE CONTRACTOR'S CERTIFICATION WILL BE RETURNED TO THE CONTRACTOR WITHOUT REVIEW.**

v. No material shall be ordered, fabricated or shipped or any work performed until the Engineer returns the required submittal to the Contractor with satisfactory review indicated.

vi. The Engineer's review of the Contractor's submittals shall in no way relieve the Contractor of any responsibility under the Contract. An acceptance of a submittal shall be interpreted to mean that the Engineer has no specific objections to the submitted material, subject to conformance with the Contract Documents.

B. Shop Drawings

i. The Contractor shall submit to the Engineer for review shop drawings for all fabricated work and for all manufactured items for which shop drawings are required elsewhere in the project manual.

ii. Where manufacturer's publications in the form of catalogs, brochures, illustrations or other data sheets are submitted, items for which approval is requested shall be shall be specifically indicated. Submittals showing only general information shall not be acceptable.

iii. Within ten (10) days after notice to proceed, the contractor shall submit three (3) copies of his preliminary schedule of shop drawing submittals to the Engineer for approval.

C. Layout and Installation Drawings

i. The Contractor shall submit to the Engineer for review layout and installation drawings for all pipes, valves, fittings, sewers, manholes, electrical, conduits, etc. to be provided under this contract.

ii. Within ten (10) days after notice to proceed, the contractor shall submit three (3) copies of his preliminary schedule of layout and installation drawing submittals to the Engineer for approval.

PART 2 – OTHER REQUIREMENTS

A. Progress Schedule

i. The Contractor shall submit three (3) copies of its proposed progress schedule to the Engineer for review and approval, in accordance with the General Conditions.

ii. Progress schedule shall be updated monthly, with three (3) copies submitted to the Engineer with the application for payment. The Engineer may withhold progress payments until such time as the schedule or revised schedule is received.

iii. Progress schedule shall be prepared in the form of a horizontal bar chart showing in detail the proposed sequence of work. Schedule shall be time scaled showing start and completion dates for each stage of the work. The

schedule shall account for all subcontractors. The schedule shall provide for proper sequence of construction considering various crafts, purchasing time, submittal review, material delivery, equipment fabrication and similar time-consuming factors. The schedule shall show as a minimum, earliest starting earliest completion, latest starting, latest completion, and total float for each task or item.

B. List of Subcontractors

i. The Contractor shall submit to the Engineer for review, prior to the preconstruction conference, a listing of all subcontractors. This submittal shall include a description of the work to be performed by each subcontractor, the estimated value of such work, and the subcontractor's experience performing similar work.

END OF SECTION 02000

SECTION 02150

BYPASS SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope: The Contractor shall furnish, construct, maintain and operate bulkheads, containment system, plugs, hoses, piping, and pumps to bypass sewage flow around the project area as necessary. The bypass system shall, at all times, prevent backup or overflow onto streets, yards and unpaved areas or into buildings, adjacent ditches, storm sewers, and waterways. The Contractor shall design and provide the bypass system with sufficient firm pumping capacity to pump the existing sewer being bypassed flowing full. Firm capacity is defined as the capacity of the pumping system when the largest pump is out of service. The capacity of the sewer shall be calculated based on the minimum slope of the smallest diameter of the section of sewer that is being bypassed. The Contractor is advised that during rain events the flow in the existing sewers will increase rapidly and will fill the pipe and in many cases surcharge the pipe. Bypass pumping systems will be paid as specified in the Bid.

B. Spills of any type, including but not limited to all spills and/or leaks caused by the operation of bypass pumps or other operations of the Contractor are strictly prohibited at all times; notwithstanding such prohibition any such occurrence shall be reported to the Owner immediately after discovery and all costs, associated with the overflow and overflow clean up, including any fines and legal costs incurred by the Owner and costs associated with property damage as a result of the overflow, shall be paid for solely by the Contractor. Costs of damage to real or personal property as a result of an overflow, and any other direct, indirect, incidental or consequential damages resulting therefrom or related thereto, shall be the sole responsibility of the Contractor, for which the Contractor will defend, indemnify and hold the Owner harmless. In addition to these responsibilities of the Contractor in the event of a substantial spill that reaches a natural stream caused by the negligent operations of the Contractor, may be deemed to be a substantial violation of the Contract Documents and a basis for termination under Paragraph 15.02 of the General Conditions.

C. The Contractor is forewarned of the potential for sewer surges which cause rapid increases in sewer discharges, in particular during rain events. The Contractor's bypass equipment and set up shall be adequate to prevent overflows under these surge conditions. The Contractor shall provide ample free board and wet well volume as required to contain the sewage. If risers to assist with sewage containment are proposed by the Contractor, the risers shall be coordinated with the upstream system to prevent any backups, overflows, or any other problems.

1.02 QUALITY ASSURANCE

A. Any violations resulting from sewage spills shall be the sole responsibility of the Contractor.

1.03 SUBMITTALS

A. General: Provide all submittals, including the following.

B. The Contractor shall coordinate with the Engineer to determine the Bypass System (as defined in PART 3 EXECUTION; 3.01 BYPASS SYSTEM) and the type and number of pumps to be used. For bypass pumping systems, Contractor shall submit, prior to installation, a detailed plan and description outlining all details and provisions of the temporary bypass pumping system. The plan shall be specific and complete, including such items as schedules, locations, elevations, type of plugs, temporary piping, capacities of equipment, instrumentation and controls, alarm systems, communication systems, soundproof enclosures, materials and all other incidental items necessary and/or required to ensure proper operation of the bypass pumping system, including protection of the access and bypass pumping locations from damage due to the discharge flows, ability to pump dry weather and wet weather flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No bypass pumping shall begin until all provisions and requirements have been reviewed and approved.

C. The bypass designs should be sealed by a licensed North Carolina professional engineer. The bypass pumping plan shall include but not be limited to the following:

1. Staging areas for pumps

2. Drawings showing the alignment of the bypass pipes.

3. Flow stoppage system, including pipe and channel plugging method, types of plugs and size of plugs;

4. Number, size, material, location and method of installation of pump suction piping;

5. Number, size, materials, method of installation and location of discharge piping;

6. Bypass pump sizes, capacity, number of each size to be on site, basis of selection (calculations), and power requirements;

7. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted) for each set up;

8. Size and location of standby power generators and diesel storage and access plan if engine driven equipment is to be provided, or plan for suitable connection to existing electrical gear, if electrical power is to be provided;

9. Restraining lengths for piping;

10. Any temporary pipe supports and anchoring required;

11. Sections showing suction and discharge piping depth, embedment, select fill and special backfill;

12. Schedule for installation of and maintenance of bypass pumping lines;

13. Design for access to bypass pumping locations;

14. Details of suction and discharge piping and fittings (including quick disconnects) and connection to other piping;

15. Show force main pipe material and thickness can withstand all normal operating and surge pressures with a safety factor of 2.0.

16. Protection against main breaks;

17. Method of noise control for each pump and/or generator including primary sound enclosures and sound blankets;

18. Fuel tank location, size, and containment systems;

19. Continuous on-site monitoring plan;

20. Emergency Spillage Plan;

21. Instrumentation and control system to determine flow levels and to eliminate the risk of spills due to improper installation and operations. The instrumentation and control system submitted by the Contractor for approval by the Owner shall include all equipment proposed (including redundant instrumentation and control equipment) and sequences of instrumentation activation as well as all alarms and fail-safe provisions.

22. Sequence of construction for bypass pumping system.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Design piping, joints, and accessories to withstand at least 1.5 times the maximum system pressure. The Contractor shall be responsible for all design calculations and shall be responsible for securing and protecting all force main piping in any manner required by the Owner, Engineer, or other controlling agency.

B. Pumps shall be dry self-priming type, in good working order, with a working pressure gauge on the discharge. Pumps may either be engine driven equipment, or electrically driven equipment. Contractor shall be responsible for all power costs associated with provision and operation of engine driven equipment including but not limited to purchase and delivery of fuel. Contractor shall be responsible for providing all equipment and connections required to provide electrically driven equipment and for protecting the power feed if electrically driven,

The pumps shall be designed to provide a firm capacity adequate to handle the existing sewer flowing full. Firm capacity shall be defined as the pumping capacity available when the largest pump in the system is out of service. The system shall contain at least two identical duty (primary) pumps and at least one identical backup pump. For short duration bypass activities during dry-weather periods as determined and agreed to by the Engineer, the bypass system may contain one duty (primary) pump and one identical backup pump. Contractor and pump supplier shall determine system pressure requirements based on proposed bypass piping size and layout and shall submit the proposed system curve for the pumping system.

C. Pumps shall meet the requirements of the Town of Cary Noise Ordinance and shall be Critical Silenced pumps. Bypass pumps shall be provided with a pre-engineered sound attenuation enclosure. Sound blankets shall not be acceptable for primary noise attenuation. Sound blankets are required around the entire bypass pumping system. Sound blankets shall be free standing and 12-ft high minimum. Sound blanket shall have Class 1 flammability per ASTM E-84. Sound blanket shall reduce sound by at least 10 dB at 125 Hz.

D. Contractor shall provide pump in sufficient number and capacity that a firm capacity in accordance with 1.01.A above is achieved with one pump out of service. A single pipeline to convey bypass will be deemed acceptable provided the header connects to all pumps including standby pump(s), is designed and installed in full accordance with these specifications, and has capacity to transport pumped flow rates specified.

E. Provide level control device to allow pumps to ramp up and down in response to incoming sewage flow. Provide standby level control device to alarm high liquid level and to start pumps.

F. Provide autodialers to report pumping system emergency conditions. Coordinate autodialer contact information with Owner. Battery backup to autodialer shall allow operation of autodialers for a minimum period of 24 hours in the event of power failure. The autodialer shall be tested at least weekly by tipping the floats and ensuring that the appropriate notifications are reported.

G. Alarm systems shall be local (flashing light) and shall also activate the autodialer. As a minimum, the following alarms shall be reported:

1. High liquid level in the bypass pumping suction manhole with level control device

2. Engine failure

3. Power failure

The Owner shall be notified immediately if the bypass pumping system is unable to keep up with the incoming flow, regardless of the reason.

H. Design local alarm to operate for a minimum of 24 hours on battery backup in the event of power failure.

I. Design level control devices to operate for a minimum of 24 hours on battery backup in the event of power failure.

J. If diesel powered pumps are provided, Contractor shall store sufficient fuel on site to allow for 72 hours of continuous operation without fuel delivery. 72 hours of continuous operation shall be based on 24 hours of operation at the system's firm capacity.

K. Contractor shall provide a temporary cast iron or steel cover over the bypass pumping suction manhole to prevent inflow and minimize odors.

PART 3 - EXECUTION

3.01 BYPASS SYSTEM

A. Bypass system shall be comprised of a bypass pumping system combined with temporary piping to convey flow in the existing sewers.

B. The Bypass System shall be leak free and shall (as a minimum) maintain the required firm pumping capacity. The Bypass system shall provide reliable and trouble free pumping of the existing wastewater flow. All local alarms shall be readily visible to and accessible by the Owner.

3.02 FIELD QUALITY CONTROL AND MAINTENANCE

A. The Contractor shall provide an operator to man the bypass pumping system continuously while the pumps are in use to monitor the system and check for alarms and leaks. At no time during the bypass pumping operations shall the system be unmanned. Contractor's operator shall inspect the pump operation to ensure trouble-free and leak free operation a minimum of once per day. A monitoring log shall be maintained by the Contractor and available for observation by the Engineer/Owner upon request. All systems, piping, pumps, air vents, monitoring equipment, valves, plugs, security measures, level indicating devices and all related appurtenances associated with the bypass system shall be continuously and regularly monitored for proper and leak free operation.

B. Any time the bypass pumping system is operating, the Contractor shall provide a specialist/mechanic, able to respond onsite within fifteen (15) minutes, to adjust pump speed, valves, etc., make minor repairs to the system (including pumps, piping, and plugs) and report problems. Contractor's specialist/mechanic shall have all tools and equipment on-site to perform this work. The specialist/mechanic shall be connected to the autodialer system.

C. In the event of accidental spill or overflow, take all necessary actions immediately to stop the spill or overflow and take action to clean up, disinfect the spill and immediately notify the Owner. Disinfection shall include, but is not limited to, removal of all debris, pumping of any excess overflow back into the system, neutralization by raking and liming. The Owner will provide the Contractor with a call-down emergency list for contacts in the event of a spill or overflow. All bypass system abnormalities, operational changes, maintenance, and repairs shall be reported immediately to the Engineer and Owner. All alarms shall be responded to in person by qualified Contractor's personnel immediately.

D. Spare parts for each type of pump and piping shall be kept on site.

3.03 INSTALLATION AND REMOVAL

A. Contractor shall locate the bypass pipelines to minimize any disturbance to existing utilities and site areas (such as trees) and shall obtain approval of the pipeline locations from the Engineer.

B. During all bypass pumping operation, the Contractor shall protect existing structures and equipment from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the existing structures and equipment caused by human or mechanical failure.

C. When working inside existing structures, the Contractor shall exercise caution and comply with all federal, state, and local occupational safety and health standards when working in the presence of gases, combustible or oxygen-deficient atmospheres, and confined spaces.

D. When bypass pumping operations are complete, piping shall be drained and flushed into the sewer system prior to disassembly.

E. The Contractor shall notify the Engineer at least 48 hours prior to initial start up and/or to any significant changes to the bypass system. This includes moving pumps and/or piping, installing or removing plugs, starting a new bypass location, ceasing an existing bypass location, reestablishing gravity flow, etc. A Town of Cary representative from Public Works/Utilities must inspect and approve the existing layout and all pumping equipment at each significant change to the bypass system. A bypass pumping checklist addressing all relevant features of the bypass system shall be generated by the Contractor and approved by the Owner and Engineer. The bypass pumping checklist shall be completed by both the Contractor and a Town of Cary representative prior to the start up of any bypass pumping operations and/or to any significant changes to the bypass system.

F. In the event of an anticipated extreme weather condition (e.g. hurricane or other large precipitation generating event), the Owner may require that the bypass pumping system is temporarily disabled and normal flow reestablished. In that event, any

manholes that are used by the Contractor as suction or discharge locations shall be reinstated to their original condition or better to prevent stormwater intrusion.

END OF SECTION

SECTION 02650

SEWER CLEANING AND TELEVISION INSPECTION

PART 1 GENERAL

1.1 SCOPE

A. Work in this section shall consist of furnishing all labor and equipment required to completely clean sewers from manhole to manhole and to inspect and document the interior condition of gravity sanitary sewer mains utilizing closed circuit television (CCTV) equipment.

B. Related Work.

Section 02651 Cured-In-Place Pipe Lining (CIPP) for Main Sewers
Section 02651A Cured-In-Place Pipe Lining (CIPP) for Main Sewers - Ultraviolet Light Cured CIPP

1.2 SUBMITTALS

A. The Contractor shall provide one copy of the CCTV inspections to the Engineer. The inspections and submittals shall be in digital format as specified herein. The inspection logs shall also be submitted in hard copy format (one copy of the logs printed in color) and in a pdf file, and the videos shall be submitted on portable hard drives. Each submittal to the Engineer shall include a transmittal that lists the file names and all sewer segments and video files included with the submittal. The Engineer will return any submitted hard drive to the Contractor after the inspections have been reviewed.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CLEANING AND TELEVISION INSPECTION OF SEWERS

A. The Contractor shall continuously notify the public of the work being performed. Refer to Section 01010 for requirements.

B. The Contractor shall perform and provide all necessary traffic control measures to complete the work. Refer to Section 01010 for requirements.

C. Prior to starting the clean and TV work, the Contractor shall walk the sewers to be cleaned and televised to locate manholes and identify additional manholes not shown on the drawings. The Contractor shall note any added manholes and notify

the Owner/Engineer so manhole numbers can be assigned prior to starting the TV inspections. In general, additional manholes that are found during the inspections shall be numbered as the downstream manhole number followed by an "A". The Contractor shall also update the drawings to show any changes based on the actual sewer layout. These "red-line" markups shall be submitted to the Engineer along with the TV inspections.

D. The Contractor shall thoroughly clean and televise the sewers and submit one copy of the final television inspection video and printed log to the Engineer for review as specified herein. 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 (if included in the project area) 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. No cleaning equipment shall be in the sewers while the television inspections are being performed.

   The cleaning shall be performed prior to the pre-rehabilitation television inspection. 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 rehabilitation work shall be re-cleaned, re-inspected and re-submitted to the Engineer for review at no additional cost to the Owner.

E. 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.

F. In lieu of immediately disposing of the solids off-site and at the Contractor's expense, the Contractor will be permitted to install a temporary transfer station. The Contractor will be permitted to discharge solids and minimal associated liquids removed during cleaning operations into the transfer station. Liquids shall be decanted from the transfer station and discharged into the Owner's collection system at an approved location. Solids shall be disposed of at an approved facility at regular intervals. The Contractor is responsible for odor control at the

temporary transfer station. If any complaints are received or if the odor becomes noticeable, the Contractor will be required to immediately dispose of the contents of the transfer station. The Contractor is also responsible for ensuring that all solids and liquids are contained within the temporary transfer station. Any solids or liquids within the containment enclosure surrounding the temporary transfer station shall be immediately remediated. See Detail F on Sheet D-4 for additional information.

G. Prior to inserting any mechanical cutter into the sewer (such as a root cutter), the Contractor shall first quickly televise the sewer to make sure there are no other utilities passing through the sewer pipe (such as gas lines, cable lines, power lines, water lines, etc.). This requirement is intended to prevent any damage to other existing utilities and to protect workers. The television inspection does not need to be recorded or submitted to the Engineer unless there are existing utilities in the sewer, in which case a snapshot video and an accurate location will be required. This quick television inspection shall be considered incidental to the cost and no additional payment will be made. The cost of these inspections shall be included in the unit costs for cleaning and TV inspection.

H. Water for use on this project will be available from selected hydrants owned and operated by the Owner. The Owner will provide water for use by the Contractor free of charge. The Contractor shall coordinate with the Owner to have bulk water meters provided at hydrants. Water from the Owner's hydrants may only be obtained by the connection of a Town-provided meter assembly.

   The Contractor may use water from nearby streams, lakes, and ponds as needed. The water shall be filtered before use. All water pulled from nearby streams, lakes, and ponds must be discharged to the wastewater collection system.

I. The Contractor shall take 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 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 cleanup shall be completed within 4 hours of the backup.

J. The Contractor shall take care in cleaning older sewers and shall protect existing sewers from damage caused by improper use of cleaning equipment. The Contractor is advised that the sewers to be rehabilitated under this Contract are in poor structural condition.

K. After the sewers are completely cleaned, the sewers shall be inspected via closed circuit television (CCTV). As specified previously, no cleaning equipment shall be in the sewers while the television inspections are being performed. 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, to locate sewer defects that need repaired, and to confirm that the lining (if specified) can be properly installed and cured.

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

L. 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.

M. The picture quality and definition shall be to the satisfaction of the Engineer. 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 can agree on performance and quality of the inspections which must be met throughout the Contract. Sewers not inspected to the Engineer's satisfaction shall be re-inspected by the Contractor at no additional cost to the Owner.

N. 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.

O. All inspections shall begin above ground with a video look down into the start manhole to completely show the manhole and flow in the invert channel below. The inspections shall then begin from the center of the upstream manhole and end in the center of the downstream manhole. 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. The camera shall be moved through the line from upstream to downstream at a uniform rate. The camera shall be stopped at major defects and service connections and shall be panned, tilted and rotated to fully view the defects and connections. All such inspections shall be documented on digital recordings as specified. Particular attention should be paid to service connections and whether the services are active or plugged.

P. Flow levels shall be controlled to a maximum depth of 20% of the pipe diameter. Options for controlling the flow (if it exceeds 20% depth) that will be considered for approval include use of flow-through plugs (with continuous monitoring of

upstream flow levels) and bypass pumping. The Contractor may also consider performing the work on off-peak hours when flow is lower (pending approval by the Owner); any such alternate work times must not impact residents (noise, lights, general disruption, etc.). If this controlled flow level is too high to allow the sewer pipe to be clearly visible (flow blocking or inhibiting the TV camera and video), then further flow control (further plugging or bypass pumping) shall be immediately implemented at no additional cost.

Every attempt shall be made to avoid any circumstance where the camera goes under water during the video inspection, specifically when televising through pipe sags. For sag areas, if the camera goes under water or will go under water, the Contractor shall use jet equipment to pull the water out of the sag prior to videoing through the sag (the jet equipment shall be removed from the line before starting the video inspection). This flow control shall be considered incidental to the Contract as this is standard practice prior to televising through any area where the camera goes under water and proceeds "blindly"; no additional payment will be made for performing this work. Some flow needs to remain in the sags if possible so that the extent of the sag (start and end point) is clearly visible. If the camera lens becomes fouled by going under water, the camera shall be removed, cleaned and the inspection shall start over at the start manhole.

Q. The inspections shall be complete from manhole to manhole without the need for reverse setups unless approved otherwise by the Engineer. 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 then continue the inspection. No additional payment will be made for the initial CCTV inspections that were blocked.

R. Reverse setups will only be allowed and accepted for payment if the blockage or defect preventing the CCTV inspection in the initial direction does not need to be repaired as determined by the Engineer. The Contractor shall notify the Engineer in writing of such situations for the Engineer's review and approval. If approved, payment will be made for the length of sewer inspected.

S. 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 at no additional cost to the Owner.

T. The Contractor is advised that the sewers included in this Contract are old and in poor structural condition. The Contractor shall use extreme caution during all cleaning and television inspection work.

U. 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 (for example, if the equipment is hung in pipe with major structural damage that definitely needs repaired, the Engineer may agree to pay for removing the equipment).

V. Upon completion of the cleaning and television inspection work, the Contractor shall submit one copy of the final digital television inspections to the Engineer as specified. The inspections must be in order and complete or the Engineer will immediately return the inspections to the Contractor for corrections. The entire work order/work area/basin must be complete prior to submitting – no partial work orders or work areas will be accepted or reviewed by the Engineer unless specifically approved otherwise. The final inspection shall mean that the sewer has been completely cleaned (no roots, debris, grease, tuberculation, etc.), 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 as specified herein.

W. 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. The Contractor should expect heavy debris and roots.

X. Payment will be made for the initial cleaning and TV inspection that provides a complete inspection from manhole-to-manhole. Payment will not be made for additional cleaning and TV inspections that are necessary prior to performing any further work on the sewer, such as cleaning/TVing right before installing CIPP pipe lining - the cost of any such additional cleaning and TV inspections shall be included in the other various unit prices bid.

3.2 REMOVAL OF PROTRUDING SERVICE CONNECTIONS

A. Service connections that are protruding into the main sewer shall be cut flush with the pipe wall prior to installing CIPP (refer to Section 02651 Cured-In-Place Pipe Lining (CIPP) for further details and requirements). In addition, any protruding laterals blocking the CCTV inspection shall be cut. The cutting shall be accomplished using an internal robotic cutter specifically designed for such work. The internal remote cutter shall be capable of cutting any pipe material including PVC, vitrified clay, cast iron, ductile iron and orangeburg pipe. All cut pieces of the service connection shall be removed from the main sewer pipe. The costs for

removing protruding connections shall be paid at the unit price bid. The Engineer will not approve payment for excavating protruding services in lieu of cutting them internally unless there is a specific reason or circumstance in which the lateral cannot be cut.

3.3 DIGITAL VIDEO INSPECTIONS AND CCTV DATABASE

A. All televised sewer inspections performed under this Contract (including pre-rehabilitation and post-rehabilitation inspections) shall be submitted to the Engineer in electronic (digital) format.

B. Each submittal to the Engineer shall include the database file along with the video files. Video files shall be MPEG4, wmv or other approved format (Engineer to approve). The Contractor shall make all adjustments necessary to adhere to the required format specified herein at no additional cost to the Owner. After the first submittal, the Engineer will notify the Contractor of any required changes in the data and file format, and the Contractor shall make such modifications at no additional cost.

C. The digital recording shall include video information that accurately reproduces the original picture of the video inspection. The video portion of the digital recording shall be free of electrical interference and shall produce a clear and stable image.

D. Video shall include overlay/text display. Each inspection start shall include overlay display of section details including at a minimum:

1 Owner name
2 Project name
3 Contractor name
4 Street name (if applicable)
5 Date/time of inspection
6 MH Start #/MH End #
7 Pipe material
8 Pipe size
9 Direction of Video
10 Weather or Flow Level
11 A constant display of the street name, MH start #/MH End #, date and distance shall appear on screen.

E. CCTV inspector shall move or remove overlay display accordingly so it does not interfere with the inspection review of particular observations/defects as the inspection is occurring. As an observation/defect is noted by the inspector, a text display shall appear with the text describing the observation/defect. Text shall display for a minimum of 4 seconds. Distance shall appear continuously in the lower right corner of the video image as the camera is traveling down the line. It

is imperative that distance is accurate. The CCTV inspector shall calibrate/test footage at the beginning of each day as incorrect footage will result in return of inspections.

F. Completed work shall consist of video files captured live off the inspection camera as specified herein. The video file resolution shall be 640 x 480. All video files created shall be consistent with the Owner's existing codec (as applicable).

G. Each pipe inspection's observations shall be related to a time point within the video.

H. During the inspection, the video file recording shall pause as the operator selects the observation/defect notation, eliminating "on hold" video. In situations of reverse inspection, the reverse inspection shall be in a separate video file.

I. The video files shall be named as follows (unless directed otherwise by the Engineer):

STARTMH_ENDMH_PIPEID_DATE.mp4 (or wmv or approved format)

J. The database file and the corresponding video files shall be submitted to the Engineer on portable external hard drives. The hard drive shall be delivered to the Engineer for reviewing the television inspections. The Engineer will return the hard drive to the Contractor after the inspections have been reviewed. Multiple hard drives will likely be required as the data will be transferred to the Engineer numerous times throughout the Contract.

K. Each hard drive submitted to the Engineer shall include a transmittal listing the file names and all sewer segments and video files included on the hard drive. The Contractor shall maintain a "master" hard drive throughout the Contract that contains all databases and all video files performed during this project. The databases shall be merged to reduce the number of individual database files as required by the Engineer. The Engineer will specify which files to merge.

L. At the end of the Contract, the master hard drive shall be submitted to the Engineer. The master hard drive shall be complete with all files and all changes required by the Engineer. A single master hard drive shall be submitted unless otherwise approved by the Engineer. The master hard drive shall become the property of the Owner. Costs associated with providing the master hard drive shall be included in the various bid items.

M. Recorded Observations for each inspection shall include: observation distance, observation defect/description, video counter time where observation occurs within digital video, and severity rating for each observation/defect.

N. 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.

O. The digital database file of the television inspections shall be submitted in a PACP export file format so that the Owner can import the data into their CCTV software system.

P. All costs associated with providing the digital television inspections as specified, including performing the inspections, shall be included in the various bid items – no separate or additional payment shall be made.

END OF SECTION

SECTION 02651

CURED-IN-PLACE PIPE LINING (CIPP) FOR MAIN SEWERS

PART 1 GENERAL

1.1 SCOPE

A. Work under this section consists of furnishing all materials, labor, and equipment required for the installation of cured-in-place pipe (CIPP) in main sewers.

1.2 DESIGN AND PERFORMANCE REQUIREMENTS

A. The CIPP shall be designed for a life of 50 years or greater in accordance with ASTM F1216, Appendix X.1, for "fully deteriorated gravity pipe conditions." The minimum installed, cured liner thickness shall be as listed below when using a standard felt liner. When a fiberglass reinforced felt liner is required, the Contractor shall submit CIPP thickness calculations. The Bid Form and/or Drawings may require the thicknesses for installation based on the Engineer's decision for specific installations and may list specific thicknesses for larger diameter sewers.

8" sewer:	6.0 mm	(0' to 20' deep)
	7.5 mm	(20' to 28' deep)
10" sewer:	6.0 mm	(0' to 14' deep)
	7.5 mm	(14' to 25' deep)
12" sewer:	7.5 mm	(0' to 16' deep)
	9.0 mm	(16' to 24' deep)
15" sewer:	7.5 mm	(0' to 10' deep)
	9.0 mm	(10' to 16' deep)
	10.5 mm	(16' to 24' deep)
16" sewer:	7.5 mm	(0' to 8' deep)
	9.0 mm	(8' to 13' deep)
	10.5 mm	(13' to 18' deep)
	12.0 mm	(18' to 24' deep)
18" sewer:	9.0 mm	(0' to 10' deep)
	10.5 mm	(10' to 14' deep)
	12.0 mm	(14' to 19' deep)
	13.5 mm	(19' to 24' deep)
21" sewer:	10.5 mm	(0' to 10' deep)

	12.0 mm	(10’ to 13’ deep)
	13.5 mm	(13’ to 17’ deep)
24” sewer:	12.0 mm	(0’ to 10’ deep)
	13.5 mm	(10’ to 13’ deep)
	15.0 mm	(13’ to 16’ deep)
27” sewer:	13.5 mm	(0’ to 10’ deep)
	15.0 mm	(10’ to 12’ deep)
	16.5 mm	(12’ to 15’ deep)
	18.0 mm	(15’ to 18’ deep)
30” sewer:	15.0 mm	(0’ to 10’ deep)
	16.5 mm	(10’ to 12’ deep)
	18.0 mm	(12’ to 14’ deep)
	19.5 mm	(14’ to 17’ deep)

C. The cured liner shall have the following minimum structural properties:

Flexural Strength of 4,500 psi in accordance with ASTM D 790
Flexural Modulus of 250,000 psi in accordance with ASTM D 790
Tensile Strength of 3,000 psi in accordance with ASTM D 638

D. The required structural CIPP wall thickness shall be based on the following design parameters:

Design Safety Factor	2.0
Short-Term Flexural Modulus	250,000 psi
Long-Term Flexural Modulus	125,000 psi
Flexural Strength	4,500 psi.
Creep Retention Factor	50%
Ovality	2%
Soil Modulus	1,000 psi
Soil Density	120 pounds per cubic foot
Soil Coefficient of Friction	0.130 r
Groundwater Depth	Ground Surface Elevation
Live Load	H20 Highway
Poisson’s Ratio	0.3
Enhancement Factor, K	7
Service Temperature Range	40 to 140 degrees F
Maximum Long-Term Deflection	5 percent

1.3 SUBMITTALS

A. Submit a contractor statement of qualifications which identifies key personnel and their specific CIPP experience, and recent projects listing the total length

installed by host pipe diameter. Work and personnel experience listed must reference projects that used process method and materials to be used on this project. Include project names, references/contacts and phone numbers.

B. Submit product data for the fabric tube, resin, catalysts, and waterstops demonstrating conformance to the specifications.

C. Submit manufacturer material certifications for the fabric tube and resin that state conformance to the specifications. The felt tube manufacturer shall provide in their certification a statement identifying how many years they have produced the felt tube. Material certifications shall be current and must reference the project.

D. Submit manufacturers' shipping, storage and handling recommendations for all components of the CIPP system.

E. Submit CIPP wet-out information. Wet-out information shall include the identification of the wet-out facility and process description and a sample wet-out form. The wet-out forms shall document, at a minimum, the date and time of wet-out, the wet-out supervisor, the wet-out facility address, the location where the CIPP will be installed (by manhole numbers), the CIPP diameter, the length of wet-tube and dry-tube, the thickness of the CIPP, the roller gap setting for establishing the liner thickness, the felt manufacturer, the resin used (by product name and batch/shipment number) and quantity, the catalyst(s) used (by product name) and quantity, any quality control samples taken, and all else pertinent to the wet-out process.

F. Installation procedures and curing schedules shall be submitted. Installation procedures shall include acceptable inversion heads and pressures, heating ("cooking") and cool-down procedures and temperatures for varying sewer diameters/lengths/depths, times for each stage of the process, and cure logs for the resin/resin system used. The Contractor shall provide this information without delay or claim to any confidentiality. Testing procedures and quality control procedures shall also be submitted.

G. Submit a sample CIPP installation report. The report shall include items such as manhole numbers, location, project number, date, time, temperature, curing temperature, curing time, cool down temperature and time, and liner thickness.

H. With each shipment of CIPP delivered to the jobsite, submit certifications that the CIPP lining was manufactured in accordance with these specifications and the appropriate ASTM standards. The certifications shall include a signed statement by the wet-out manager/supervisor that no fillers were added to the resin system during manufacture of the CIPP. In addition, wet-out forms documenting the wet-out shall be delivered with each section of CIPP

manufactured and delivered to the jobsite.

I. With each shipment of resin to the wet-out facility, submit certification that the resin was manufactured under ISO 9002 certified procedures and meets these specifications.

J. Submit a plan for bypassing sewage around the work area and facilities where sewage flows must be interrupted to carry the work. The plan shall be reviewed by the Engineer and shall be acknowledged as acceptable before any work is started.

K. Submit CIPP thickness calculations sealed by a licensed North Carolina professional engineer for fiberglass reinforced felt liner. Any deviations from the design parameters should be clearly noted.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be shipped, stored, and handled in a manner consistent with written recommendations of the CIPP system manufacturer to avoid damage. Damage includes, but is not limited to, gouging, abrasion, flattening, cutting, puncturing, premature curing, or ultra-violet (UV) degradation. The CIPP shall be maintained at a proper temperature in refrigerated facilities prior to installation to prevent premature curing. All damaged materials shall be promptly removed from the project site at the Contractor's expense.

1.5 QUALIFICATIONS

A. The Contractor performing the CIPP installation shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer. The Contractor must have successfully installed at least 1,000,000 feet of CIPP for a minimum of 10 years in wastewater collection systems utilizing the products and installation methods specified herein.

In addition, if steam cure is being proposed for the CIPP installation as specified herein, the Contractor must have successfully installed at least 500,000 feet of CIPP via steam cure for at least 5 years in wastewater collection systems utilizing the products specified herein. If the Contractor does not meet this experience requirement, then water cure shall be used for all installations.

The Contractor shall submit detailed references (project names, dates, owner contact names and numbers, project descriptions with lengths installed, etc.) to the Engineer as requested to demonstrate compliance with the above experience requirements. The Engineer's decision on whether the Contractor meets the experience requirements shall be final, and the Contractor shall not be due any additional money if the experience requirements are not met and water cure is

required.

B. The Contractor's personnel shall have the following experience with the products and installation method to be used on this project.

Project Manager – Shall have a minimum of 5 years managing CIPP projects for wastewater collection systems.

Superintendent - Shall have a minimum of 5 years of on-site supervision of CIPP projects for wastewater collection systems. The superintendant shall have supervised a minimum of 300,000 feet of installed CIPP in wastewater collection systems of the pipe diameters included in the project. In addition, the superintendent shall have been the direct, on-site superintendent for three separate projects that included a minimum of 5,000 feet of 24-inch diameter CIPP or larger each.

C. The manufacturer of the felt tube shall have manufactured the product to be used on this project for at least 5 years. The felt material manufacturer and facility shall not change throughout the duration of the contract unless approved by the Engineer in writing.

D. Approved CIPP products are listed in these specifications. Even though the Contractor's product may be listed as approved, the Contractor shall still meet the experience requirements specified above, or the Contractor will not be approved for this work.

1.6 ENVIRONMENTAL REQUIREMENTS

A. The use of the product shall not result in the formation or production of any detrimental compounds or by-products at the wastewater treatment plant.

1.7 PROJECT ACCESS

A. The Contractor shall utilize existing road rights-of-way and sanitary sewer easements to perform the work unless notified otherwise. The Contractor shall coordinate with and meet the requirements of North Carolina Department of Transportation, the Owner, or any other agency or municipality that may be impacted by the work.

1.8 WARRANTY

A. The materials used for the project shall be certified by the manufacturer for the specified purpose. The manufacturer shall warrant the liner to be free from defects in raw materials for one (1) year from the date of final acceptance by the Owner.

1.9 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. The Contractor shall ensure that the products and work comply with the current version of the following American Society for Testing and Materials (ASTM) standards:

1. ASTM D638 - Standard Test Method for Tensile Properties of Plastics

2. ASTM D790 - Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

3. ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

4. ASTM D5813 - Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe

5. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

6. ASTM F1743 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

PART 2 PRODUCTS

2.1 CURED-IN-PLACE-PIPE LINING

A. Cured-In-Place-Pipe (CIPP) lining shall be one of the following products or approved equal. The products below shall adhere to all requirements specified herein and shall be modified as necessary to meet these requirements.

- CIPP Corporation Liners
- Invert-A-Pipe by IPR Southeast LLC
- National Liner by National EnviroTech Group, LLC
- Inliner by Inliner Technologies, Inc.
- Insituform by Insituform Technologies, Inc.
- Diamond Lining Systems by Daystar Composites LLC
- Premier-Pipe USA by J.W.M. Environmental, Inc.
- Pipenology CIPP for SAK Construction

B. Depending on location, CIPP can be installed and cured using water, steam, or ultraviolet. See Section 02651A for ultraviolet cured requirements.

The curing method for sewers less than 18 inches may be water or steam. The curing method for sewers 18 inches and larger shall be water unless otherwise approved. The

choice of curing method shall be appropriate for the pipe being lined and must be approved by the Engineer. For example, sewers with heavy active leaks shall be lined using water cure unless the Contractor can prove to the Engineer that the steam can overcome the heat sink and active water stream.

The Engineer will note any concerns with steam curing. Those concerns will be in writing, and the Contractor shall fully address the concerns. If the Engineer's concerns are not fully addressed, the Contractor shall install those specific sewers using water cure.

C. The liner shall be composed of tubing material consisting of one or more layers of a flexible non-woven polyester felt with or without other additives such as fiberglass or other reinforcing additives. The felt tubing shall be impregnated with a thermosetting isothalic polyester resin and catalyst or vinyl ester and catalyst. The liner material and resin shall be completely compatible. The inside and/or outside layer of the tube shall be coated with an impermeable material compatible with the resin and fabric. The inside layer of the tube shall be resistant to blistering during the curing process. The liner shall cure in the presence of water or steam at the required temperature for the resin system.

D. The felt material shall be manufactured by companies specializing in felt production for CIPP. The manufacturer shall have manufactured felt material for CIPP for at least 5 years as documented by references. The felt manufacturer, references and location of the manufacturing facility shall be submitted to the Engineer for review and approval. The felt material manufacturer and facility shall not change throughout the duration of the Contract unless specifically approved by the Engineer in writing.

E. The polyester or vinyl ester resin shall be PREMIUM, NON-RECYCLED resin only. PET resins, or those containing fillers, additives or enhancement agents shall not be used. The resin manufacturer shall not include any old resin or rework in the product shipped to the wet-out facility. The resin shall be manufactured under ISO 9002 certified procedures. Such certification shall be submitted to the Engineer for each shipment of resin to the wet-out facility. The proposed resin shall equal or exceed the published properties of AOC 102NA or Reichhold Polylite 33420 resin (for isothalic polyester resin) or Reichhold Atlac 580-20 (for vinyl ester resin).

F. The exact makeup of the resin shall be submitted to the Engineer including chemical resistance information, cure logs and temperatures. Polyester resins shall have a minimum Heat Distortion Temperature of 212 degrees Fahrenheit per ASTM D648. Vinyl ester resins shall have a minimum Heat Distortion Temperature of 220 degrees Fahrenheit per ASTM D648.

G. The exact mixture ratio of resin and catalyst shall also be submitted. The catalyst system shall be identified by product name. The resin/catalyst ratio shall be approved by the resin manufacturer in writing. The catalyst system shall be made up of a primary catalyst and a secondary catalyst. The primary catalyst shall be Akzo Perkadox 16 or approved equal and shall be added at a maximum of 1% of the resin volume by weight unless

otherwise approved by the Engineer. The secondary catalyst shall be Akzo Trigonox or approved equal and shall be added at a maximum of 0.5% of the resin volume by weight unless otherwise approved by the Engineer. The resin/catalyst system shall be formulated so that the CIPP will cure as specified below. Resins, catalysts and resin/catalysts mixing ratios shall not be changed during this Contract unless specifically approved by the Engineer in writing.

H. The cure schedules for the CIPP shall be submitted to the Engineer for review. The curing process/schedules shall be approved by the resin manufacturer in writing. The cure schedules shall include specific information on stepping the temperature up to "cooking" temperatures, "cooking" temperatures and durations, and cool-down procedures – all to be approved in writing by the resin manufacturer. The CIPP shall cure in the presence of water or steam. The minimum cure/"cook" time shall be as recommended by the resin manufacturer. The cure time shall be increased as deemed necessary by the Contractor/resin manufacturer, including but not limited to, longer CIPP installations, active ground water infiltration into the existing sewers, pipe type, pipe location, etc.

I. The resin shall be shipped directly from the resin manufacturer's facility to the CIPP wet-out facility. The resin shall not be sent to any intermediate mixing facility. Copies of the shipment documents from the resin manufacturer shall be submitted to the Engineer showing dates of shipment, the originating location and the receiving location.

J. The resin shall be used to manufacture the CIPP as shipped. No fillers or additives shall be added at the wet-out facility except for the required catalyst as recommended by the resin manufacturer. The Contractor shall submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility (to include the date of manufacture and the Heat Distortion Temperature). This information shall be submitted prior to manufacturing any CIPP.

K. The Contractor shall identify the wet-out facility where all CIPP under this Contract will be manufactured. All CIPP shall be manufactured from this designated wet-out facility throughout the entire Contract unless specifically approved otherwise by the Engineer in writing. Multiple wet-out facilities shall not be allowed.

L. The Engineer, Owner and/or an agent of the Owner may inspect the CIPP during manufacturing (during "wet-out"). The Contractor shall submit a schedule for manufacturing the CIPP to the Engineer every Friday for the following week. The Engineer and Owner must be given an opportunity to witness the manufacturing of all CIPP for this project. If the CIPP is manufactured without providing the required notice to the Engineer, the CIPP will be marked as rejected prior to installation and will not be approved for installation in this project.

M. If the Engineer and/or Owner decide to inspect the manufacturing of the CIPP, the Contractor shall provide full access to witness the wet-out process and shall provide any

and all information related to the manufacturing as requested by the Engineer, Owner or the Owner's agent without delay and without claims of confidentiality or product privacy.

N. The Engineer or Owner may take samples of the resin from the wet-out facility for infrared analyses (IR Scan) throughout the duration of this Contract. This standard analytical test involves shining a beam of light in the infrared frequency region through a thin sample of the subject resin. The frequency of light is then varied across the infrared spectrum. Chemical functional groups present in the resin being analyzed will absorb infrared light as specific frequencies and with characteristic absorption intensities.

   The Owner will pay for all such infrared analyses and resin testing. To allow the resin samples to be taken, the Contractor shall place a sampling valve in-line at a point prior to the resin/catalyst mixing stage and after the resin/catalyst mixing stage. These sampling valves shall remain in place throughout the duration of the Contract and shall always be accessible to the Engineer and Owner.

   The infrared analyses will be used to verify that the resin and resin/catalyst composition and mixture being used is the approved resin and resin/catalyst system. Payment will not be made for any CIPP manufactured with unapproved resin and resin/catalyst mixtures. The Contractor shall submit results of infrared analyses of the proposed resin and resin/catalyst mixture, performed and certified by the resin manufacturer, prior to manufacturing any CIPP as a shop drawing. The results of these analyses (the resin's chemical fingerprint) will be used as the standard for verifying the resin and resin/catalyst mixture being used throughout the Contract.

   The Engineer will compare the submitted chemical fingerprint with the fingerprint of AOC 102NA or Reichhold Polylite 33420 resin (for isothalic polyester resin) or Reichhold Atlac 580-20 (for vinyl ester resin) for a baseline comparison. The Contractor and resin manufacturer shall fully describe, explain and justify any differences between the AOC/Reichhold resin and proposed resin fingerprints without delay or claim to confidentiality.

O. When cured, the CIPP shall form a continuous, tight-fitting, hard, impermeable liner which is chemically resistant to any chemicals normally found in domestic sewage. The liner shall be chemically resistant to trace amounts of gasoline and other oil products commonly found in municipal sewerage and soils adjacent to the sewer pipe to be lined.

P. The CIPP shall be fabricated to a size that will tightly fit the sewer being rehabilitated after being installed and cured. The liner shall be capable of fitting into irregularly shaped pipe sections and through bends and dips within the pipeline. Allowance for longitudinal and circumferential expansion shall be taken into account when sizing and installing the liner. All dimensions shall be verified in the field by the Contractor prior to fabrication of the liner. Field measurements shall be used to ensure maximum closure between the new liner and the existing sewer pipe. There shall be no leakage of groundwater between the existing pipe and the CIPP at the manhole connection or service

lateral connections. Any leakage found shall be eliminated by the Contractor at no additional cost to the Owner.

Q. The application of the resin to the felt tubing (wet-out) shall be conducted under factory conditions and the materials shall be fully protected against UV light, excessive heat and contamination at all times.

R. The length of the liner shall be the length deemed necessary by the Contractor to effectively carry out the insertion of the liner and sealing of the liner at the outlet and inlet manholes. The required length of liner shall be verified in the field by the Contractor prior to fabrication of the liner.

S. The installed thickness shall be measured as specified elsewhere herein. The Contractor shall submit his proposed plan for ensuring that the installed CIPP meets the above minimum thickness requirements. The plan shall include the proposed CIPP thickness to be installed (pre-installation thickness) and detailed inversion or pull-in procedures to reduce stretching and to reduce migration of resin.

PART 3 EXECUTION

A. Care shall be taken in shipping, handling and laying to avoid damaging the CIPP. Any CIPP damaged in shipment shall be replaced as directed by the Engineer. Any CIPP showing a split or tear or has been mishandled shall be marked as rejected and removed at once from the work. The liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. Any liner showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

B. The Contractor shall continuously notify the public of the work being performed. Refer to Section 01010 for requirements.

C. The Contractor shall develop and submit to the Engineer a protocol for addressing odor complaints during the CIPP installation process (primarily styrene odor complaints). The protocol shall include steps to be taken by on-site and management personnel immediately when the complaint is received, including discussing the odor with the property owners/residents to address their concerns and alleviating the odor from the home/residence or business using fans or other means as necessary. The Contractor shall also maintain a calibrated portable styrene test unit to immediately document the atmospheric concentrations of the styrene on the site and in the house/residence/business when a complaint is received. The styrene concentrations must be tested prior to exhausting the odors from the house/residence/business. The Contractor shall also utilize blowers (vacuum blowers) during the CIPP installation to exhaust odors from the sewers and into the atmosphere during the installation as deemed necessary. This will help to minimize the potential for odors to travel up service laterals and into homes/businesses. The blowers shall be strategically placed to exhaust the concentrated odors in an isolated

location. The costs for addressing such odors issues/complaints shall be included in the unit prices bid for CIPP.

D. The Contractor shall perform and provide all necessary traffic control measures to complete the work. Refer to Section 01010 for requirements.

E. The Contractor shall develop and submit to the Engineer a proposed shot plan at least 30 days prior to CIPP installation. The shot plan shall identify where the CIPP will be inserted, the direction of insertion (upstream or downstream), the sewers included in each shot, plans for addressing CIPP in manholes that the shot goes through, access points, curing method, and any other relevant information. The Engineer will review and comment or approve. The Contractor must address the Engineer's comments and resubmit until resolved.

F. The Contractor shall clean and televise each length of pipe to be lined as specified in the Section 02650 – Cleaning and Television Inspection. Prior to lining the main sewer and the pre-rehabilitation television inspection, protruding service lateral connections shall be internally cut/ground down flush with the pipe wall with a robotic cutter specifically designed for this purpose and all required point repairs shall be completed. The internal cutter shall be capable of cutting any pipe material including cast iron, PVC, vitrified clay pipe, ductile iron pipe and orangeburg pipe.

G. Water for use on this project will be available from selected hydrants owned and operated by the Owner. The Owner will provide water for use by the Contractor free of charge. The Contractor shall coordinate with the Owner to have bulk water meters provided at hydrants. Water from the Owner's hydrants may only be obtained by the connection of a Town-provided meter assembly.

The Contractor may use water from nearby streams, lakes, and ponds as needed. The water shall be filtered before use. All water pulled from nearby streams, lakes, and ponds must be discharged to the wastewater collection system.

H. The Contractor shall bypass pump sewage flows around the lining work while it is being performed as specified in the Section 02150 – By-Pass System.

I. The Contractor shall take precautions to avoid damage or flooding to public or private property being served by the sewer being lined. 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 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 cleanup shall be completed within 4 hours of the backup.

J. The Contractor shall furnish and install the CIPP lining in the full length of sewer. The installation of the CIPP shall be in complete accordance with the applicable provisions of ASTM F1216 or ASTM F1743 except as modified herein, these specifications and the manufacturers' specifications.

K. Water or air shall be used to invert CIPP installed via ASTM F1216 or to invert the calibration hose through CIPP installed via ASTM F1743. The water inversion of the CIPP and calibration hoses shall be accomplished by using natural water pressure (head) achieved by erecting platforms or scaffolding to an elevation determined by the Contractor or by using CIPP installation vessels/units that creates water pressure. The Contractor shall determine the necessary inversion heads (pressure) for each line segment. If an installation vessel/unit is used, a pressure relief valve shall be installed on the vessel so that the necessary pressure/inversion heads are not exceeded at any time during the inversion. Water or air pressure shall not be varied by any means throughout the inversion process except when approved by the Engineer. The Contractor shall submit required inversion heads/inversion processes for each installation as a shop drawing without delay and claim to confidentiality or product/installation privacy.

L. CIPP shall be cured with water or steam in strict accordance with the manufacturer's recommendations. This shall include achieving cooking temperatures, cooking times, and cool-down procedures. The Contractor shall submit required curing schedules and procedures for each installation as a shop drawing without delay and claim to confidentiality or product/installation privacy.

Cool down shall meet the minimum criteria established herein or the manufacturer's recommendations, whichever is more stringent. The water temperature inside the pipe shall be cooled at a maximum rate of 20 degrees per hour until the water temperature is within 20 degrees of the ambient temperature. Do not "shock" the liner with dramatically cooler water. Slowly introduce cooler water into the cool down cycle. The cool down period cannot be less than 1 hour even if the water temperature inside the pipe is within 20 degrees of the ambient temperature.

M. The Contractor shall install and utilize the VeriCure process (or approved equal) for monitoring the cure temperature of the CIPP. VeriCure shall be installed from manhole to manhole under the bottom of the CIPP. The installation and use of VeriCure shall be in strict accordance with the manufacturer's recommendations. The cure temperature data shall be recorded electronically with the required monitoring devices/computers/computer software. Printed color data reports with detailed descriptions/summaries of the data along with the digital data file shall be submitted to the Engineer for review prior to requesting payment for the CIPP. All special software to review the data file shall also be submitted.

N. In larger diameter sewers (30 inch or larger) and/or when the section being water cured has a volume of 20,000 gallons or greater, the cure water shall be released from the sewer being lined in a slow, methodical manner. A quick "batch" release of the water shall not be allowed. The cure water shall be released by cutting a small/narrow opening in the

CIPP to allow the water to slowly drain while the CIPP cool-down process is being implemented. This will serve to slowly release the water and also allow some cool-down of the water prior to/during the release. The entire release process shall occur over a minimum 6-hour period unless approved otherwise by the Engineer. The Owner may also sample the cure water during the release to test for chemical compounds that may have a detrimental effect on the downstream water reclamation facility. The Contractor shall accommodate all sampling efforts by the Owner. If damaging chemical compounds (such as styrene or vinyl chloride) exist at high enough levels that may impact treatment processes (as determined by the Owner), the Contractor shall modify the cure water release time to further slow the release of the water to allow additional time and dilution in the sewer system.

O. The CIPP shall be neatly cut 2 inches from the manhole walls after installation unless otherwise directed by the Engineer. The CIPP shall be sealed at the manholes to provide a watertight liner connection at the manhole. There shall be no leakage of groundwater into the manhole between the CIPP and existing sewer pipe and between the existing sewer pipe and manhole wall. A hydrophilic waterstop (non-bentonite) comprised of modified chloroprene rubber shall be installed around the liner 6 inches from each manhole wall prior to processing the liner to provide additional waterstop protection. As the CIPP is expanded, the waterstop shall be pressed tightly against the existing sewer to provide a leak-tight seal. The waterstop shall be Hydrotite as manufactured by Greenstreak (St. Louis, Missouri) or equal. All CIPP connections to manholes shall be further sealed with an approved non-shrink grout to completely cover the CIPP/manhole connection point. CIPP lining shall be sealed to manhole linings (where specified) in an acceptable manner as approved by the Engineer. Further, all invert channels shall be coated with an approved grout to match the CIPP elevations in the manhole. Submit detailed drawings of the pipe-manhole connections to the Engineer for approval, including termination points in manholes and transitions with manhole linings where installed.

P. The Contractor shall fully reopen all of the existing active service connections in each length of sewer following lining. The service connections shall be reopened from inside the sewer by means of a closed-circuit television camera controlled cutting device appropriate for the CIPP. All openings shall be clean and neatly cut and shall be flush with the lateral pipe. The openings shall also be buffed with a wire brush to remove rough edges and provide a smooth finish. The bottom of the openings shall be flush with the bottom of the lateral pipe to remove any lip that could catch debris. Openings shall be 100% of the service lateral pipe. The Contractor shall re-open any service lateral that does not meet this requirement as evidenced by the post-rehabilitation inspections at no additional cost to the Owner. The Contractor shall be fully responsible for all backups and damage caused by not fully opening a lateral connection, including paying all costs associated with repairing damage as required by the Engineer, Owner and/or property owner.

Q. Preliminary Post-CIPP TV Inspections: Immediately after the CIPP is installed and the services connections are completely opened and brushed, the Contractor shall televise the

installed CIPP to verify and document that the CIPP was properly installed and cured and that all service connections have been opened as specified. The preliminary post-CIPP TV inspection videos shall be submitted to the Engineer within 1 day of the CIPP being installed. This will allow the Engineer to confirm that there are no CIPP issues that need addressed on this sewer and/or future installations and that the service laterals are properly opened. The preliminary post-CIPP inspections shall clearly show the CIPP liner and all service connections.

The Engineer will accept these preliminary post-CIPP TV inspections for approving payment of the installed CIPP with the final post-CIPP inspections as specified herein being required prior to final payment. The Contractor may submit these inspections as the final post-CIPP inspections if all grout/concrete work is finalized in the connecting manholes (including grouting the pipe connections, coating the invert channels, and performing the specified manhole rehabilitation) and all specifications are met. Completing all of the manhole work may be difficult to get finished so that the TV inspections can be submitted within 1 day as specified above. The Contractor's unit price bid for the CIPP shall include preliminary post-CIPP and final post-CIPP TV inspections.

R. Installation reports shall be generated for each segment of liner installed. The reports shall document installation, including manhole numbers, street names/sewer location, project number, date, time, temperature, curing temperature, curing time, liner thickness, etc. A sample report shall be submitted to the Engineer for approval prior to installing any lining. The reports shall be submitted to the Engineer prior to requesting payment.

S. For every sewer segment that is lined (sewer segment is defined as the sewer between two manholes), the Contractor shall remove one restrained sample of the installed liner at least 12 inches in length for testing of installed CIPP flexural properties and thickness. The CIPP testing shall include determining flexural strength, flexural modulus, tensile strength and thickness of each sample. These four separate individual tests make up one completed CIPP test. Payment will be made for each completed CIPP test at the unit price bid after the test results are submitted to the Engineer.

For sewers 12 inches in diameter and smaller, the sample shall be captured by installing the lining through a section of PVC pipe (same diameter as the existing sewer diameter) within the most downstream manhole of the installation and at all intermediate manholes if multiple sewer segments are lined at the same time. For sewers 15 inches in diameter and larger, plate samples shall be taken and cured in the same water as the installed CIPP.

The Contractor shall be responsible for capturing the samples and preparing the samples for testing (cutting the samples to the required dimensions, removing the PVC pipe, etc.). The testing laboratory shall specify the dimensions for the samples. In addition, the Contractor shall cut a 1-inch wide representative sample (taken at least 2 inches from the end of the specimen) for the Engineer's records. The Contractor shall label all samples including writing on the samples where they were taken (manhole numbers, work orders, and other relevant information) and the date they were taken.

The Engineer will direct the Contractor which samples to submit to the testing laboratory. The Contractor shall retain a sample from all samples that are submitted to the testing laboratory until the end of the project. These samples shall be available upon request from the Engineer. The Contractor will copy the Engineer on all submittals to the testing laboratory. The testing laboratory shall submit all test results directly back to the Contractor with a copy to the Engineer. The test results shall be returned to the Contractor and Engineer within 21 days from the laboratory receiving the samples. If the results are not received in this timeframe, payment will be withheld. It shall be the Contractor's responsibility to ensure that the laboratory meets the specified schedule.

The Contractor shall select the independent testing laboratory and shall pay the laboratory for all tests. The Contractor will be paid for the tests through the Contract at the unit price bid for each completed test. All testing shall be performed by an independent, accredited, certified and experienced (minimum 5 years of experience) testing laboratory as chosen by the Contractor. The Contractor shall submit the name and location of the testing laboratory for approval. The submittal shall include the laboratory's experience testing CIPP samples, the laboratory's accreditation/certification to perform CIPP testing from a recognized accreditation body, and a certified statement from the laboratory that they are independent from and not associated with the Contractor in any way.

The tests shall be used to verify that the installed CIPP meets these specifications. CIPP thickness shall be measured in accordance with ASTM D5813. Flexural properties shall be determined per ASTM D790. Tensile strength shall be determined per ASTM D638.

T. Any lining that does not meet the specified <u>installed</u> strength and/or thickness requirements, regardless of the amount below the specified requirements, shall be corrected by the Contractor in a manner approved by the Engineer at no additional cost to the Owner. The Engineer's decision on how to correct deficient CIPP installations shall be final. Options for correcting deficient liner that will be considered by the Engineer include removing the liner and re-lining the sewer, excavating and replacing the sewer from manhole to manhole, pipe bursting the sewer from manhole to manhole, re-lining sewers completely from manhole to manhole, or providing the Owner with a substantial credit.

Credits will only be considered for lining that does not meet the required thickness. CIPP lining thickness may be up to 5% below the specified minimum installed thickness before the credit will be applied. For example, if the minimum specified thickness is 6 mm, the credit will only apply if the CIPP is less than 5.7 mm thick. There will be no "re-calculations" of required thicknesses based on actual flexural test results for that sample. The minimum specified thicknesses shall be required regardless of the final flexural properties of the CIPP as installed. If a credit is acceptable to the Engineer and Owner, the credit shall be calculated by multiplying the bid price by the percent that the liner thickness is below the minimum required installed thickness as follows:

Credit = (1 – (installed CIPP thickness/min required thickness)) x Bid Price

The Contractor shall not assume that a credit will be acceptable to the Engineer or Owner or that the above formula will be used in all situations or for all installed CIPP thicknesses. Liner thickness of less than 85% of the required minimum thickness will not be eligible for any payment.

All credits shall be accounted for on the monthly pay estimates (each and every month) as the failed test results are received by the Engineer. Credits shall not accumulate until the end of the Contract. In addition, any other defective CIPP shall be repaired within 21 days of being identified or payment will be withheld and work will not be allowed to continue.

U. Following installation of the CIPP, reopening and brushing of all active service lateral connections, and completion of all manhole rehabilitation including vacuum testing (where applicable), the Contractor shall conduct a final post-rehabilitation television inspection of the completed work to verify that the liner installation is acceptable as defined herein. The sewers shall be thoroughly cleaned prior to performing the television inspections. No cleaning equipment shall be in the sewers during the post-rehabilitation inspections. The pipe shall be dry so that the entire CIPP can be seen. This will require that temporary plugging or bypass pumping be provided for all post-rehabilitation television inspections.

The post-rehabilitation television inspections shall be in accordance with the inspections specified in Section 02650 – Cleaning and Television Inspection. The post-rehabilitation television inspections shall be within 3 feet of the actual sewer length as measured above ground from center of manhole to center of manhole. Any inspection that exceeds this limit shall be re-performed and re-submitted to the Engineer prior to payment at no additional cost to the Owner. One copy of the final post-rehabilitation inspections shall be submitted to the Engineer for review and approval as specified. The inspections must be in order, correct and complete or the Engineer will immediately return the inspections to the Contractor for corrections.

V. Payment will not be made for any sewer lining until the Engineer has reviewed and approved the final CCTV inspection. The final CCTV inspection shall not be performed until all manhole rehabilitation work is completed (including vacuum testing where applicable). As specified previously herein, the Engineer will accept preliminary post-CIPP TV inspections for payment with the final post-CIPP TV inspections being required prior to payment of the manhole rehabilitation work (where applicable) and/or final payment. The Contractor shall submit the required digital inspections a minimum of 10 days in advance of any payment request to provide the Engineer ample time to review the information.

W. There shall be no holes, dry spots, lifts, ribs, wrinkles, blisters, ridges, splits, bulges, cracks, delaminations or other type defects in the CIPP lining. In addition, there shall be no groundwater leakage through the CIPP or between the liner and the existing pipes including at the connections to manholes. Defective lining and groundwater leakage

shall be repaired in a manner suitable to and approved by the Engineer at no additional cost to the Owner.

The Engineer's decision on how to correct defective lining shall be final. Options for repairing defective lining that will be considered by the Engineer include removing the liner and re-lining the sewer, excavating and replacing the sewer from manhole to manhole, pipe bursting the sewer from manhole to manhole, re-lining sewers completely from manhole to manhole, or installing a sectional CIPP patch to repair the defective area.

In addition, the Engineer and Owner may require an additional warranty beyond the standard warranty period (defined elsewhere in these Specifications) for defective CIPP at no additional cost to the Owner. This additional warranty will be for a maximum of five years (one year standard warranty plus four additional years). The warranty should include all costs associated with the remedial work and be non pro-rated. This additional warranty may also be required on the entire "batch" of CIPP if the defect appears to be material related (resin, felt, catalyst, etc.) or wet-out related regardless of the acceptance test results or visual review of any particular CIPP liner section in that "batch".

If a CIPP patch is approved as a repair method for manhole-to-manhole CIPP, the Owner will not pay the full bid price for that sewer segment (manhole to manhole). The price reduction (credit) shall be negotiated with the Contractor and shall be acceptable to the Owner. The credit shall be equal to at least 25% of the unit price bid for the CIPP installation and shall apply to the entire CIPP lining from manhole to manhole. The Owner shall have the final decision on the amount of the credit. Any such credits shall be accounted for on the monthly pay estimates (each and every month) as the defective CIPP is repaired. Credits shall not accumulate until the end of the Contract.

END OF SECTION

SECTION 02651A

CURED-IN-PLACE PIPE LINING (CIPP) FOR MAIN SEWERS ULTRAVIOLET LIGHT CURED CIPP

PART 1 GENERAL

1.1 SCOPE

A. Work under this section consists of furnishing all materials, labor, and equipment required for the installation of cured-in-place pipe (CIPP) in main sewers cured by ultraviolet (UV) light.

1.2 DESIGN AND PERFORMANCE REQUIREMENTS

A. The CIPP shall be designed for a life of 50 years or greater in accordance with ASTM F1216, Appendix X.1, for "fully deteriorated gravity pipe conditions." The Bid Form and/or Drawings may list alternate minimum required thicknesses for installation based on the Engineer's decision for specific installations and may list specific thicknesses for larger diameter sewers.

Each CIPP shall be designed to withstand internal and/or external loads as dictated by the site and pipe conditions. Unless listed by the Engineer on the Bid Form and/or Drawings, the required installed thickness of the CIPP shall be derived using the standard engineering methodology as found in ASTM F1216, Appendix X1. In no case shall the installed thickness be less than 3 mm. The thickness calculations, signed and sealed by a registered North Carolina professional engineer, shall be submitted to the Engineer prior to CIPP installation. The designs shall include a step by step calculation that shows all equations, defines all variables, lists all assumptions, and clearly indicates all values used for the design.

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

C. The cured liner shall have the following minimum structural properties:

Flexural Strength of 6,500 psi in accordance with ASTM D 790
Flexural Modulus of 725,000 psi in accordance with ASTM D 790
Tensile Strength of 9,000 psi in accordance with ASTM D 638

D. The required structural CIPP wall thickness shall be based at a minimum on the

physical properties in Section 1.2.C above and in accordance with ASTM F2019-20 and the design equations in the Appendix X1 of ASTM F1216, with the following design parameter considerations:

Design Safety Factor	2.0
Creep Retention Factor	50%
Ovality	2%
Soil Modulus	1,000 psi
Soil Density	120 pounds per cubic foot
Soil Coefficient of Friction	0.130 r
Groundwater Depth	Ground Surface Elevation unless otherwise noted
Live Load	H20 Highway
Poisson's Ratio	0.3
Enhancement Factor, K	7
Service Temperature Range	40 to 140 degrees F
Maximum Long-Term Deflection	5 percent

A modification to the soil modulus may be considered for sewers with more than 30 feet of cover as approved or specified by the Engineer. In addition, where other data exists for ovality or other parameters, the required structural CIPP wall thickness shall be based on the more stringent parameters unless otherwise approved or specified by the Engineer.

1.3 SUBMITTALS

A. Submit a contractor statement of qualifications which identifies key personnel and their specific UV light cured CIPP experience, and recent projects listing the total length of UV light cured CIPP installed by host pipe diameter. Work and personnel experience listed must reference projects that used process method and materials to be used on this project. Include project names, references/contacts and phone numbers.

B. Submit, prior to the installation or use of any lining materials or equipment, certified test results from the manufacturers which indicate that all materials conform to the applicable requirements.

C. Submit test results of the proposed resin that meet the chemical resistance requirements of ASTM F2019-20, Section 5.2.7. The chemical resistance tests will be completed in accordance with Test Method D5813.

D. Submit manufacturer information that describes the materials, curing speeds, curing installation processes, installation pressures, temperature limitations, and recommended post curing documentation.

E. Submit manufacturer material certifications that state conformance to the

specifications. Material certifications shall be current and must reference the project.

F. Submit manufacturers' shipping, storage and handling recommendations for all components of the CIPP system.

G. Submit CIPP wet-out information. Wet-out information shall include the identification of the wet-out facility and process description and a sample wet-out form. The wet-out forms shall document, at a minimum, the date and time of wet-out, the wet-out supervisor, the wet-out facility address, the location where the CIPP will be installed (by manhole numbers), the CIPP diameter, the length of wet-tube and dry-tube, the thickness of the CIPP, the roller gap setting for establishing the liner thickness, the liner manufacturer, the resin used (by product name and batch/shipment number) and quantity, the catalyst(s) used (by product name) and quantity, any quality control samples taken, and all else pertinent to the wet-out process.

H. Installation procedures and curing schedules shall be submitted. The Contractor shall provide this information without delay or claim to any confidentiality. Testing procedures and quality control procedures shall also be submitted.

I. Submit a sample CIPP installation report. The report shall include items such as manhole numbers, location, project number, date, time, temperature, curing time, liner thickness, etc.

J. Submit the recording of the curing parameters for every segment. The recording shall include:

    a. Curing speed
    b. Light source working and wattage
    c. Inner air pressure
    d. Curing temperatures
    e. Date and time
    f. Length of liner

K. Submit data from during the curing process. Infrared sensors shall be used to record curing data that shall be submitted to the Engineer with a post CCTV inspection. This shall be accomplished using a computer and database that are tamper proof.

L. With each shipment of CIPP delivered to the jobsite, submit certifications that the CIPP lining was manufactured in accordance with these specifications and the appropriate ASTM standards. The certifications shall include a signed statement by the wet-out manager/supervisor that no fillers were added to the resin system during manufacture of the CIPP. In addition, wet-out forms

documenting the wet-out shall be delivered with each section of CIPP manufactured and delivered to the jobsite.

M. With each shipment of resin to the wet-out facility, submit certification that the resin was manufactured under ISO 9001 certified procedures and meets these specifications.

N. Submit a plan for bypassing sewage around the work area and facilities where sewage flows must be interrupted to carry the work. The plan shall be reviewed by the Engineer and shall be acknowledged as acceptable before any work is started.

O. Submit CIPP thickness calculations sealed by a licensed North Carolina professional engineer. Any deviations from the design parameters should be clearly noted.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be shipped, stored, and handled in a manner consistent with written recommendations of the CIPP system manufacturer to avoid damage. Damage includes, but is not limited to, gouging, abrasion, flattening, cutting, puncturing, premature curing, or (UV) degradation. All damaged materials shall be promptly removed from the project site at the Contractor's expense.

1.5 QUALIFICATIONS

A. The Contractor performing the CIPP installation shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer. The Contractor must have successfully installed at least 1,000,000 feet of CIPP for a minimum of 10 years in wastewater collection systems of which at least 100,000 feet shall be the exact glass fiber reinforced, UV light cured product proposed by the Contractor. In addition, the Contractor shall have successfully installed three separate projects that included a minimum of 10,000 feet of 24-inch diameter CIPP or larger each. Included in the 30,000 feet of 24-inch diameter CIPP or larger shall be pipe diameters that are equal to or greater than the largest pipe diameter included in this project.

The Contractor shall submit detailed references (project names, dates, owner contact names and numbers, project descriptions with lengths installed, etc.) to the Engineer as requested to demonstrate compliance with the above experience requirements. The Engineer's decision on whether the Contractor meets the experience requirements shall be final, and the Contractor shall not be due any additional money if the experience requirements are not met.

B. The Contractor's personnel shall have the following experience with the products

and installation method to be used on this project.

Project Manager – Shall have a minimum of 5 years managing CIPP projects for wastewater collection systems.

Superintendent - Shall have a minimum of 5 years of on-site supervision of CIPP projects for wastewater collection systems. The superintendant shall have supervised a minimum of 300,000 feet of installed CIPP in wastewater collection systems of the pipe diameters included in the project of which 50,000 linear feet must be with the exact glass fiber reinforced, UV cured product proposed by the Contractor. In addition, the superintendent shall have been the direct, on-site superintendent for three separate projects that included a minimum of 5,000 feet of 24-inch diameter CIPP or larger each.

C. The CIPP product manufacturer shall have at least 10 years of experience in the successful manufacturing of glass fiber, UV cured-in-place liners. The CIPP product must have been installed in a minimum of 5,000,000 feet or 4,000 manhole to manhole line sections of successful wastewater collection system installations worldwide, of which 1,000,000 feet shall be within the U.S. The manufacturer and facility shall not change throughout the duration of the contract unless approved by the Engineer in writing.

D. Approved CIPP products are listed in these specifications. Even though the Contractor's product may be listed as approved, the Contractor shall still meet the experience requirements specified above, or the Contractor will not be approved for this work.

1.6 ENVIRONMENTAL REQUIREMENTS

A. The use of the product shall not result in the formation or production of any detrimental compounds or by-products at the wastewater treatment plant.

1.7 PROJECT ACCESS

A. The Contractor shall utilize existing road rights-of-way and sanitary sewer easements to perform the work unless notified otherwise. The Contractor shall coordinate with and meet the requirements of North Carolina Department of Transportation, the Owner, or any other agency or municipality that may be impacted by the work.

1.8 WARRANTY

A. The materials used for the project shall be certified by the manufacturer for the specified purpose. The manufacturer shall warrant the liner to be free from defects in raw materials for one (1) year from the date of final acceptance by the Owner.

The Contractor shall warrant the liner installation for a period of one (1) year from the date of final acceptance by the Owner.

1.9 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. The Contractor shall ensure that the products and work comply with the current version of the following American Society for Testing and Materials (ASTM) standards:

1. ASTM D543 - Test Method for Resistance of Plastics to Chemical Reagents
2. ASTM D578 - Standard Specification Glass Fiber Strands
3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics
4. ASTM D790 - Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
5. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin Impregnated Tube
6. ASTM F1743 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
7. ASTM F2019-20 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic Cured-in-Place (GRP-CIPP) Using the UV-Light Curing Method
8. ASTM D2122 Standard 1 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
9. ASTM D3567 Standard Practice for Determining Dimensions of ‘‘Fiberglass’’ (Glass-Fiber- Reinforced Thermosetting Resin) Pipe and Fittings
10. ASTM D5813 - Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe

PART 2 PRODUCTS

2.1 CURED-IN-PLACE-PIPE LINING

A. UV Cured-In-Place-Pipe (CIPP) lining shall be one of the following products or approved equal. The products below shall adhere to all requirements specified herein and shall be modified as necessary to meet these requirements

- Alphaliner by Reline America
- Inliner STX by Granite Inliner
- Saertex Liner by Saertex Multicom
- iPlus Glass by Insituform

B. The CIPP can be installed and cured using water, steam, or ultraviolet. See Section 02651 - CIPP for Main Sewers for water and steam cured requirements.

The choice of installation method shall be the Contractor's choice except that the default installation method for sewers less than 18 inches in diameter shall be steam cured. UV cure for sewers less than 18 inches in diameter must be approved by the Engineer prior to installation. The choice of curing method shall be appropriate for the pipe being lined and must be ultimately approved by the Engineer as stated below. For example, sewers with heavy active leaks shall be lined using water cure unless the Contractor can prove to the Engineer that the UV cure can overcome the heat sink and active water stream.

The Engineer will note any concerns with UV curing methods during review of the pre-rehabilitation TV inspections. Those concerns will be in writing, and the Contractor shall fully address the concerns. If the Engineer's concerns are not fully addressed, the Contractor shall install those specific sewers using water cure at the bid price. Steam and ultraviolet cure will be paid at the same unit price bid. There is an adder bid item for water cure where required.

C. The CIPP tube shall consist of one or more layers of glass fiber reinforced materials capable of carrying resin, withstanding installation pressures and curing temperatures. The CIPP tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit minor irregular pipe sections.

D. The CIPP tube should be fabricated under controlled conditions to a size that, when installed, will tightly fit the internal circumference and the length of the original conduit. The tube shall be able to stretch to fit irregular pipe sections and negotiate bends of up to 30 degrees and shall have sufficient strength to bridge missing pipe sections, with the use of a canvas sleeve if necessary.

E. The glass fiber tube shall be saturated with the appropriate resin using a resin bath system to allow for the lowest possible amount of air entrapment. An inner and outer material shall be added that are both impervious to airborne styrene with the outer material also having UV blocking characteristics. If required by the liner manufacturer, the inner membrane will be removed after the installation and curing processes are completed.

F. The Contractor shall verify the lengths in the field before cutting the CIPP tube to length. Continuous individual liners can be made over one or more manhole to manhole sections.

G. The CIPP tube shall be uniform in thickness and when subjected to the manufacturer recommended installation pressures shall meet or exceed the designed wall thickness.

H. Interior and exterior plastics shall be styrene resistant to protect and contain the resin used in the liner.

I. A pre-liner shall be inserted into the pipe prior to inserting the liner. If the fiberglass liner has a second outer layer applied during manufacturing such as UV blocking foil, a pre-liner will not be required.

J. A third layer of protective foil shall be installed on the exterior of the liner to prevent liner damage during the installation process and block UV penetration causing the liner to cure prematurely.

K. The liner is to be constructed of with an inner fleece layer giving the exposed inside surface a resin rich layer.

L. 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 CCTV inspection may be made.

M. The fiberglass within the liner shall be non-corrosion (E-CR Glass) material and shall be free from tears, holes, cuts, foreign materials and other surface defects. Its glass fibers must extend in a longitudinal direction to ensure no longitudinal stretching during the pull-in process.

N. At time of manufacture, each lot of CIPP tube shall be inspected and certified to be free of defects. The CIPP tube shall be marked for distance at regular intervals along its entire length, not to exceed five feet. Such markings shall also include the CIPP tube manufacturer's name or identifying symbol.

O. The resin used to impregnate the liner shall produce a cured liner pipe resistant to shrinkage, corrosion, abrasion and shall have a proven resistance to municipal wastewater. The impregnation equipment shall contain devices to secure a proper distribution of resin. Following impregnation, the fabric tube shall be exposed to a resin thickening procedure.

P. The resin shall be a chemically resistant, UV cured, isophthalic polyester resin or vinyl ester resin (as determined by the Engineer).

Q. When combined with the CIPP tube, the resin system shall provide a CIPP that meets the structural requirements of ASTM F2019-20, the minimum physical properties specified in Section 1.2.C, and those properties which are to be utilized in the design of the lining system for this project.

R. When combined with the CIPP tube, the resin system shall provide a CIPP that complies with the chemical resistance requirements specified in ASTM F2019-20, Section 5.2.7. The chemical resistance tests shall be completed in accordance with ASTM D5813.

S. The exact makeup of the resin shall be submitted to the Engineer including chemical resistance information and cure logs. Polyester resins shall have a minimum Heat Distortion Temperature of 212 degrees Fahrenheit per ASTM D648. Vinyl ester resins

shall have a minimum Heat Distortion Temperature of 220 degrees Fahrenheit per ASTM D648.

T. The resin shall be shipped directly from the resin manufacturer's facility to the CIPP wet-out facility. The resin shall not be sent to any intermediate mixing facility. Copies of the shipment documents from the resin manufacturer shall be submitted to the Engineer showing dates of shipment, the originating location and the receiving location.

U. The resin shall be used to manufacture the CIPP as shipped. No fillers or additives shall be added at the wet-out facility except for the required catalyst as recommended by the resin manufacturer. The Contractor shall submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility (to include the date of manufacture and the Heat Distortion Temperature). This information shall be submitted prior to manufacturing any CIPP.

V. The Contractor shall identify the wet-out facility where all CIPP under this Contract will be manufactured. All CIPP shall be manufactured from this designated wet-out facility throughout the entire Contract unless specifically approved otherwise by the Engineer in writing. Multiple wet-out facilities shall not be allowed.

W. The Engineer, Owner and/or an agent of the Owner may inspect the CIPP during manufacturing (during "wet-out"). The Contractor shall submit UV wetout schedules so that an agent of the Owner may inspect the CIPP manufacturing process. The Contractor shall submit a schedule for manufacturing the CIPP to the Engineer every Friday for the following week. The Engineer and Owner must be given an opportunity to witness the manufacturing of all CIPP for this project. If the CIPP is manufactured without providing the required notice to the Engineer, the CIPP will be marked as rejected prior to installation and will not be approved for installation in this project.

X. If the Engineer and/or Owner decide to inspect the manufacturing of the CIPP, the Contractor shall provide full access to witness the wet-out process and shall provide any and all information related to the manufacturing as requested by the Engineer, Owner or the Owner's agent without delay and without claims of confidentiality or product privacy.

Y. The Engineer or Owner may take samples of the resin from the wet-out facility for infrared analyses (IR Scan) throughout the duration of this Contract. This standard analytical test involves shining a beam of light in the infrared frequency region through a thin sample of the subject resin. The frequency of light is then varied across the infrared spectrum. Chemical functional groups present in the resin being analyzed will absorb infrared light as specific frequencies and with characteristic absorption intensities.

The Owner will pay for all such infrared analyses and resin testing. To allow the resin samples to be taken, the Contractor shall place a sampling valve in-line at a point prior to the resin/catalyst mixing stage and after the resin/catalyst mixing stage. These sampling valves shall remain in place throughout the duration of the Contract and shall always be accessible to the Engineer and Owner.

The infrared analyses will be used to verify that the resin and resin/catalyst composition and mixture being used is the approved resin and resin/catalyst system. Payment will not be made for any CIPP manufactured with unapproved resin and resin/catalyst mixtures. The Contractor shall submit results of infrared analyses of the proposed resin and resin/catalyst mixture, performed and certified by the resin manufacturer, prior to manufacturing any CIPP as a shop drawing. The results of these analyses (the resin's chemical fingerprint) will be used as the standard for verifying the resin and resin/catalyst mixture being used throughout the Contract.

The Engineer will compare the submitted chemical fingerprint with the fingerprint of Reichhold Polylite 33420 resin (for isothalic polyester resin) or Reichhold Atlac 580-20 (for vinyl ester resin) for a baseline comparison. The Contractor and resin manufacturer shall fully describe, explain and justify any differences between the Reichhold and proposed resin fingerprints without delay or claim to confidentiality.

Z. The installed thickness shall be measured as specified elsewhere herein. The Contractor shall submit his proposed plan for ensuring that the installed CIPP meets the minimum thickness requirements. The plan shall include the proposed CIPP thickness to be installed (pre-installation thickness) and detailed installation procedures to reduce stretching and to reduce migration of resin.

PART 3 EXECUTION

A. The Contractor shall continuously notify the public of the work being performed. Refer to Section 01010 for requirements.

B. The Contractor shall develop and submit to the Engineer a protocol for addressing odor complaints during the CIPP installation process (primarily styrene odor complaints). The protocol shall include steps to be taken by on-site and management personnel immediately when the complaint is received, including discussing the odor with the property owners/residents to address their concerns and alleviating the odor from the home/residence or business using fans or other means as necessary. The Contractor shall also maintain a calibrated portable styrene test unit to immediately document the atmospheric concentrations of the styrene on the site and in the house/residence/business when a complaint is received. The styrene concentrations must be tested prior to exhausting the odors from the house/residence/business. The Contractor shall also utilize blowers (vacuum blowers) during the CIPP installation to exhaust odors from the sewers and into the atmosphere during the installation as deemed necessary. This will help to minimize the potential for odors to travel up service laterals and into homes/businesses. The blowers shall be strategically placed to exhaust the concentrated odors in an isolated location. The costs for addressing such odors issues/complaints shall be included in the unit prices bid for CIPP.

C. The Contractor shall perform and provide all necessary traffic control measures to complete the work. Refer to Section 01010 for requirements.

D. The Contractor shall develop and submit to the Engineer a proposed shot plan at least 30 days prior to CIPP installation. The shot plan shall identify where the CIPP will be inserted, the direction of insertion (upstream or downstream), the sewers included in each shot, plans for addressing CIPP in manholes that the shot goes through, access points, and any other relevant information. In addition, if there are any manhole to manhole sections that exceed the maximum length that can be provided, the Contractor shall submit information on the proposed methodology to install two or more shots, overlap details, sealing information, and all other relevant information. The Engineer will review and comment or approve. The Contractor must address the Engineer's comments and resubmit until resolved.

E. The Contractor shall clean and televise each length of pipe to be lined as specified in the Section 02650 – Cleaning and Television Inspection. Prior to lining the main sewer and the pre-rehabilitation television inspection, protruding service lateral connections shall be internally cut/ground down flush with the pipe wall with a robotic cutter specifically designed for this purpose and all required point repairs shall be completed. The internal cutter shall be capable of cutting any pipe material including cast iron, PVC, vitrified clay pipe, ductile iron pipe and orangeburg pipe.

F. Water for use on this project will be available from selected hydrants owned and operated by the Owner. The Owner will provide water for use by the Contractor free of charge. The Contractor shall coordinate with the Owner to have bulk water meters provided at hydrants. Water from the Owner's hydrants may only be obtained by the connection of a Owner-provided meter assembly.

G. The Contractor shall bypass pump sewage flows around the lining work while it is being performed as specified in the Section 02150 – By-Pass System.

H. The Contractor shall take precautions to avoid damage or flooding to public or private property being served by the sewer being lined. 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 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 cleanup shall be completed within 4 hours of the backup.

I. The Contractor shall furnish and install the CIPP lining in the full length of sewer. The installation of the CIPP shall be in complete accordance with the applicable provisions of ASTM F2019-20 except as modified herein, these specifications and the manufacturers' specifications.

J. As required by the contractor, a plastic sheet at least 10 mil thick may be pulled into the host pipe prior to liner insertion to protect the liner from damage as the liner is pulled in.

K. The liner shall be pulled-in through an existing manhole or approved access point and fully extend to the next designated manhole or termination point. The pulling speed shall not exceed 15 ft/min. Care shall be exercised not to damage the tube during the pulling phase.

L. A constant tension winch should be used, as specified by the liner manufacturer, to pull the glass fiber liner into position in the pipe. The liner shall have a longitudinal fiberglass reinforcement band which runs the entire length of the liner ensuring that the pulling force is transferred to the band and not the fiberglass liner. Once inserted, end plugs shall be used to cap each end of the glass fiber liner to prepare for pressurizing the liner. The end plugs shall be secured to prevent them from being expelled due to pressure. Liner restraints shall be used in manholes.

M. The liner shall then be inflated with air with sufficient pressure to hold the liner tight to the host pipe wall.

N. The Contractor will video record the liner prior to commencement of the curing process, and make the recording available to the Engineer upon request.

O. CIPP curing shall be in accordance with applicable ASTM F2019-20, Section 6.6 and 6.7, with the following modifications:

    a. The ultraviolet curing lamps shall operate in a sufficient frequency range to ensure the curing of the resin.
    b. A camera must be located on the ultraviolet light assembly to enable the video inspection of the liner and to ensure that the liner has been properly inflated and any liner problems can be identified before curing begins.
    c. The Contractor shall submit a documented record of time, rate of travel of the ultraviolet light assembly, and internal temperatures and pressures during the curing process to the Engineer upon request.

P. The UV light sources shall be assembled according to the manufacturer's specifications for the liner diameter. For the liner to achieve the required water tightness and specified mechanical properties, the following parameters must be controlled during the entire curing process, giving the Engineer a record of the curing parameters over every segment of the entire length of the liner. The recording shall include:

    a. Curing speed
    b. Light source working and wattage
    c. Inner air pressure
    d. Curing temperatures
    e. Date and time
    f. Length of liner

Q. The optimal curing speed, or travel speed of the energized UV light sources, is determined for each length of liner based on liner diameter, liner thickness, and exothermic reaction temperature. Curing speed shall be as recommended by the manufacturer and determined by contractor based on various site specific field conditions. This shall be accomplished using a computer and database that are tamper proof. During the curing process, infrared sensors shall be used to record curing data that will be submitted to the Engineer with a post CCTV inspection.

R. If the liner is manufactured with a removable inner film, the inner film material shall be removed and discarded after curing to provide optimal quality of the final product.

S. The CIPP shall be neatly cut 2 inches from the manhole walls after installation unless otherwise directed by the Engineer. The CIPP shall be sealed at the manholes to provide a watertight liner connection at the manhole. There shall be no leakage of groundwater into the manhole between the CIPP and existing sewer pipe and between the existing sewer pipe and manhole wall. A hydrophilic waterstop (non-bentonite) comprised of modified chloroprene rubber shall be installed around the liner 6 inches from each manhole wall prior to processing the liner to provide additional waterstop protection. As the CIPP is expanded, the waterstop shall be pressed tightly against the existing sewer to provide a leak-tight seal. The waterstop shall be Hydrotite as manufactured by Greenstreak (St. Louis, Missouri) or equal. All CIPP connections to manholes shall be further sealed with an approved non-shrink grout to completely cover the CIPP/manhole connection point. CIPP lining shall be sealed to manhole linings (where specified) in an acceptable manner as approved by the Engineer. Further, all invert channels shall be coated with an approved grout to match the CIPP elevations in the manhole. Submit detailed drawings of the pipe-manhole connections to the Engineer for approval, including termination points in manholes and transitions with manhole linings where installed.

T. The Contractor shall fully reopen all of the existing active service connections in each length of sewer following lining. The service connections shall be reopened from inside the sewer by means of a closed-circuit television camera controlled cutting device appropriate for the CIPP. All openings shall be clean and neatly cut and shall be flush with the lateral pipe. The openings shall also be buffed with a wire brush to remove rough edges and provide a smooth finish. The bottom of the openings shall be flush with the bottom of the lateral pipe to remove any lip that could catch debris. Openings shall be 100% of the service lateral pipe. The Contractor shall re-open any service lateral that does not meet this requirement as evidenced by the post-rehabilitation inspections at no additional cost to the Owner. The Contractor shall be fully responsible for all backups and damage caused by not fully opening a lateral connection, including paying all costs associated with repairing damage as required by the Engineer, Owner and/or property owner.

U. Preliminary Post-CIPP TV Inspections: Immediately after the CIPP is installed and the service connections are completely opened and brushed, the Contractor shall televise the installed CIPP to verify and document that the CIPP was properly installed and cured and

that all service connections have been opened as specified. The preliminary post-CIPP TV inspection videos shall be submitted to the Engineer within 1 day of the CIPP being installed. This will allow the Engineer to confirm that there are no CIPP issues that need addressed on this sewer and/or future installations and that the service laterals are properly opened. The preliminary post-CIPP inspections shall clearly show the CIPP liner and all service connections.

The Engineer will accept these preliminary post-CIPP TV inspections for approving payment of the installed CIPP with the final post-CIPP inspections as specified herein being required prior to final payment. The Contractor may submit these inspections as the final post-CIPP inspections if all grout/concrete work is finalized in the connecting manholes (including grouting the pipe connections, coating the invert channels, and performing the specified manhole rehabilitation) and all specifications are met. Completing all of the manhole work may be difficult to get finished so that the TV inspections can be submitted within 1 day as specified above. The Contractor's unit price bid for the CIPP shall include preliminary post-CIPP and final post-CIPP TV inspections.

V. Installation reports shall be generated for each segment of liner installed. The reports shall document installation, including manhole numbers, street names/sewer location, project number, date, time, temperature, curing time, curing parameters, curing speed, liner thickness, etc. A sample report shall be submitted to the Engineer for approval prior to installing any lining. The reports shall be submitted to the Engineer prior to requesting payment.

W. For every sewer segment that is lined (sewer segment is defined as the sewer between two manholes), the Contractor shall remove one restrained sample of the installed liner at least 12 inches in length for testing of installed CIPP flexural properties and thickness. The CIPP testing shall include determining flexural strength, flexural modulus, tensile strength and thickness of each sample. These four separate individual tests make up one completed CIPP test. Payment will be made for each completed CIPP test at the unit price bid after the test results are submitted to the Engineer.

For sewers 12 inches in diameter and smaller, the sample shall be captured by installing the lining through a section of PVC pipe (same diameter as the existing sewer diameter) within the most downstream manhole of the installation and at all intermediate manholes if multiple sewer segments are lined at the same time. For sewers 15 inches in diameter and larger, plate samples shall be taken and cured in the same water as the installed CIPP.

The Contractor shall be responsible for capturing the samples and preparing the samples for testing (cutting the samples to the required dimensions, removing the PVC pipe, etc.). The testing laboratory shall specify the dimensions for the samples. In addition, the Contractor shall cut a 1-inch wide representative sample (taken at least 2 inches from the end of the specimen) for the Engineer's records. The Contractor shall label all samples including writing on the samples where they were taken (manhole numbers, work orders, and other relevant information) and the date they were taken.

The Engineer will direct the Contractor which samples to submit to the testing laboratory. The Contractor shall retain a sample from all samples that are submitted to the testing laboratory until the end of the project. These samples shall be available upon request from the Engineer. The Contractor will copy the Engineer on all submittals to the testing laboratory. The testing laboratory shall submit all test results directly back to the Contractor with a copy to the Engineer. The test results shall be returned to the Contractor and Engineer within 21 days from the laboratory receiving the samples. If the results are not received in this timeframe, payment will be withheld. It shall be the Contractor's responsibility to ensure that the laboratory meets the specified schedule.

The Contractor shall select the independent testing laboratory and shall pay the laboratory for all tests. The Contractor will be paid for the tests through the Contract at the unit price bid for each completed test. All testing shall be performed by an independent, accredited, certified and experienced (minimum 5 years of experience) testing laboratory as chosen by the Contractor. The Contractor shall submit the name and location of the testing laboratory for approval. The submittal shall include the laboratory's experience testing CIPP samples, the laboratory's accreditation/certification to perform CIPP testing from a recognized accreditation body, and a certified statement from the laboratory that they are independent from and not associated with the Contractor in any way.

The tests shall be used to verify that the installed CIPP meets these specifications. CIPP thickness shall be measured in accordance with ASTM D5813. Flexural properties shall be determined per ASTM D790. Tensile strength shall be determined per ASTM D638.

X. Any lining that does not meet the specified <u>installed</u> strength and/or thickness requirements, regardless of the amount below the specified requirements, shall be corrected by the Contractor in a manner approved by the Engineer at no additional cost to the Owner. The Engineer's decision on how to correct deficient CIPP installations shall be final. Options for correcting deficient liner that will be considered by the Engineer include removing the liner and re-lining the sewer, excavating and replacing the sewer from manhole to manhole, pipe bursting the sewer from manhole to manhole, re-lining sewers completely from manhole to manhole, or providing the Owner with a substantial credit.

Credits will only be considered for lining that does not meet the required thickness. CIPP lining thickness may be up to 5% below the specified minimum installed thickness before the credit will be applied. For example, if the minimum specified thickness is 6 mm, the credit will only apply if the CIPP is less than 5.7 mm thick. There will be no "re-calculations" of required thicknesses based on actual flexural test results for that sample. The minimum specified thicknesses shall be required regardless of the final flexural properties of the CIPP as installed. If a credit is acceptable to the Engineer and Owner, the credit shall be calculated by multiplying the bid price by the percent that the liner thickness is below the minimum required installed thickness as follows:

Credit = (1 – (installed CIPP thickness/min required thickness)) x Bid Price

The Contractor shall not assume that a credit will be acceptable to the Engineer or Owner or that the above formula will be used in all situations or for all installed CIPP thicknesses. Liner thickness of less than 85% of the required minimum thickness will not be eligible for any payment.

All credits shall be accounted for on the monthly pay estimates (each and every month) as the failed test results are received by the Engineer. Credits shall not accumulate until the end of the Contract. In addition, any other defective CIPP shall be repaired within 21 days of being identified or payment will be withheld and work will not be allowed to continue.

Y. Following installation of the CIPP, reopening and brushing of all active service lateral connections, and completion of all manhole rehabilitation including vacuum testing (where applicable), the Contractor shall conduct a final post-rehabilitation television inspection of the completed work to verify that the liner installation is acceptable as defined herein. The sewers shall be thoroughly cleaned prior to performing the television inspections. No cleaning equipment shall be in the sewers during the post-rehabilitation inspections. The pipe shall be dry so that the entire CIPP can be seen. This will require that temporary plugging or bypass pumping be provided for all post-rehabilitation television inspections.

   The post-rehabilitation television inspections shall be in accordance with the inspections specified in Section 02650 – Cleaning and Television Inspection. The post-rehabilitation television inspections shall be within 3 feet of the actual sewer length as measured above ground from center of manhole to center of manhole. Any inspection that exceeds this limit shall be re-performed and re-submitted to the Engineer prior to payment at no additional cost to the Owner. One copy of the final post-rehabilitation inspections shall be submitted to the Engineer for review and approval as specified. The inspections must be in order, correct and complete or the Engineer will immediately return the inspections to the Contractor for corrections.

Z. Payment will not be made for any sewer lining until the Engineer has reviewed and approved the final CCTV inspection. The final CCTV inspection shall not be performed until all manhole rehabilitation work is completed (including vacuum testing where applicable). As specified previously herein, the Engineer will accept preliminary post-CIPP TV inspections for payment with the final post-CIPP TV inspections being required prior to payment of the manhole rehabilitation work (where applicable) and/or final payment. The Contractor shall submit the required digital inspections a minimum of 10 days in advance of any payment request to provide the Engineer ample time to review the information.

AA. There shall be no holes, dry spots, lifts, ribs, wrinkles, blisters, ridges, splits, bulges, cracks, delaminations or other type defects in the CIPP lining. In addition, there shall be no groundwater leakage through the CIPP or between the liner and the existing pipes including at the connections to manholes. Defective lining and groundwater leakage

shall be repaired in a manner suitable to and approved by the Engineer at no additional cost to the Owner.

The Engineer's decision on how to correct defective lining shall be final. Options for repairing defective lining that will be considered by the Engineer include removing the liner and re-lining the sewer, excavating and replacing the sewer from manhole to manhole, pipe bursting the sewer from manhole to manhole, re-lining sewers completely from manhole to manhole, or installing a sectional CIPP patch to repair the defective area.

In addition, the Engineer and Owner may require an additional warranty beyond the standard warranty period (defined elsewhere in these Specifications) for defective CIPP at no additional cost to the Owner. This additional warranty will be for a maximum of five years (one year standard warranty plus four additional years). The warranty should include all costs associated with the remedial work and be non pro-rated. This additional warranty may also be required on the entire "batch" of CIPP if the defect appears to be material related (resin, tube, catalyst, etc.) or wet-out related regardless of the acceptance test results or visual review of any particular CIPP liner section in that "batch".

If a CIPP patch is approved as a repair method for manhole-to-manhole CIPP, the Owner will not pay the full bid price for that sewer segment (manhole to manhole). The price reduction (credit) shall be negotiated with the Contractor and shall be acceptable to the Owner. The credit shall be equal to at least 25% of the unit price bid for the CIPP installation and shall apply to the entire CIPP lining from manhole to manhole. The Owner shall have the final decision on the amount of the credit. Any such credits shall be accounted for on the monthly pay estimates (each and every month) as the defective CIPP is repaired. Credits shall not accumulate until the end of the Contract.

END OF SECTION

SECTION 02653

MANHOLE REHABILITATION

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section includes the rehabilitation of existing manholes throughout the project and/or service area.

B. This Section covers the cleaning, repair, structural restoration, and rehabilitation of existing manholes as required to eliminate leakage into the manholes and to restore structural integrity. The work includes but is not limited to: cleaning entire manhole interior, repair/reconstruction of the failed sections of the structure; stopping active leaks through manhole walls and joints; preparation of surfaces to receive the application of coatings designed to resist the affects of hydrogen sulfide gas or the affects of aging; and, application of those coatings to provide a monolithic liner on the inside walls of the manhole as specified.

C. All ancillary work shall be constructed properly in accordance with the Drawings and Specifications. All defects shall be remedied to the engineer's satisfaction prior to approval.

1.02 REFERENCE SPECIFICATION, CODES, AND STANDARDS

A. The Contractor shall ensure that the products and work comply with the reference specifications listed in the Contract Documents.

B. The Contractor shall ensure that the products and work comply with the current version of the following American Society for Testing and Materials (ASTM) standards:

1. ASTM C78 Standard Test Method for Flexural Strength of Concrete
2. ASTM C94 Standard Test for Ready Mix Concrete
3. ASTM C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
4. ASTM C234 Standard Test Method for Comparing Concretes on the Basis of the Bond Developed with Reinforcing Steel
5. ASTM C267 Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings
6. ASTM C321 Standard Test Method for Bond Strength of Chemical-Resistant Mortars
7. ASTM C496 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

8. ASTM C596 Standard 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 C827 Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
11. ASTM C882 Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear
12. ASTM C952 Standard Test Method for Bond Strength of Mortar to Masonry Units
13. ASTM C1072 Test Method for Measurement of Masonry Flexural Bond Strength
14. ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test

1.03 QUALIFICATIONS

A. The Contractor performing the work, as a company, must have at least five years of experience coating manholes with cementitious mortar, and shall have successfully installed a cementitious mortar lining product in a minimum of 2,000 manholes as documented by verifiable Owner references.

B. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer as certified and licensed by the product manufacturer.

C. The Contractor's proposed superintendent/foreman for the work under this Contract shall have successfully installed a cementitious lining product in a minimum of 1,000 manholes as documented by verifiable Owner references. The Contractor shall submit information to demonstrate that the experience requirements are met.

D. The cementitious product shall have been manufactured for installation specifically in manholes for at least five years and shall have been installed in at least 10,000 manholes. References that are documented and that can be verified shall be submitted to demonstrate that the cementitious products meet these requirements. Contact names and numbers shall be included with the references.

E. Approved cementitious products are listed in these specifications. Even though the product may be listed as approved, the product manufacturer and Contractor(s) shall still meet the experience requirements specified above, or the products and Contractor will not be approved for this work.

1.04 SUBMITTALS

A. Three hard copies (one to be returned to Contractor after review, one to remain with the Engineer and one to remain with the Owner) and one pdf of all submittals specified herein shall be submitted to the Engineer.

B. The Contractor shall submit complete shop drawings of the manhole lining system to demonstrate compliance with these specifications, to show materials of construction and to detail installation procedures. Testing procedures and quality control procedures shall also be submitted.

C. Certifications that the manhole lining was manufactured in accordance with these specifications and the appropriate ASTM standards shall be submitted with each shipment.

D. For all products to be used for manhole rehabilitation, the Contractor shall submit manufacturer documents containing product technical information, ASTM test results and certification, application procedures and specifications for approval, and testing and quality control procedures.

E. References for the Contractor, superintendent and products shall be submitted to verify the specified experience.

F. The Contractor shall submit a plan for bypassing sewage around the work area and facilities where sewage flows must be interrupted to complete the work. The plan shall be reviewed by the Engineer and shall be acknowledged as acceptable before any work is started. The bypass designs should be sealed by a licensed North Carolina professional engineer.

1.05 WARRANTY

A. The materials used for the project shall be certified by the manufacturer for the specified purpose. The manufacturer shall warrant the cementitious liner material to be free from defects in raw materials for 1 year from the date of installation and acceptance by the Owner. The Contractor shall warrant the liner installation for a period of 1 year from final acceptance.

PART 2 PRODUCTS

2.01 MATERIALS – CEMENTITIOUS MORTAR LINING SYSTEM

A. The Contractor shall line the interior of the manholes with a cementitious mortar lining system where specified in accordance with the specifications of the manufacturer.

B. The cementitious manhole lining system for the interior of manholes shall be a monolithic system suitable for use as a trowel or spray-applied monolithic surfacing in sewer manholes. The cementitious lining system shall be a 100% calcium aluminate product (product comprised of calcium aluminate cement and calcium aluminate aggregate). Partial calcium aluminate products (or blended products) shall not be considered an equal and shall not be approved. The hydrogen sulfide resistant 100% calcium aluminate products shall be one of the following products or approved equal:

- High Performance by Strong Seal Systems
- Aluminaliner PF by Quadex
- Sewpercoat PG by Kerneos, Inc.
- Mainstay ML-PF by Madewell
- Cemtec HITECH 100 by A.W. Cook Cement
- Maximum CA Plus Cement by Standard Cement Materials

C. The cementitious lining system shall be a pumpable cement mixture. The lining shall be installed via low-pressure application only. The materials shall be suitable for all the specified design conditions. Trowel application may be approved by the Engineer.

D. The cementitious lining shall provide a minimum service life of 25 years. The cured cementitious lining shall be continuously bonded to all the brick, mortar, concrete, chemical sealant, grout, pipe and other surfaces inside the sewer manhole. Provide bond strength data on cured, cementitious lining based on ASTM test methods referenced herein.

E. The cementitious liner when cured shall have the following minimum characteristics at 28 days as measured by the applicable ASTM standards referenced herein:

1. Minimum compressive strength of 6,000 psi
2. Minimum bond strength of 130 psi
3. Shrinkage of less than 0.05%

F. The cementitious lining shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20^{o}F to 100^{o}F. Provide test data on shrinkage of the cementitious lining based on the ASTM standards referenced herein.

F. Chemical sealants or grouts used to seal active manhole leaks, to patch cracks, to fill voids and to otherwise prepare the manhole surfaces for the lining installation shall be suitable for the intended purpose and shall be compatible with the lining as certified by the manufacturer.

G. External Coating: Whenever the outside of exposed manholes walls are specified to be coated with a special exterior cementitious mortar product, the exterior mortar shall be HB2 Repair Mortar by ThoRoc, SikaTop 123 by Sika Corporation, or approved equal. The installed thickness shall be at least 2 inches, toweled smooth after application.

2.02 MATERIALS – INJECTION GROUTING

A. The grout used to completely stop identified leaks shall be a polyurethane grout and shall be Hydro Active Cut by DeNeef Construction Chemicals, AV-202 Multigrout by Avanti International, or approved equal.

B. The grout shall be suitable for injection and shall expand to seal identified leaks. The grout shall be installed per the manufacturer's recommendations. The material shall be suitable for all the specified design conditions.

C. The grout shall provide a minimum service life of 25 years. When cured, the grout shall be suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage. The grout shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20^{o}F to 100^{o}F.

D. The grout shall effectively seal the identified leak in the sewer manhole and prevent any penetration or leakage of groundwater infiltration at this location or other nearby locations or within the same pre-cast manhole joint as a direct result of the injected grout. Any leaks from such migration shall be sealed at no additional cost.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND SHIPPING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Any lining product damaged in shipment, 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.

B. 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.

3.02.1 INSTALLATION – CEMENTITIOUS LINING

A. The Contractor shall notify all property owners who discharge sewage directly to the manhole being rehabilitated 72 hours in advance, giving the date, start time

and estimated completion time for the work being conducted and the impacts to the property owner.

B. Water for use on this project will be available from selected hydrants owned and operated by the Owner. The Owner will provide water for use by the Contractor free of charge. The Contractor shall coordinate with the Owner to have bulk water meters provided at hydrants. Water from the Owner's hydrants may only be obtained by the connection of a Town-provided meter assembly.

C. The Contractor shall clean each sewer manhole to be surfaced and shall dispose of any resulting material. The cleaning shall be performed using a high power jet wash at a minimum of 3500 psi water pressure to remove all dust, biological growths, grease, oil, paint or any other surface contaminants or coatings. The tip of the nozzle shall be a maximum of 4 inches from the manhole wall during cleaning to ensure that 3,500 psi is being applied to the walls.

D. Coatings that cannot be removed shall be sanded with coarse sand paper to rough the surface sufficient to obtain and ensure adequate bonding of the lining. Roots shall be removed by manually cutting the roots from inside the manhole.

E. 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 an appropriate grout compatible with the cementitious lining. Injection grouting may be required to seal active leaks including leaks in existing invert channels and benches. All loose mortar and rubble of existing walls, benches and inverts shall be removed.

F. Prior to installing the lining, the Engineer along with the Contractor must inspect and approve the surface preparation work. The Contractor shall notify the Engineer when the manholes are ready for inspection. The Contractor is responsible for ensuring proper preparation and installation conditions including temperature and moisture regardless of the findings by the Engineer during his inspection. The manhole lining shall be completed immediately after the inspection, or the manhole may need to be re-cleaned prior to spraying to remove accumulated debris on the benches and walls.

G. The Contractor shall prepare the manhole to receive cementitious lining as necessary by reshaping and repairing benches, inverts, and walls where required including smoothing out irregular shaped corbel and chimney sections prior to spray application. All interior surfaces shall be prepared as recommended by the manufacturer. Minimum requirements are as listed below.

    1. All cracks and other voids must be repaired and filled with suitable non-shrinking cements, sealants or grouts, including all voids between the existing sewer pipes and manhole walls.
    2. All patches shall be smooth and even with the manhole wall.

3. All existing manhole rungs/steps shall be removed and voids filled.
4. All surfaces shall be suitably prepared for the required bonding of the cementitious lining as recommended by the manufacturer.
5. If steel reinforcement (rebar) is encountered when cleaning or preparing the surface, notify the Engineer before any additional work is performed so that the steel reinforcement can be evaluated.

H. A complete, watertight seal shall be provided at pipe and manhole wall connections including filling in all voids around the connection and completely covering the connection with an approved non-shrink grout. Contractor shall submit details of how the watertight connections will be made to the Engineer for review and approval. The invert channel shall be coated with an appropriate quick-set grout product in complete accordance with the manufacturer's instructions.

I. When CIPP is installed in the connecting sewer(s), the invert channel shall be coated with an approved grout to build up the invert channel to the invert elevations of the new cured-in-place pipe lining (CIPP); to fill all voids, cracks, holes, etc.; and to form a smooth flow channel. The entire channel shall be coated. The coating shall be a minimum ¼-inch thick. The Contractor shall submit details of the proposed grout for this application.

J. The Contractor shall furnish and place the cementitious lining in each manhole as shown in the Details. The installation of the lining shall be in complete accordance with the applicable provisions of ASTM and the manufacturers' specifications.

K. The Contractor shall bypass pump sewage flows around the manhole when the work is being performed. Contractor shall submit a detailed bypass pumping plan to the Engineer prior to starting any work. The Contractor is advised that a number of manholes will surcharge during rain events.

L. The walls and benches shall be coated to the required minimum 1-inch thickness by spray-on methods. Invert channels shall also be coated as specified herein. Cementitious mortar may be trowel-applied if approved by the Engineer. Cementitious mortar lining shall be monolithically applied in one pass or application and shall be troweled smooth after application. The manhole lining shall not be installed until all required main sewer rehabilitation and other manhole rehabilitation work are complete.

M. The 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. When cured, the 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.

N. The Contractor shall plug off and/or protect the connecting pipes while coating the manhole walls to prevent any material from washing down the sewers. If material enters the sewer pipes, the Contractor will be required to clean the sewers from manhole to manhole to remove all material and then televise the sewer to demonstrate that all material is removed at no cost to the Owner.

O. The Contractor shall take precautions to avoid damage or flooding to public or private property being served by the manhole being rehabilitated. 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 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 cleanup shall be completed within 4 hours of the backup.

P. External Coating: Whenever the outside of exposed manholes walls are specified to be coated with a special exterior cementitious mortar product, the exterior mortar shall be HB2 Repair Mortar by ThoRoc, SikaTop 123 by Sika Corporation, or approved equal. The existing surface shall be completely cleaned and all loose material removed prior to applying the cementitious material. Installation shall be in strict accordance with the manufacturer's recommendations including utilizing any required bonding agents and providing proper curing conditions. The installed thickness shall be at least 2 inches, toweled smooth after application.

3.02.2 INSTALLATION – INJECTION GROUTING

A. The Contractor shall notify all property owners who discharge sewage directly to the manhole being rehabilitated 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted and the impacts to the property owner.

B. The Contractor shall inject grout to seal the specified leaks. The grout shall be injected in accordance with the manufacturer's instructions. Grout shall continue to be pumped until the leak is completely sealed. The hole drilled to inject the grout shall be covered with non-shrink grout.

3.03.1 ACCEPTANCE TESTS - CEMENTITIOUS MORTAR LINING SYSTEM

A. Field acceptance of the cementitious lining shall be based on the Engineer's field inspections and evaluation of the appropriate installation and curing test data.

The cementitious lining shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole interior. 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.

B. If the Engineer has to enter the manholes to inspect the work, the Contractor shall provide forced air ventilation, gas monitors and detectors, harnesses, lights, confined space entry permits, 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.

C. Samples shall be taken of the installed liner each day that cementitious lining is installed as follows: one sample if one to five manholes were coated that day, two samples if six to ten manholes were coated that day, three samples if eleven to fifteen manholes were coated that day, and four samples if sixteen or more manholes were coated that day. Samples shall be taken at equally spaced intervals throughout the day. The frequency of tests may be increased by the Engineer and performed by the Contractor at no additional cost to the Owner when the required tests show that the installed lining does not meet the specifications.

D. Samples shall be cube samples. At least six cubes shall be taken for each sample for testing. All cube samples shall be taken in the field from the material being sprayed. The Contractor shall show the samples to the Engineer each day and the Engineer shall initial the samples for delivery to the testing laboratory. The Contractor shall properly take and store the samples and shall deliver the samples to the testing laboratory. The laboratory shall document that they received the initialed samples. The tests shall be performed by an independent testing laboratory. All costs associated with the tests shall be paid for by the Contractor. The test results shall be submitted to the Engineer immediately when available, no later than 30 days after the lining is installed, or payment will be withheld.

   The samples shall be tested in accordance with the applicable ASTM standards to verify that the installed liner meets the compressive strength requirements specified herein and the lining manufacturer's published data on the product. Tests shall include 7-day and 28-day strength tests (3 tests/cubes for each time period for each sample). Shrinkage and bond strength tests shall be performed on each batch or lot of material shipped to the Contractor.

E. The Engineer will direct which manholes shall be tested via vacuum testing when <u>all</u> manhole rehabilitation work to that manhole is complete. Manholes shall not be vacuum tested until at least 7 days after the cementitious lining was installed. Vacuum testing shall be performed in accordance with ASTM C-1244 except that the minimum test time shall be 1 minute. The Engineer or Owner shall be present for all testing. The Contractor shall notify the Engineer 48 hours prior to testing.

The Contractor shall submit test reports of the testing which include the project name, manhole tested, data on testing (vacuum pressure, test duration, etc.), and whether the manholes passed or failed the test. Test reports must be submitted for failed tests with the reason for failure noted on the report. The Engineer shall sign all test reports to document that the Engineer was present for the testing. Any manhole that fails the vacuum test shall be repaired and retested immediately by the Contractor at no additional cost.

F. There shall be no groundwater infiltration or other leakage (active or previously active) through the manhole walls, benches, inverts or pipe connections at the manholes after it has been lined. If leakage is found, it shall be eliminated with an appropriate cement mortar, grout or sealant as recommended by the manufacturer and approved by the Engineer at no additional cost to the Owner. Injection grouting may be required to stop leaks around the pipe connections or in the invert channel or benches. The Engineer's decision on how defective lining is repaired shall be final. If any defective lining is discovered after it has been installed or during the warranty period, it shall be repaired or replaced in a satisfactory manner at no additional cost to the Owner. Repaired manholes including those repaired during the warranty period shall be vacuum tested at no additional cost to the Owner.

G. Payment shall not be made for the installed cementitious lining until (1) the manhole passes the vacuum test, (2) all material tests are submitted, and (3) the final CCTV inspection of the CIPP liner is submitted as specified in Section 02651 (when CIPP is installed; final CCTV performed after manhole rehabilitation is completed).

3.03.2 ACCEPTANCE TESTS – INJECTION GROUTING

A. Field acceptance of the grout shall be based on the Engineer's visual inspections, the Engineer's evaluation of the appropriate installation, and the absence of any visible active leaks in the general area of the original leak location or within the same pre-cast manhole joint.

B. If the Engineer has to enter the manholes to inspect the work, the Contractor shall provide forced air ventilation, gas monitors and detectors, harnesses, lights, confined space entry permits, 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.

C. There shall be no groundwater infiltration or other leakage (active or previously active) at or near the original leak location or within the same the pre-cast manhole joint after it has been repaired. If leakage is found and deemed to be a direct result of the original repair as determined by the Engineer, it shall be eliminated as approved by the Engineer at no additional cost to the Owner. The Engineer's decision on how additional leak(s) are repaired shall be final. If any

additional leaks are discovered after it has been installed or during the warranty period, they shall be repaired in a satisfactory manner at no additional cost to the Owner.

END OF SECTION

SECTION 03000
CLEARING AND GRUBBING
(Revised 1-9-02)

PART 1 - GENERAL

A. The Contractor shall furnish all labor, equipment, materials, tools, etc. and shall perform all clearing and grubbing of trees, down timber, logs, snags, brush undergrowth, heavy growth of grass or weeds, debris, and rubbish, etc. All such material shall be disposed of by burning (when permitted), suitable removal from the site, or other means acceptable to the Engineer.

B. The width of clearing for the project shall be limited to the right of way and temporary and permanent easements as noted on the drawings. The entire width of the permanent easement is to be cleared unless otherwise indicated by clearing limits noted on the drawings. Clearing and grubbing shall be conducted in a manner to prevent damage to vegetation that is intended to remain growing and also to prevent damage to adjacent property.

C. The Engineer will designate all areas of growth or individual trees inside the clearing limits, which are to be preserved due to their desirability. The trees to be preserved will be shown in the Contract Documents or designated by the Engineer.

D. All spoil materials that are removed by clearing and grubbing operations shall be adequately disposed of, removed from the site or burned if permitted by the appropriate authorities. The contractor shall be responsible for controlling fires in compliance with all Federal, State or local laws.

E. All work performed under this section shall cause a minimum of erosion and sediment pollution as outlined in Section 16000. Installation of temporary or permanent erosion control measures shall occur immediately after clearing and grubbing operations have begun or as directed by the Engineer.

PART 2 - PAYMENT

A. Basis of Payment: Payment for “Clearing and Grubbing” shall be at the unit price per area basis or lump sum as indicated on the Itemized Proposal. If no line item is provided for clearing and grubbing, it shall be considered incidental to the project.

END OF SECTION 03000

SECTION 05000
ASPHALT CONCRETE
(Revised 1-9-02)

PART 1 - GENERAL

A. The work covered by this section consists of the installation and/or removal of aggregate base course, asphalt concrete surface course, asphalt concrete intermediate course, asphalt concrete base course, asphalt tack coat, asphalt prime coat, Geotextile Interlayer, Asphalt Surface Treatments, and utility adjustments.

B. No base material shall be placed on a roadway until the storm sewer, subgrade, utilities and all appurtenances have been inspected and approved by the Inspector.

C. The latest revision of the "Standard Specifications for Roads and Structures" of the North Carolina Department of Transportation (NCDOT) shall apply to this project unless otherwise specified herein.

D. Before the asphalt surface course is placed on the road, the aggregate base course shall be inspected and approved by the Inspector.

PART 2 - MATERIALS

A. Aggregate Base Course:

i. This base course shall consist of an approved coarse aggregate produced in accordance with Section 520 in the NCDOT "Standard Specifications for Roads and Structures." All materials, construction requirements and other provisions in Section 520 shall apply. The subgrade for the coarse aggregate base course shall be constructed in accordance with the requirements of these Specifications.

ii. The subgrade shall be thoroughly compacted and constructed to the line, grade, and cross section on the plans or as directed by the Engineer. Before placing the base course, the subgrade shall be inspected and approved by the Inspector, and backfilling behind the curb shall be complete.

iii. The base course material shall be placed in lifts not to exceed eight (8) inches. Each layer shall be graded to the required section and compacted to at least one hundred percent (100%) of the density as determined by AASHTO T180. The base material shall be compacted at

a moisture content which is approximately that required to produce the maximum density.

iv. After final shaping and compacting, the Inspector will check the surface of the base for conformance to grade and typical section. The thickness of the base shall be within a tolerance of plus or minus 1/2 inch of the base thickness required by the plans.

v. Basis of Payment: Payment will be made under the contract unit price bid per square yard at the specified thickness for the actual amount of "Aggregate Base Course" used to construct the roadway base to the line, grade, and cross section indicated on the plans. The price of aggregate base course installed under curb and gutter shall be included in the price per linear foot for Curb and Gutter.

B. Superpave - Asphalt Concrete Surface Course: Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, & S 12.5 D:

i. The Superpave surface course shall be Asphalt Concrete Surface Course, Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, or S 12.5 D shall be produced, delivered, placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

ii. Sections of the newly finished pavement shall be protected from traffic until they have become properly hardened. Finished surfaces of the base shall be checked with a 10-foot straightedge, applied parallel to the center of the pavement, and any places that vary more than one-eighth (1/8) of an inch as measured from the bottom of the straightedge to the finished course shall be corrected.

C. Superpave - Asphalt Concrete Intermediate Course: Type I 19.0 B, I 19.0 C, & I 19.0 D:

i. The Superpave intermediate course shall be Asphalt Concrete Intermediate Course, Type I 19.0 B, I 19.0 C, or I 19.0 D shall be produced, delivered, placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

D. Superpave - Asphalt Concrete Base Course: Type B 25.0 B, B 25.0 C, & B 37.5C:

i. The Superpave base course shall be Asphalt Concrete Base Course, Type B 25.0 B, B 25.0 C, or B 37.5C shall be produced, delivered,

placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

E. Pavement Repair Patch

i. Where it is necessary to open cut along or across streets with asphalt surfaces, the pavement shall be replaced with seven (7) inches of Superpave - Asphalt Concrete Intermediate Course: Type I 19.0 B, I 19.0 C, or I 19.0 D and two (2) inches of Superpave - Asphalt Concrete Surface Course: Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, or S 12.5 D, as directed by the Engineer. The replacement surface and/or base shall extend a minimum of 1 foot on each side of the excavated opening. The thickness of the replacement material shall be sufficient to provide a base and surface of equivalent strength to the undisturbed base and surface. The replaced pavement shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

F. Asphalt Tack Coat:

i. The tack coat shall be asphalt or asphalt cement and shall meet the general, material, and construction specifications as specified in Section 605 of the NCDOT "Standard Specifications for Roads and Structures." The tack coat shall be uniformly applied at a rate of three hundredths (0.03) gallons per square yard and shall be applied beneath each layer of asphalt plant mix base or pavement to be placed except where a prime coat has been applied, unless otherwise approved or specified by the Engineer. There will be no direct payment for the work covered by this section.

G. Asphalt Prime Coat:

i. The prime coat shall be asphalt and shall meet the general, material, and construction specifications as specified in Section 600 of the NCDOT "Standard Specifications for Roads and Structures." The prime coat shall be uniformly applied, in accordance with the referenced specifications, on existing non-asphalt base courses prior to placement of asphalt pavement, unless otherwise approved or specified by the Engineer. There will be no direct payment for the work covered by this section.

H. Asphalt Plant Mix:

i. The production, delivery, and placement of all types of asphalt plant mixed bases, intermediate, and surface courses shall conform to

Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures." There will be no direct payment for the work covered by this section.

PART 3 - PAYMENT FOR ASPHALT CONCRETES

A. Basis of Payment:

i. Payment of Asphalt Concrete Surface Course (Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, or S 12.5 D), Asphalt Concrete Intermediate Course (Type I 19.0 B, I 19.0 C, & I 19.0 D), and Asphalt Concrete Base course (Type B 25.0 B, B 25.0 C, or B 37.5C) shall be paid at the contract unit price bid per square yard at the thickness designated or as indicated in the Itemized Proposal. The bid price shall be full compensation for all furnishing, mixing, hauling, placing and compacting all materials, and for all labor, equipment and incidentals necessary to complete the work.

ii. Pavement repair patches shall be paid at the contract unit price bid per linear foot or per square yard for "Pavement Repair Patch" as indicated in the Itemized Proposal. The unit price for pavement repair shall be full compensation for all work necessary to repair the pavement and maintain the roadway. The unit price shall include all pavement repair(s) both temporary and permanent, furnishing, hauling, placing, and shaping the asphalt pavement to produce a uniform, smooth driving surface. No additional payments will be issued to replace pavement damaged by the Contractor outside of the standard trench opening as defined by the Contract Documents.

iii. If the thickness of the asphalt concrete is suspected to be less than specified on the plans and Itemized Proposal, the Engineer shall have corings performed to determine the thickness in place. Corings shall be made at five-hundred (500) foot intervals or as determined by the Engineer. If the Contractor desires additional corings, the Engineer's material testing firm shall perform additional corings at the Contractor's expense. If the asphalt concrete is found to be thicker than specified, the Contractor shall not be compensated for asphalt concrete placed to a thickness above and beyond the specified thickness. If the asphalt concrete is found to be thinner than specified, the Engineer shall determine if: 1) more asphalt concrete must be placed to bring the thickness to the specified thickness or 2) the unit price shall be adjusted down to compensate the Owner for material which was not placed. The method of adjustment will be based on the ratio of thickness installed to the thickness specified.

PART 4 - CONSTRUCTION METHODS

A. Subgrade:

i. Preparation of Subgrade: The subgrade shall be shaped to the lines, grades and typical sections established by the Owner. All unsuitable material, boulders and all vegetative matter shall be removed and replaced with suitable material. Suitable material shall come from sources approved by the Owner.

ii. Compaction of Subgrade: The top one (1) foot of subgrade and the entire base course shall be compacted to a density of 100 PERCENT maximum dry density as determined by AASHTO method T99. For that portion of fill under roadways and extending beyond the back of curb, compact to a density of NO LESS THAN 95 PERCENT maximum dry density as determined by AASHTO method T99. Backfill material shall be placed in lifts of eight (8) inches or less of compacted soil.

a) The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method.

b) The Contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade.

B. Proofrolling:

i. Equipment: The equipment shall consist of a loaded tandem-axle dump truck or similar pneumatic-tired equipment of a minimum ten (10) ton static weight. The Contractor is responsible for providing the equipment necessary in order to perform proofrolling at no additional cost to the Owner.

ii. Method: After the roadbed has been completed within five hundredths (0.05) feet of final grade, the roadbed shall then be compacted and tested with two (2) or more coverages unless otherwise directed by the Owner, using a heavy pneumatic-tired roller meeting the requirements listed above. A coverage is considered that stage in the rolling procedure when the entire width of the area being proofrolled has been in contact with the pneumatic tires of the roller. The roller shall be operated in a systematic manner so that the number of coverages over all areas to be proofrolled can be readily determined and recorded.

a) The equipment shall be operated at a speed between two and one-half (2-1/2) and three and one-half (3-1/2) miles per hour. All proofrolling procedures shall be followed to the satisfaction of the Inspector on site during the proofrolling.

iii. Corrective Action: If it becomes necessary to take corrective action, such as, but not limited to, underdrain installation, undercut and backfill of unsuitable materials, and aeration of excessively wet material in areas that have been proofrolled, these areas shall be proofrolled again following the completion of the necessary corrections. If the corrections are necessary due to the negligence of the Contractor or weather, the corrective work and additional proofrolling shall be performed by the Contractor at no cost to the Owner.

C. Placing Asphalt Concrete Mixture:

i. The mixture shall be spread by means of a mechanical self-contained, power-propelled paver, capable of spreading the mixtures, without segregation, to the required grade and confine the mixture to true lines without the use of stationary side forms.

ii. The term “screed” includes any “strike-off” device operated by cutting, crowding or other practical action which is effective on the mixtures at workable temperature without tearing, shoving or gouging and which produces a finished surface of the evenness and texture specified.

iii. Longitudinal and transverse joints shall be made in a careful manner. Well bonded and sealed joints are required. If necessary to obtain this result, joints shall be painted with hot asphalt cement and heated. After the base course mixture has been spread and before roller compaction is started, the surface shall be checked and all flat spots and irregular areas removed and replaced with satisfactory material. Irregularities in grade shall be corrected before compacting.

iv. Contact surfaces of headers, curbing, gutters, manholes, etc. shall be painted with an approved asphalt cement just before the base mixture is placed against them. All exposed longitudinal edges of the surface course shall be “set up” by tamping with a rake or lute at proper height and level to receive the maximum compression under rolling.

v. Asphalt mixture shall not be produced or placed during rainy weather, when the subgrade or base course shows excess moisture, or when the air temperature is less than 40° F. in the shade away from artificial heat, unless otherwise permitted by the Owner. In applications involving less than one inch of asphalt, the temperature shall be at least 50° F. Should rain begin during paving operations, the Owner assumes no responsibility for asphalt left on the trucks at the time that the paving operation is halted.

D. Protection of Material:

i. The Contractor shall provide and have ready for use at all times enough tarpaulins or covers for use in case of rain, chilly wind, or other delay, for the purpose of covering or protecting any material dumped but not spread.

E. Compacting Asphalt Concrete Mixture:

i. After placing, the mixture shall be thoroughly and uniformly compacted with tandem rollers of eight (8) or ten (10) ton model weighing not less than 250 pounds per inch width of roller tread. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition.

ii. Each roller shall be operated by a competent, experienced operator and must be kept in continuous operation as nearly as practicable. Rolling shall start longitudinally at the outer edges and proceed toward the center of the pavement, overlapping on successive trips by at least one half (1/2) the width of the roller.

iii. The speed of the roller shall be at all times slow enough to avoid displacement of the hot mixture as a result of reversing. Any displacement shall be immediately corrected. Rolling shall proceed at a rate not in excess of 500 square yards per hour per roller and shall continue until no further visible compaction is obtainable and all roller marks have been eliminated. Rolling shall compact the mixture to at least ninety-four (94) percent of the laboratory density as determined by the Marshall test method.

iv. The asphalt concrete mixture shall have a temperature at the time of delivery of between 250° F and 300° F and shall be rolled with a temperature of not less than 235° F.

v. Rolling shall be started as soon as the mixture will bear the roller without undue misplacement or hairline cracking. Delays in rolling hand raked mixture will not be tolerated.

vi. To prevent adhesion of the mixture to the roller, the wheels shall be kept moistened with water. Places not accessible to the roller shall be thoroughly compacted with hot tamps.

F. Compacted Densities:

i. Unless otherwise noted compaction and density control of Asphalt Pavements shall be in accordance with the requirements of Sections 609

and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures." There will be no direct payment for the work covered by this section.

ii. The Contractor shall allow time for the inspections and testing of areas, as needed, by Town of Cary as directed by the Engineer.

G. Plant Tickets:

i. The number of batches and total weight of all loads of mixture shall be recorded in duplicate upon plant ticket forms. With each load delivered to the work, the truck driver shall present one copy of the plant ticket to the Inspector. The driver shall retain one copy for the Contractor. Should the Engineer decide to provide a plant inspector, he/she shall keep the stub copy. The weights to be included in the estimate shall be the total of the tickets delivered by the truck driver to the Inspector at the work site. At any time, for the purpose of checking the weighing equipment at the plant, the Owner may direct the Contractor to weigh or cause to be weighed on tested and approved platform scales at the Contractor's expense the contents of any truckload that is to be delivered to the work site.

H. Protection of Pavement:

i. When edges are not protected, planks of the same thickness shall be placed adjacent to longitudinal or transverse joints until the surface course is completed. Sections of newly finished pavements shall be protected from traffic until they have become properly hardened by temperature cooling.

PART 5 - REMOVAL OF EXISTING PAVEMENT

A. The work covered by this section consists of the removal and disposal of the portland cement concrete or bituminous components of an existing pavement structure, including paved shoulders, within the limits shown on the plans or as directed by the Engineer. This work shall also include the removal of any temporary roadway pavement structure placed during construction to serve as a detour. The work covered by this section shall not include the removal and disposal of sidewalks, driveways, and curb and gutter, which are covered in the "Unclassified Excavation" subsection.

B. Where concrete pavement is to be removed, the Contractor shall provide a neat edge along the pavement being obtained by sawcutting the pavement at least two (2) inches deep or greater as required to provide a neat, clean break from the pavement to remain, before breaking the adjacent pavement

away. The pavement shall be broken up and removed for its entire depth or milled to the specified depth as indicated in the Contract Documents. The disposal of all materials resulting from the pavement removal shall be done as provided herein.

C. Insofar as possible, all materials shall be used in the construction of embankments, but such use shall be subject to the approval of the Engineer.

D. Milling asphalt pavement shall be in accordance with Section 607 of the latest version of the NCDOT "Standard Specifications for Roads and Structures."

E. All materials, which cannot be used in the work, shall be disposed of off site of the right of way in waste areas provided by the Contractor.

F. Basis of Payment:

i. The quantity of pavement removed will be paid for at the contract unit price bid per square yard for "Removal of Existing Pavement" as indicated in the Itemized Proposal. Unless otherwise indicated the quantity of pavement to be removed will be determined by actual surface area measurement of the pavement prior to its removal. The unit price and payments shall be full compensation for all work covered by this section, including but not be limited to the satisfactory sawcutting, breaking up, removal, hauling, and disposal of existing pavement.

ii. The quantity of paving to be milled shall be paid for at the contract unit price bid per square yard at the specified depth for "Milling Asphalt Pavement" as indicated in the Itemized Proposal. Unless otherwise indicated the quantity of milling will be determined by actual surface area measurement of the pavement prior to its removal. The unit price and payments shall be full compensation for all work covered by this section, including but not be limited to the milling and/or remilling of the pavement, cleaning the milled surface, loading, hauling, and disposal of all milled material.

PART 6 - ASPHALT RESURFACING

A. General:

i. Asphalt Resurfacing shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

ii. Should construction take place near signalized intersections, the Contractor shall contact the NCDOT Division Traffic Engineer to

schedule the field location of any traffic signal conflicts. The Contractor shall notify the Engineer of any potential conflict prior to construction. The Contractor shall be responsible for coordinating the conflict relocation with NCDOT during construction.

iii. The Contractor shall prepare a weekly schedule detailing the construction activities planned for the following week. This schedule shall be presented to the Inspector before Friday, 12:00 noon of the week preceding the effective date of the schedule. Weekly meetings may be required to review construction activities as directed by the Engineer.

iv. In the event that all vehicles are not removed from the construction area despite timely delivery of the construction notice letter, the Contractor shall attempt to contact vehicle owners by other means in an effort to find the vehicle's owner to have the vehicles relocated. If the Contractor is unsuccessful they shall contact the Engineer and provide the make, model, and license plate number of the vehicle as well as the vehicle location. The Engineer shall try contacting the vehicle owner and if unsuccessful shall contact a designated towing company to move the vehicle out of the construction area, to a neighboring street as directed by the Engineer, at the Town of Cary's expense. The towing company shall attach a standard letter to the vehicle upon towing. The Engineer will provide the standard letter.

v. Construction traffic control shall be provided on each street by the Contractor in strict conformance with NCDOT "North Carolina Supplement to the MUTCD," the MUTCD, the Contract Documents, or as directed by the Engineer. No work shall begin on any street without the proper traffic control measures in place.

vi. Construction traffic control shall be installed and practiced as a means to inform drivers that asphalt tack coat is being placed on the road surface.

vii. The Contractor shall be responsible for spraying or burning all weeds growing on and in the streets. The Contractor shall be responsible for removing and properly disposing of the dead weeds as carefully cleaning each street before beginning asphalt concrete construction operations.

viii. Asphalt resurfacing projects shall have a maximum acceptable elevation difference, between the top of the resurfacing layer and the gutter, of 1.0 inch. The Owner shall not accept any newly resurfaced streets exceeding this maximum elevation difference. Should it be determined that the resurfacing layer is more than 1.0 inch higher than the gutter elevation the resurfacing shall be removed and replaced or remedied as directed by the Engineer at the Contractor's expense.

ix. The Contractor shall allow time for the inspection of areas, as needed, by a qualified testing firm as directed by the Engineer.

x. The Contractor shall construct all improvements so as to create and/or maintain positive drainage.

xi. The above listed requirements of this sub-part are considered incidental to the cost of the asphalt concrete surface course specified in the Itemized Proposal and Contract Documents.

B. Materials:

i. Geotextile Interlayer Installation:

a) The geotextile interlayer shall be a needlepunched, nonwoven engineering fabric made of polypropylene and staple fiber; calendared on one side. It shall be resistant to ultraviolet degradation and have the following properties:

	Typical	Test
Grab Tensile Strength (lbs)	101	ASTM D 4632
Grab Elongation (%)	50	ASTM D 4632
Puncture Strength (lbs)	65	ASTM D 4833
Mullen Burst (psi)	220	ASTM D 3786
Trapezoidal Tear (lbs)	45	ASTM D 4533
Mass Per Unit Area (oz/sq yd)	4.1	ASTM D 5261
Thickness (mils)	35	ASTM D 5199
Melting Point (°F)	Greater than 150	ASTM D 276
UV Resistance (%)	70 at 500 hrs	ASTM D 4355

b) For the tack coat, uncut asphalt cements are preferred, however, cationic or anionic emulsions may be used. For asphalt cements the minimum temperature shall be 150° C, but to avoid damage to the fabric the distributor tank temperatures shall not exceed 160° C. When asphalt emulsions are used, the emulsion shall be cured prior to placing the fabric.

c) The engineering fabric shall be placed onto the asphalt sealant, calendared side up, prior to the time the asphalt has cooled and lost tackiness. Wrinkles or folds in excess of 1 inch shall be slit and laid flat. In order to maximize fabric contact with the pavement surface, blooming or pneumatic rolling will be required. The fabric joints shall be overlapped sufficiently to ensure full closure of the joint, but should not exceed 6 inches. To prevent edge pickup by the paver,

transverse joints shall be lapped in the direction of paving. A second application of sealant to the fabric overlaps will be required as directed by the Engineer.

d) Quickly following the fabric installation, the hot-mix overlay should be placed evenly. Should the asphalt bleed through the fabric causing construction problems prior to overlay placement, the affected areas shall be blotted by spreading sand. Turning the paver and other vehicles shall be gradual and kept to a minimum to avoid movement of, or damage to the sealant saturated fabric.

e) Basis of Payment: Payment shall be made under the contract unit price bid per square yard for the actual amount of "Geotextile Interlayer" as indicated in the Itemized Proposal and shall constitute full compensation for furnishing all labor, material, equipment, and performing all operations in connection with placing the geotextile interlayer as shown on the plans, Contract Documents, or as directed by the Engineer.

ii. Asphalt Surface Treatment:

a) Chip seal shall be "straight seal" with 78M stone in accordance with Section 660 of the NCDOT "Standard Specifications for Roads and Structures." Careful attention shall be given to surface preparation (as specified in Section 660) under chip sealing.

b) Cleanup: Excess aggregate resulting from straight seal shall be collected and removed from the construction site either before resurfacing occurs or one (1) week after the straight seal is applied, whichever occurs first.

c) Basis of Payment: Payment shall be made under the contract unit price bid per square yard at the specified type of seal coat for the actual amount of "Asphalt Surface Treatment" as indicated in the Itemized Proposal and shall constitute full compensation for furnishing all labor, material, equipment, and performing all operations in connection with the placement and cleanup of the asphalt surface treatment as shown on the plans, Contract Documents, or as directed by the Engineer.

iii. Leveling Course

a) In asphalt resurfacing projects a leveling course of Superpave - Asphalt Concrete Surface Course (Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, & S 12.5 D), as directed by the Engineer, shall be hand-placed in areas where the pavement is

depressed, sunken or uneven, and its surface grade varies from surrounding elevation by one (1) inch or greater. Leveling asphalt shall be placed prior to chip seal applications or as designated by the Engineer.

b) Basis of Payment: Payment for this work shall be included in the unit price per ton for "Asphalt Leveling Course" as indicated in the Itemized Proposal. Plant tickets should be submitted with the pay request, and each ticket should include a date, time of delivery, signature of recipient and street name. Only those tickets with the above information will be approved.

PART 7 - SPEED HUMPS AND RAISED CROSSWALKS

A. General:

i. Speed hump and raised crosswalk construction shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

ii. In the event that all vehicles are not removed from the construction area despite timely delivery of the construction notice letter, the Contractor shall attempt to contact vehicle owners by other means in an effort to find the vehicle's owner to have the vehicles relocated. If the Contractor is unsuccessful they shall contact the Engineer and provide the make, model, and license plate number of the vehicle as well as the vehicle location. The Engineer shall try contacting the vehicle owner and if unsuccessful shall contact a designated towing company to move the vehicle out of the construction area, to a neighboring street as directed by the Engineer, at the Town of Cary's expense. The towing company shall attach a standard letter to the vehicle upon towing. The Engineer will provide the standard letter.

iii. Construction traffic control shall be provided on each street by the Contractor in strict conformance with NCDOT "North Carolina Supplement to the MUTCD," the MUTCD, the Contract Documents, or as directed by the Engineer. No work shall begin on any street without the proper traffic control measures in place.

iv. The maximum acceptable height of speed humps and/or raised crosswalks shall be as indicated in the Contract Documents or as designated by the Engineer. The Owner shall not accept any newly constructed speed humps and/or crosswalks exceeding the maximum specified elevation. Should it be determined that the height exceeds the maximum elevation, the speed humps and/or raised crosswalks shall be

removed and replaced or remedied as directed by the Engineer at the Contractor's expense.

v. The Contractor shall construct all improvements so as to create and/or maintain positive drainage.

B. Basis of Payment:

i. Payment for “Speed Humps” and/or “Raised Crosswalks” shall be paid at the contract unit price bid per each item or lump sum as indicated in the Itemized Proposal. The unit price shall be full compensation for furnishing all labor, material, equipment, and performing all operations in connection with placing the asphalt concrete and pavement markings as indicated in the Contract Documents or as directed by the Engineer.

PART 8 - UTILITY ADJUSTMENTS

A. General:

i. No manholes or water valve boxes shall be raised and left for a period of time greater than fourteen (14) days before the street is resurfaced. Should this period of time be exceeded, all work shall be stopped until the resurfacing of such streets has been completed. Immediately after utility adjustments take place the sides of the utility shall be painted bright orange for visibility and if directed by the Engineer 36” (minimum) reflective orange traffic cones or other devices shall also be added for visibility. There will be no separate compensation for this work and shall be considered incidental to the cost of the items as defined under “Basis of Payment.”

ii. Cast iron risers will not be allowed for adjustment of manholes and water valve boxes.

iii. If any existing broken manholes or water valve boxes are discovered, the Owner shall furnish new manhole rings and covers or new water valve boxes for replacement of the broken ones by the Contractor at no additional cost to the Owner. Replacements will be the same as stocked by the Town of Cary or approved as acceptable alternate by the Engineer.

iv. Adjustment of fire hydrants shall include both horizontal and vertical adjustment to leave existing fire hydrants positioned in accordance with Town of Cary Standard Details 6.06 and 6.07, or as otherwise noted on plans.

B. Basis of Payment:

i. Payment for these items shall be at the respective contract unit prices for “Adjust Water Valve Boxes,” “Adjust Manholes” and “Adjust Fire Hydrants” as indicated in the Itemized Proposal and shall be full compensation for all labor, equipment, materials, and incidentals necessary to complete the work. There shall be no separate compensation for the adjustment of manholes, water valves, and fire hydrants that are installed as a part of this Contract.

END OF SECTION 05000

SECTION 06000
CAST IN PLACE CONCRETE
(Revised 1-9-02)

PART 1 - MATERIALS

A. Portland cement concrete for curb and gutter, driveways, driveway aprons, wheelchair ramps, sidewalks, traffic islands and other items as specified on the plans shall have a minimum 28 day compressive strength of 3,000 psi, a non-vibrated slump between 2.5 and 4 inches, a minimum cement content of 545 pounds per cubic yard, an air entrainment of 5 - 7%, and a maximum water-cement ratio of 0.545 in accordance with Class B concrete as described in the NCDOT "Standard Specifications for Roads and Structures" unless otherwise specified in the Contract Documents. Portland cement concrete for structures, culverts and other items as specified on the plans shall be Class A or Class AA in accordance with NCDOT "Standard Specifications for Road and Structures." Dyed concrete is not allowed in construction of driveway aprons or public sidewalks unless otherwise specifically required in the Contract Documents.

B. Joint filler shall be a non-extruding joint material conforming to ASTM C1751.

C. Aggregate for portland cement concrete shall meet the requirements for fine and course aggregate of Section 1014 of the NCDOT "Standard Specifications for Roads and Structures."

D. Portland Cement and admixtures shall meet the requirements of Section 1000 of the NCDOT "Standard Specifications for Roads and Structures."

E. Water for mixing or curing the concrete shall be free from injurious amounts of oil, salt, acid, or other products injurious to the finished product.

PART 2 - QUALITY ASSURANCE

A. Concrete shall be only plant-mixed, transit-mixed or ready-mixed concrete. The time elapsing from mixing to placing the concrete shall not exceed ninety (90) minutes. Concrete shall not be deposited on frozen subgrade and shall not be poured when the air temperature is falling and below 40° F, and the predicted low temperature for the succeeding 24 hour period is less than 32° F.

B. All concrete when placed in the forms shall have a temperature of between 50° F and 90° F and shall be maintained at a temperature of not less than 50° F for at least 72 hours for normal concrete and 24 hours for high early

strength concrete, or for as much time as is necessary to secure proper rate of airing and designed compressive strength. The use of admixture, retarders, and accelerators shall be used as directed by the Engineer.

PART 3 - CONSTRUCTION METHODS - GENERAL

A. Proportioning of Concrete: The concrete shall be mixed in proportions discussed herein and approved by the Engineer.

B. Mixing Concrete: The concrete shall be mixed by machine on the job or at a central mixing plant. A batch mixer of any approved type may be used. The method of measuring the materials for the concrete, including water, shall be one which will insure separate and uniform proportions of each of the materials at all times. The mixing shall continue at least 1-1/2 minutes after all ingredients have been emptied before receiving material for the succeeding batch.

   i. A central mixing plant shall not be used until approved by the Engineer and shall be certified by the NCDOT. The concrete from a central plant shall be delivered and deposited at the consistency specified without segregation. The time elapsing from mixing to placing the concrete shall not exceed ninety (90) minutes.

   ii. Concrete shall be mixed only in such quantities as are required for immediate use and all such material shall be used while fresh and before initial set has taken place. Any concrete in which set has begun shall not be used in the work. Retempering of concrete will not be allowed.

C. Subgrade: The subgrade shall be excavated to the required depth below the finished surface in accordance with the plans to the lines and grades established by the Engineer. All soft yielding material or other unsuitable material shall be removed and replaced with suitable material and the subgrade shall be compacted thoroughly and finished to a firm, smooth surface. No curb and gutter, driveways, driveway aprons, wheelchair ramps, sidewalks, or traffic islands shall be poured until the subgrade is approved by the inspector.

D. Forms: The forms shall be of metal and of the necessary dimensions to construct the combined curb and gutters specified in the plans. Wood forms may be used where conditions make the use of metal forms impractical. The use of wood forms must be approved by the Engineer. The forms shall be set true to the line and grade established by the Engineer and held rigidly in position, so as to prevent leakage of mortar and springing out of line when the concrete is placed in them. The forms shall be true in line, free from warping or bending. No concrete shall be placed until the forms and subgrades have been approved by the Inspector.

E. Placing of Concrete: The subgrade shall be moistened and the concrete shall be placed in the forms and tamped sufficiently to bring the mortar to the surface, after which it shall be finished smooth and even by means of a wooden float.

i. The curb and gutter shall be constructed in place in uniform sections ten (10) feet in length. The joints between sections shall be formed by steel templates one-sixth (1/6) inch in thickness and of the width and depth of the curb and gutter. The templates shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

ii. Machine poured concrete curb and gutter will be scored at 15 feet intervals with expansion joints located at intervals no greater than 50 feet.

iii. Expansion joints shall be one-half (1/2) inch in width and shall be placed between all rigid objects at a distance of no more than fifty (50) feet apart and shall extend the full depth of the concrete with the top of the filler one-half (1/2) inch below the finished surface.

F. Finishing: The edges of the curb and gutter shall be finished with an approved edging tool of one-half (1/2) inch radius. Joints shall be similarly finished immediately after the templates have been removed.

G. Curing: Contractor may select method of curing provided that the method is approved by the Engineer and that the means and methods of curing conform to standards specified by current AASHTO or ASTM specifications.

H. Removing Forms: Forms shall not be removed from freshly placed concrete until it has set for at least 12 hours. Forms shall be carefully removed in such a manner as to prevent damage to the edges of the concrete. Any honeycombed areas along the sides shall be filled promptly with mortar composed of one part cement and two parts of fine aggregate.

I. Cold Weather and Night Concreting: Concreting shall be done when weather conditions are favorable unless otherwise directed by the Engineer. Concrete operations shall be discontinued when a temperature of 40° F is reached on a falling thermometer and may be continued when temperature reaches 35° F on a rising thermometer. No concreting shall be attempted when local weather bureau indicates temperature below freezing within the ensuing 24 hours unless proper precautions are made to protect the concrete by covering with straw or other thermal insulation satisfactory to the Engineer. The Contractor shall be responsible for the quality and strength of the concrete laid during cold weather and any concrete damaged

by frost action or freezing shall be removed and replaced as directed by the Engineer at the Contractor's expense.

i. The Contractor may be permitted by the Engineer to proceed with concrete operations during cold weather in temperatures of not less than 25° F at placing time provided that the Contractor furnishes an approved admixture and uses an amount per batch not to exceed two percent (2%) by weight of the total amount of cement, and further provided that he takes other precautions deemed necessary by the Engineer to prevent concrete from freezing during curing period.

ii. No more concrete shall be laid than can be properly finished and covered during daylight, unless adequate artificial light satisfactory to the Engineer is provided.

J. Protection of Concrete: Immediately after the forms have been removed and all honeycombed areas repaired, the back of the curb shall be backfilled to prevent underwash. Traffic shall be excluded from crossing the concrete for a period of approximately fourteen (14) days, by erection and maintenance of suitable barricades, unless otherwise specified in the Contract Documents or by the Engineer. Contractor shall be responsible for any damage resulting from traffic or vandalism until accepted by the Engineer, and he shall remove and replace any concrete damaged as directed by the Inspector.

PART 4 - CONSTRUCTION METHODS - CURB & GUTTER, DRIVEWAYS, DRIVEWAY APRONS, WHEELCHAIR RAMPS, SIDEWALKS, AND TRAFFIC ISLANDS

A. Areas of concrete to be removed shall be sawcut before removing. The sawcut shall provide a smooth, straight edge approximately two (2) inches deep before breaking away the adjacent concrete. There will be no direct payment for the work covered by this section.

B. Concrete shall be constructed in accordance with Section 825 of the NCDOT “Standard Specifications for Roads and Structures” and shall be given a “sidewalk finish,” except as otherwise noted herein.

C. Brooming of the concrete surface shall be done transverse to the direction of traffic. Joint spacing shall not be less than 5 feet. Where existing sidewalks are being widened, transverse joints shall be located so as to line up with existing joints in the adjacent existing sidewalk. Grooved joints shall not be sealed.

D. No backfill shall be placed adjacent to the curb & gutter, driveways, driveway aprons, wheelchair ramps, or sidewalks until at least 3 curing days have

elapsed, as defined in Section 825-9 of the NCDOT "Standard Specifications for Roads and Structures." However, all backfill shall be placed within 4 calendar days after the completion of this 3 curing day time period. Backfill shall clean earthen material free of all debris and shall be compacted to a degree comparable to the adjacent undisturbed material or as directed by the inspector.

PART 5 - PAYMENT

A. Basis of Payment: Compensation for cast in place concrete items shall be as follows:

i. Payment for "Concrete Curb and Gutter" shall be paid at the unit price bid per linear foot for the type as indicated in the Itemized Proposal and in accordance with the Town of Cary Standard Details. The aggregate base course or asphalt concrete placed under the concrete curb and gutter shall be in accordance with the Town of Cary Standard Details and shall be included in the unit price bid for curb and gutter. Unit price shall be full compensation for all labor, equipment and materials to furnish and install curb and gutter, and aggregate base course or asphalt concrete under the curb and gutter. Payment for this item shall not be made until work is complete, including backfilling and seeding & mulching, and has been inspected and accepted by the inspector.

ii. Payment for "Concrete Sidewalk" shall be paid at the unit price bid per linear foot at the width and thickness designated in the Itemized Proposal and in accordance with the Town of Cary Standard Details. Unit price shall be full compensation for all labor, equipment and materials to furnish and install concrete sidewalk. Payment for this item shall not be made until work is complete, including backfilling and seeding & mulching, and has been inspected and accepted by the inspector.

iii. Payment for "Concrete Wheelchair Ramps" shall be paid at the unit price bid per each item as designated in the Itemized Proposal and in accordance with the Town of Cary Standard Details. Unit price shall be full compensation for all labor, equipment and materials to furnish and install concrete wheelchair ramps, depressed curb and gutter, and aggregate base course or asphalt concrete under the depressed curb and gutter or wheelchair ramp necessary for the construction of the concrete wheelchair ramp. Payment for this item shall not be made until work is complete, including backfilling and seeding & mulching, and has been inspected and accepted by the inspector.

iv. Payment for "Concrete Driveway Aprons" shall be paid at the unit price bid per each at the width designated in the Itemized Proposal and in accordance with Town of Cary Standard Details. Unit price shall be full

compensation for all labor, equipment and materials to furnish and install concrete driveway aprons. Payment for this item shall not be made until work is complete, including backfilling and seeding & mulching, and has been inspected and accepted by the inspector.

v. Payment for “Concrete Pipe Collars” and “Pipe Plugs” shall be paid at the unit price bid per cubic yard for each item as designated in the Itemized Proposal and in accordance with Section 840 of the NCDOT “Standard Specifications for Roads and Structures”. Unit price shall be full compensation for all labor, equipment and materials to furnish and install the concrete.

vi. Payment for Concrete Driveways and other Miscellaneous Concrete shall be paid at the unit price bid per cubic yard at the class designated or as indicated in the Itemized Proposal. Unit price shall be full compensation for all labor, equipment and materials to furnish and install the concrete.

END OF SECTION 06000

SECTION 07000
UTILITY TRENCHES
(Revised 8-4-2010)

PART 1 - GENERAL

A. The Contractor shall provide all labor, materials, tools, and equipment to perform all work and services necessary for, or incidental to, the excavation, shaping, and backfill of utility trenches in accordance with the Construction Drawings, Contract Documents, and the latest edition of the Town of Cary Standard Specifications and Details Manual (Standard Specifications).

B. Existing Utilities:The Contractor shall be completely and solely responsible for locating all existing buried utilities and preventing damage to those utilities.

C. Pavement Removal: Where trenches are excavated in paved areas, the pavement shall be saw-cut prior to removal. All pavement cuts shall be repaired within a maximum of three (3) calendar days from the date the cut is made.If conditions do not permit a permanent repair within the given time limit, permission to make a temporary repair must be obtained from the Engineer.

D. Trench Excavation: Trenches for all buried utility installations, such as water distribution lines, sanitary sewer lines, force mains, and storm sewer lines shall be excavated to the required depth to permit installation of the pipe along the lines and grades as specified by the Contract Documents and Standard Specifications. The minimum trench width at the top of the pipe shall be at least 18-inches greater than the outside diameter of the pipe.Where excavation is in rock, the rock shall be removed to a depth of at least 6-inches below grade and the void shall be backfilled in accordance with the Contract Documents and Standard Specifications.Wet or unstable trenches shall be stabilized with #78 M stone or with a base layer of #57 stone at no additional cost to the Owner.

E. Dewatering:The Contractor shall dewater the trench throughout construction by pumping in a manner that all pipe jointing may be made under dry conditions.Water shall be disposed of in a manner not detrimental to the public health or to public or private property.

F. Rock Blasting and Excavation: Extreme care shall be exercised by the Contractor at all times in the blasting of rock to give maximum protection to both persons and surrounding property. "Extreme Care" is interpreted to mean the provision of protective devices, such as mats, that will be adequate to assure that there will be **no** projection of loose rocks into areas outside the right-of-way or easements provided for construction of the

watermain. Failure to take the necessary precautions will be considered a breach of Contract, and work will be stopped until the Engineer and Owner are satisfied that adequate protection will be provided on all remaining blasting operations for the project. There shall be no separate or additional payment for rock blasting, excavation, or removal of any kind.

G. Pipe Laying: All pipe shall be laid in accordance with its manufacturer's recommendations and the Contract Documents and Standard Specifications. The subgrade at the bottom of the trench shall be shaped to secure uniform support throughout the length of the pipe. A space shall be excavated under the bell of each pipe to provide space to relieve bearing pressure on the bell and to provide room to adequately make the joint. Open ends of pipe shall be plugged with a standard plug or capped at all times when pipe laying is not in progress. Trench water shall not enter the pipe.

H. Trench Backfill:All trenches shall be properly backfilled at the end of each working day. Backfill material shall be free of construction debris, frozen material, organic material, or unstable material. The upper 2-ft of backfill material shall be free from stones greater than 4-inches in diameter. In the event that unsuitable backfill is discovered as determined by the Engineer, the Engineer may direct the Contractor to replace all or portions of the unsuitable backfill with suitable backfill materials approved by the Engineer. The Contractor shall be prepared to remove unsuitable material from the site at no additional expense to the Owner.

I. Compaction:Backfill shall be compacted to a density of no less than 95% maximum dry density as measured by AASHTO method T99. Backfill shall be placed in lifts of 8-inches or less of the uncompacted soil. When compacting in layers, each layer must be thoroughly tamped by a mechanical tamp, such as “Rammax Sheepsfoot” or equivalent, before the next layer is placed.

J. Clean-up:The Contractor shall remove all excess excavation materials, earth, debris, etc. and shall clean up and leave all affected property, streets, roads and highways in a neat, clean and orderly condition as required throughout construction and upon completion of the work specified under this section. Unless directed by the Engineer, all affected areas shall be returned to the contour that existed prior to construction – mounding of the easement or right-of-way shall not be allowed.If so directed by the Engineer, the Contractor shall deposit all or a part of the excess earth at such point or points as may be designated. Excess earth from trenches along state controlled highways or roads shall be disposed of in a manner satisfactory to the State Department of Transportation.All temporary pipes and ditching used during construction to carry surface water shall be removed.

PART 2 - PAYMENT

A. Basis of Payment:Direct payment shall not be issued for preparation, excavation, pavement removal, rock excavation,disposal, dewatering,sheeting, shoring and backfilling of utility trenches unless otherwise indicated by the Contract Documents.

END OF SECTION 07000

SECTION 11000
SANITARY SEWER GRAVITY MAINS
(Revised 7-21-2010)

PART 1 - GENERAL

A. The Contractor shall provide all labor, materials, tools, and equipment to perform all work and services necessary for, or incidental to, the furnishing and complete installation of sanitary sewer gravity pipe, precast concrete manholes, service lateral piping and connections, and aerial crossings in accordance with the Construction Drawings, Contract Documents, and the latest edition of the Town of Cary Standard Specifications and Details Manual (Standard Specifications).

B. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a secure, complete and compatible installation shall be furnished and installed as part of this section.

C. The Contractor shall submit to the Engineer, shop drawings for all products and materials specified under this section for the construction of this project.

D. Pipe, fittings, manholes and all other essential products shall be delivered, handled, maintained, and installed in an appropriate manner to avoid damage. Provisions for handling, laying, protection and use of the products shall be in accordance with the manufacturer's recommendations, specifications and the Contract Documents and Standard Specifications. When the manufacturer's recommendations differ from the Contract Documents and Standard Specifications, the more stringent requirements shall govern unless otherwise directed by the Engineer.

E. All materials used on this project must have a preliminary inspection by the Inspector before being used for construction purposes. Rejected materials shall be immediately removed from the job site.

F. No prolonged interruption of wastewater flow through sewer mains or sewer service laterals shall be permitted, unless otherwise specified by the Contract Documents. The Contractor shall be responsible for utilizing bypass pumping and piping, flow diversion or other methods acceptable to the Engineer for the purpose of maintaining wastewater flows, without spills or service disruptions, throughout the entire duration of this construction project. There shall be no separate and/or additional payments for maintenance of flow unless specified as such by the Contract Documents. The Contractor shall be solely responsible for any fines and/or penalties

incurred due to spills or leaks resulting from faulty by-pass pumping and piping or flow diversion setups.

G. Rock Blasting and Excavation: Extreme care shall be exercised by the Contractor at all times in the blasting of rock to give maximum protection to both persons and surrounding property. "Extreme Care" is interpreted to mean the provision of protective devices, such as mats, that will be adequate to assure that there will be **no** projection of loose rocks into areas outside the right-of-way or easements provided for construction of the sewer main. Failure to take the necessary precautions will be considered a breach of Contract, and work will be stopped until the Engineer and Owner are satisfied that adequate protection will be provided on all remaining blasting operations for the project. There shall be no separate or additional payment for rock blasting, excavation, or removal of any kind.

H. Clean-up: The Contractor shall remove all excess excavation materials, earth, debris, etc. and shall clean up and leave all affected property, streets, roads and highways in a neat, clean and orderly condition as required throughout construction and upon completion of the work specified under this section. If so directed by the Engineer, the Contractor shall deposit all or a part of the excess earth at such point or points as may be designated. Excess earth shall only be placed and spread within the easement or right-of-way when approved by the Engineer. Excess earth from trenches along state controlled highways or roads shall be disposed of in a manner satisfactory to the State Department of Transportation.

PART 2 - SANITARY SEWER PIPE MATERIALS AND INSTALLATION

A. Materials

i. General: Each length of pipe to be used shall have plainly and permanently marked thereon the following information, as well as any additional information specifically noted in the sections below:

a) Pipe class
b) Pipe strength designation or profile number
c) Manufacturer's name or trademark
d) Nominal pipe size
e) Year in which the pipe was produced

ii. Fittings: Pipe fittings shall be ductile iron conforming to the requirements of AWWA C110 and shall have a minimum rated working pressure of 250-psi.

B. Installation

i. Piping Layout: The Contractor shall furnish a detailed piping layout for approval by the Inspector prior to beginning the pipe laying operation.

ii. Use of Laser Beam For Line and Grade: When using a laser beam to control line and grade pipeline construction, the Contractor shall be required to set a survey point (accurate to line and grade) 50-ft upstream of each manhole to serve as a check point. The Contractor will be required to excavate the first 50-ft of trench and transfer the line and grade information from the check hub into the trench to verify the laser alignment prior to laying any pipe in the trench. This hub information shall show on the cut sheet.

iii. Water in Trenches: The Contractor shall remove all groundwater encountered in the trenches by pumping, bailing, or by both and handling the water in a manner that all pipe jointing may be made under dry conditions.

Water shall be handled in such a manner to provide the best possible laying conditions and shall be disposed of in a manner not detrimental to the public health or to public or private property along the sewer right of way.

Pipes shall be kept adequately plugged at all points to prevent flow of ground or stormwater through the sewers and to prevent entry of sand, mud, or other debris into the sewer.

iv. Sanitary Sewer Protection: The upstream side of the last manhole(s) of a sanitary sewer line extension under construction shall be plugged by constructing a brick/block wall to prevent the passage of groundwater, runoff and sediment into the sanitary sewer system. All water upstream of the wall shall be pumped out of the sanitary sewer line and all sediment and solids shall be removed and properly disposed of by the Contractor. The wall shall not be removed until the line has been inspected by the Town to ensure that all possible points of inflow or infiltration have been eliminated. Failure to meet these requirements will be deemed a violation of the Sewer Use Ordinance with fines up to $1,000.00 per day.

C. Basis of Payment

i. Sanitary Sewer Gravity Pipe: Payment for “Sanitary Sewer Gravity Pipe” shall be paid at the contract unit price bid per linear foot of sewer main installed as indicated by the Itemized Proposal for each pipe diameter as specified. Payment for depth shall be as specified in the Itemized Proposal and shall be measured based on the depth from the existing

ground surface (prior to construction) to the invert of the sewer main. The unit price shall include full compensation for all labor, equipment and materials necessary to furnish and install pipe, bedding, sheeting, and shoring including excavation, rock excavation and removal, bypass pumping and piping, cleaning, video survey and assessment, testing, and all other incidental items required for assembly and installation as specified by the Contract Documents and Standard Specifications. There shall be no separate or additional payment to replace backfill materials deemed unsuitable by the Engineer unless specified as such by the Contract Documents.

ii. Sanitary Sewer Protection: Payment for "Sanitary Sewer Protection" shall be paid at the contract unit price per each wall installed as indicated by the Itemized Proposal. The unit price shall include all labor, equipment, and materials necessary to furnish and install the sewer protection and all other incidental items required for assembly and installation as specified by the Contract Documents (07020.C.1.a) and Standard Specifications.

PART 3 - SANITARY SEWER MANHOLE MATERIALS AND INSTALLATION

A. Installation

i. Excavation and Bedding: Excavation shall be made to the required depth and the foundation onto which the precast concrete manhole is to be set shall be approved by the Inspector. The excavation shall include the removal of obstructions and the removal of unstable materials unsuitable for a good foundation.

ii. Inverts: Inverts shall be field built with 1:2 concrete mortar. The shape of the invert shall conform exactly to the lower half of the pipe it connects. Side branches shall be connected with the maximum radius of curve that is practical. All inverts shall be troweled to a smooth, clean surface. The upstream half of the invert shall be built at the same slope as the incoming pipe and the downstream half of the invert shall be built at the same slope as the outgoing pipe, in order to conform with centerline inverts, unless otherwise specified by the Engineer.

B. Basis of Payment

i. Precast Concrete Manhole: Payment for "Precast Concrete Manhole" shall be paid at the contract unit price per each manhole installed based on the depth of installation or per lump sum basis as listed in the Itemized Proposal for each manhole diameter as specified. The depth to be used for payment purposes shall be the depth from the existing ground surface (prior to construction) to the invert of the manhole. The unit price shall

include full compensation for all labor, equipment, and materials necessary to furnish and install a precast concrete manhole with the necessary frame, cover and flexible sleeves and all other incidental items required for assembly and installation as specified by the Contract Documents and Standard Specifications. There shall be no separate payments for excavation, bedding, rock removal, bypass pumping and piping, coatings, joint seals, joint wraps, sheeting and shoring, vacuum testing, watertight rings and covers, vents, extensions above the ground surface, or any other incidental items necessary to install the manhole unless otherwise specified by the Contract Documents.

ii. XX-inch Cored Connection to Existing Manhole: Payment for "XX-inch Cored Connection to Existing Manhole" shall be paid at the contract unit price bid per each cored connection installed as listed in the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to furnish and install a cored connection of the specified diameter, rebuild the bench and invert of the existing manhole, provide a smooth transition for the flow stream, and all other incidental items required for assembly and installation as specified by the Contract Documents and Standard Specifications. Service connections cored directly into manholes shall be paid as part of the "Sanitary Sewer Service Connection" or "Sanitary Sewer Service Connection, Bored" with no separate payment for the core.

PART 4 - SERVICE LATERAL PIPING AND CONNECTIONS

A. Basis of Payment

i. Sanitary Sewer Service Connection: Payment for "Sanitary Sewer Service Connection" shall be paid at the contract unit price bid per each service line installed as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to furnish and install the service saddle, service line, wye, cleanout, stand pipe, caps and all other incidental items required for assembly and installation as specified by the Contract Documents and Standard Specifications. There shall be no additional payment for depth or diameter unless otherwise specified by the Contract Documents.

ii. Sanitary Sewer Service Connection, Bored: Payment for "Sanitary Sewer Service Connections, Bored" shall be paid at the contract unit price bid per each connection that is installed as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to bore the service line under the roadway as well as furnish and install the service saddle, service line, wye, cleanout, stand pipe, caps and all other incidental items required for assembly and

installation as specified by the Contract Documents and Standard Specifications. There shall be no additional payment for depth or diameter unless otherwise specified by the Contract Documents.

PART 5 – AERIAL CROSSINGS

A. General: The limits of the aerial crossing are defined from the outside face of the outermost piers.

B. Basis of Payment:

i. Sanitary Sewer Aerial Crossing: Payment for "Sanitary Sewer Aerial Crossing" shall be paid at the lump sum price bid for the complete aerial crossing installed as indicated by the Itemized Proposal. The lump sum price shall be full compensation for all labor, equipment and materials necessary to furnish and install the aerial crossing, pipe, piers, and all other incidental items required for assembly and installation as specified by the Contract Documents and Standard Specifications. There shall be no additional payment for any item within the aerial crossing limits unless otherwise specified by the Contract Documents.

PART 6 – ABANDONMENT

A. Sewer Main Abandonment

i. General: Sewer main abandonment involves removing the main from service and leaving it in such a manner that it poses no risk to the public health and safety. Sewer mains that are to be removed because they present a conflict with the proposed work shall be drained of all contents, removed and disposed of as part of the excavation process. There shall be no separate payment for the removal of abandoned utility mains in the direct path of the proposed work.

a) Paved Areas: Sewer mains scheduled for abandonment in paved areas or within 5-ft of a roadway shall be filled with cement grout. The cement grout shall have a minimum compressive strength of 500-psi and shall have a consistency to flow and be vibrated in order for the mix to flow uniformly into the pipe to be filled.

b) Unpaved Areas: Sewer main abandonment in unpaved areas more than 5-ft from a roadway shall consist of draining the contents of the main, removing the main from service and plugging all openings with 500-psi cement grout. The cement plugs shall be set to extend at least 2-ft inside the main in order to provide a watertight seal. All openings in the main created by removing service connections shall also be filled with a

plug of 500-psi cement grout extending to the bottom of the main. The Contractor shall be responsible for temporarily plugging the main in such a manner to hold the cement grout in place until it cures. Cement grout used to form plugs for abandoning sewer mains may be field mixed when approved by the Engineer.

ii. Basis of Payment:

a) Sewer Main Abandonment, Paved Area: Payment for "Sewer Main Abandonment, Paved Area" shall be paid at the contract unit price per linear foot of sewer main abandoned as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to fill the main with cement grout and all other incidental items required to abandon the main as specified by the Contract Documents and Standard Specifications.

b) Sewer Main Abandonment, Unpaved Area: Payment for "Sewer Main Abandonment, Unpaved Area" shall be paid at the contract unit price per each plug installed as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to install the plug and all other incidental items required to abandon the main as specified by the Contract Documents and Standard Specifications.

B. Manhole Abandonment

i. General: Manhole abandonment involves removing the manhole from service and leaving it in such a manner that it poses no risk to the public health and safety.

a) Paved Areas: All manholes to be abandoned in paved areas or within 5-ft of a roadway shall have the ring, cover and chimney removed and disposed of at an appropriate dump site. All connecting utility pipes shall also be plugged with 500-psi cement grout set to extend at least 2-ft inside the main. The barrel of the manhole shall then be filled with non-excavatable flowable fill from the bottom of the manhole to within 8-inches of the surface of the roadway. The pavement shall be replaced as specified elsewhere in the Contract Documents.

b) Unpaved Areas: All manholes to be abandoned in unpaved areas more than 5-ft from a roadway shall have the chimney section of the manhole including the ring and cover removed. The uppermost barrel sections of the manhole shall also be removed up to a depth of at least 6-ft from the ground surface. All connecting utility pipes shall be plugged with 500-psi cement grout set to extend at least 2-ft inside the main. The manhole

barrel shall be filled with aggregate base course to within 12-inches of the ground surface. The manhole barrel shall be filled and tamped in 8-inch lifts with aggregate base course and compacted to a minimum of ninety percent (90%) Standard Proctor density. The upper 12-inches shall be filled with screened topsoil and graded uniformly with the surrounding area. The area shall be seeded and mulched as specified elsewhere in the Contract Documents.

ii. Basis of Payment

a) Manhole Abandonment, Paved Area: Payment for "Manhole Abandonment, Paved Area" shall be paid at the contract unit price per each manhole abandoned as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials and all other incidental items required to abandon the manhole as specified by the Contract Documents and Standard Specifications. There shall be no separate payment or adjustments for extra depth or diameter.

b) Manhole Abandonment, Unpaved Area: Payment for "Manhole Abandonment, Unpaved Area" shall be paid at the contract unit price per each manhole abandoned as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials and all other incidental items required to abandon the manhole as specified by the Contract Documents and Standard Specifications. There shall be no separate payment or adjustments for extra depth or diameter.

C. Manhole Removal (paved or unpaved areas)

i. General: Manholes that are to be removed because they present a conflict with the proposed work shall be cleaned of all contents, removed, and disposed of as part of the excavation process. There shall be no separate payment for the removal of abandoned manholes in the direct path of a proposed utility.

a) Paved Areas: The Contractor shall completely remove and dispose of all components of the manhole, backfill the void space with flowable fill to within 8-inches of the surface of the roadway, and replace the pavement as specified elsewhere in the Contract Documents.

b) Unpaved Areas: The Contractor shall completely remove and dispose of all components of the manhole, backfill the void space with flowable fill within 12-inches of final grade, fill the remaining area with screened

topsoil graded uniformly with the surrounding area, and seed and mulch as specified elsewhere in the Contract Documents.

ii. Basis of Payment

a) Manhole Removal, Paved Area: Payment for "Manhole Removal, Paved Area" shall be paid at the contract unit price per each manhole removed as listed in the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials and all other incidental items required to remove the manhole as specified by the Contract Documents and Standard Specifications. There shall be no separate payment or adjustments for extra depth or diameter.

b) Manhole Removal, Unpaved Area: Payment for "Manhole Removal, Unpaved Area" shall be paid at the contract unit price for each manhole removed as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials necessary to remove the manhole as specified by the Contract Documents. There shall be no separate payment or adjustments for extra depth or diameter.

PART 7 – TESTING AND INSPECTION

A. General: The Contractor shall provide all labor, equipment and materials to perform all testing in accordance with the Contract Documents and Standard Specifications. There shall be no additional payment for any testing, cleaning, or video assessment procedures.

END OF SECTION 11000

SECTION 13000
UTILITY WORK ALONG HIGHWAYS
(Revised 08-25-2010)

PART 1 - GENERAL

A. The Contractor shall provide all labor, materials, tools, and equipment to perform all work and services necessary for, or incidental to, the furnishing, complete installation, and testing of all work along highways in accordance with the Construction Drawings, Contract Documents, and the latest edition of the Town of Cary Standard Specifications and Details Manual (Standard Specifications).

B. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a secure, complete, and compatible installation shall be furnished and installed as part of this section.

C. All work within the North Carolina Department of Transportation (NCDOT) right of way is done under permit. The Contractor shall secure the necessary permits, notify NCDOT of proposed construction, and be responsible for any damage due to construction. In addition, the Contractor shall obey all traffic laws and comply with all NCDOT and local requirements, rules, and regulations.

D. The Contractor shall provide adequate warning signs, lights, barriers, railing, flaggers, etc., and shall conduct all work in accordance with the latest versions of the NCDOT "Standard Specifications for Roads and Structures," NCDOT "Roadway Standard Drawings Manual," Manual on Uniform Traffic Control Devices (MUTCD), and the NCDOT Supplement to the MUTCD (NCSMUTCD). The Contractor shall possess one copy of each of the above referenced publications. Any conflicts found between the NCSMUTCD and the MUTCD shall be resolved in favor of the MUTCD.

E. The Contractor shall conduct operations so as to maintain and protect access for vehicular and pedestrian traffic, to and from all properties affected by operations.

F. Unless otherwise stated in the Encroachment Agreement, construction within 10-ft from the edge of pavement on a NCDOT maintained roadway shall be limited to the hours of 9:00 a.m. to 4:00 p.m.

G. The Contractor shall schedule "on the site" inspection prior to beginning work at highway bridges and/or box culverts by contacting the NCDOT Head of Bridge Maintenance.

H. Lines installed under major highways shall be constructed by boring or tunneling as may be required by the NCDOT, the Contract Documents, and the Standard Specifications.

I. Any unpaved road, side road, dwelling entrance road, commercial entrance, road shoulder, or other area stabilized by rock material shall be protected from erosion during construction and shall be stabilized by the use of crusher run stone after backfilling. This stone stabilization shall be approximately 4-inches thick unless otherwise directed by the Engineer.

PART 2 - OPEN CUTTING OF HIGHWAYS

A. General

i. Open cuts within the roadway shall have vertical faces where soil and depth conditions permit and shall be shored where necessary. All excess excavated material shall be removed and disposed of at a location provided by the Contractor outside the limits of the right of way unless otherwise approved by the NCDOT Division.

ii. A trench made in the travel portion of the roadway shall not be left open overnight except in an emergency and only then when adequate barricades, signs, and torches or lights are prominently displayed to protect the traveling public.

iii. The Contractor shall backfill and replace all pavement cuts. The Contractor shall also maintain ditches cut along and across roadways in accordance with the permits received from the NCDOT and as required by the Contract Documents and the Standard Specifications. Shoulders, side ditches and cut or fill slopes shall be repaired to the satisfaction of the NCDOT Division Engineer.

iv. Trench installations that may be vulnerable to damage due to precipitation, or which may be hazardous to traffic shall be closed without delay. A trench shall not remain open longer than 24 hours except with the approval of the NCDOT Division Engineer.

v. Where utility lines pass under culverts on the NCDOT right of way, the Contractor shall fill the void from the bottom of the utility line to the spring line of the culvert with #57 stone. Where the distance between the bottom of the culvert and the top of the utility line exceeds the radius of the culvert, the Contractor shall compact soil around and above the utility line to at least 95% of maximum dry density as measured by AASHTO Method T99 and place #57 stone from the spring line of the culvert to a depth below the bottom of the culvert at least equal to the culvert radius. There shall be no separate or additional payment for this work.

vi. Excavation material shall not be stored on the pavement if it can reasonably be handled otherwise. In cases where storing of excavated material on pavement is absolutely necessary, it shall be moved as quickly as practical, and the pavement shall be thoroughly cleaned. Sand or screenings shall be placed on the pavement before the excavated material to allow for better clean up.

vii. Excavation in the immediate vicinity of drainage structures shall be made with special care so as not to damage or interfere with the use of the existing drainage facilities. Drainage facilities that are damaged by the Contractor shall be repaired immediately at no additional expense to the Owner.

B. Perpendicular Trenching

Where a trench is cut perpendicular to the road, only one-half of the road width shall be obstructed at one time in order to maintain traffic. Before the other half is cut, the initial trench shall be made usable, safe, and maintained for traffic.

C. Parallel Trenching

i. Where a trench is cut parallel to the road, adequate barricades and warning signs shall be placed and, if necessary, flaggers shall be employed to control traffic. If trenches are left open overnight, a sufficient number of barricades, signs and torches or lights shall be prominently displayed so that the traveling public will be adequately protected.

ii. Where space permits, the trench bottom shall not be nearer the edge of the pavement (measured in a horizontal plane) than the depth of the excavation so that the theoretical slope from the edge of the pavement to the bottom of the ditch is no steeper than a one-to-one slope. On paved sections under 24-ft in width, consideration shall be given for future widening and paving of shoulders. Where, in the opinion of the NCDOT Division Engineer, soil conditions are such that sheet pilings or other shorings are necessary, they shall be placed by the Contractor. The trench shall not be closer than 3-ft to the edge of the pavement approved by the NCDOT Division Engineer.

D. Compaction

The backfill around and under pipes or other utility installations on all open-cut sections across or parallel to roadways shall consist of approved material free from rocks compacted in 6-inch lifts to at least 95% maximum dry density as measured by AASHTO Method T99. Trench backfill above

the pipe shall be placed in lifts of 8-inches or less of uncompacted soil. Each lift shall be thoroughly tamped by a mechanical tamp before the next lift is placed. A pneumatic tamp, a gasoline ram type tamp, or a vibrating tamp will be required to meet the specifications of a “mechanical tamp.”

END OF SECTION 13000

SECTION 16000
SOIL EROSION AND SEDIMENTATION CONTROL
(Revised 1-9-02)

PART 1 - GENERAL

A. Temporary and permanent erosion control measures shall be provided for all land disturbing activities in accordance with the Contract Documents and/or an erosion control plan approved by the North Carolina Department of Environment and Natural Resources (NCDENR). Temporary measures shall be installed by the Contractor, then inspected by the Inspector and the NCDENR for compliance prior to any land disturbing activity. The inspection and approval process shall be required on each phase of construction. All permanent erosion control measures shall be incorporated into the work at the earliest practical time. All temporary measures shall be maintained until the permanent measures have taken effect. Temporary and permanent measures shall be coordinated to provide effective and continuous erosion control throughout the construction and post-construction period to minimize siltation of streams, lakes, reservoirs, and other impoundments, ground surfaces, and other property. These measures shall remain in effect until final approval for removal is given by the Inspector and/or the NCDENR at which time the Contractor shall remove all temporary erosion control measures at no additional cost to the Owner.

B. The Contractor shall be familiar with the applicable provisions of the Sedimentation Pollution Control Act of 1973, General Statutes, Chapter 113A, Article 4. The Contractor shall be responsible for incorporating conservation procedures necessary to comply with this act in minimizing erosion and sediment pollution associated with the construction of this project as directed by the Engineer.

C. The Contractor shall be financially responsible for any and all fines that result from the Contractor's failure to install and/or maintain erosion control measures in accordance with the Contract Documents.

D. The Contractor shall check all erosion and sediment control measures for stability and operation following each rainfall event, and no less than once per week. The Contractor shall make any needed repairs immediately to maintain all control measures as designed.

E. The Contractor shall clean out all sediment trapping devices when the device reaches 50% trap capacity and shall dispose of the sediment by spreading on the site in a protected area or by hauling away if not suitable for fill at no additional cost to the Owner.

PART 2 - TEMPORARY MEASURES

A. Temporary Silt Fence shall be installed around inlets, at the toe of all fill slopes, and any other necessary locations as shown on the plans and as directed by the Engineer. Silt fence shall be erected in accordance with the Town of Cary Standard Specifications and Details.

B. Inlet Protection shall be installed around inlets and any other necessary locations as shown on the plans and as directed by the Engineer. Inlet protection shall be erected in accordance with the Town of Cary Standard Specifications and Details.

C. Diversion Ditches shall be installed at the top of cut and fill slopes and any other necessary locations as shown on the plans and as directed by the Engineer. Diversion ditches shall be installed in accordance with the Town of Cary Standard Specifications and Details.

D. Tree Protection Fence shall be installed around the drip line of trees in the construction work area as shown on the plans and as directed by the Engineer. The tree protection fence shall be installed in such a manner that it prevents all construction activities from encroaching into the area inside the drip line of the tree. The material and installation specifications for the tree protection fence shall be approved for use by the Engineer prior to installation.

E. Construction Entrances shall be installed at all points of access to the construction site. Any access point, which does not have a construction entrance, shall be barricaded to prevent its use. Construction entrances shall be installed in accordance with the Town of Cary Standard Specifications and Details. Construction entrances shall be included in the unit bid price for “Mobilization.”

F. Sediment and Filter Basins shall be installed at all points where accumulated runoff is released to natural drainage channels as shown on the plans and as directed by the Engineer. Sediment pits and filter basins shall be sized to hold 1800 cubic feet of sediment for every acre of denuded area tributary to the structure. Sediment and filter basins shall be installed in accordance with the Town of Cary Standard Specifications and Details.

G. Catch Basin Risers/Filters shall be installed at proposed catch basin locations or at other necessary locations as shown on the plans and as directed by the Engineer. Catch basin risers/filters shall be erected in accordance with the Town of Cary Standard Specifications and Details.

H. Check Dams shall be installed in ditches any and at other necessary locations as shown on the plans and as directed by the Engineer. Check dams shall be erected in accordance with the Town of Cary Standard Specifications and Details.

I. Basis of Payment: Payment for temporary erosion control measures shall be at the contract unit price for each item as indicated on the Itemized Proposal in the contract documents. These prices will be full compensation for all work covered by this section including but not limited to the labor, equipment, and materials for furnishing and installing all temporary erosion control measures indicated on the plans, and maintenance of the work throughout the life of the project as required by the Inspector.

PART 3 - TEMPORARY AND PERMANENT NON LAWN SEEDING MEASURES

A. General:

i. After construction is complete in any area or phase of the project, the disturbed areas shall receive a permanent ground cover. Seeding and mulching shall be performed immediately behind construction. The Contractor shall provide permanent seeding in all disturbed areas as indicated in the Contract Documents. The Contractor shall adapt permanent seeding operations to protect and to accommodate any temporary seeding and soil and erosion control measures that may already be in place during the work period.

ii. When seeding must take place out of season for permanent grass the appropriate temporary seeding shall be done and the contractor shall be responsible for permanent seeding as specified in season at no additional cost to Owner.

iii. Contractor shall be responsible for turf maintenance through substantial completion. Slopes must be at 90% coverage at substantial completion review to be accepted. If not at 90% coverage, substantial completion will be delayed until the following growing season.

B. Site Preparation and Installation:

i. Ground Cover: All disturbed areas shall be dressed to a depth of five (5) inches. The top two (2) inches shall be pulverized to provide a uniform seedbed. Rake or harrow the site to establish a smooth and level final grade. Soil particles should be no larger than marble size, and pea gravel size is even better. Agricultural lime shall be applied at the rate of 95 lbs./1000 sq. ft. immediately before plowing. Grass seed shall be applied at the rates outlined in Tables 1 and 2.

ii. 5-10-10 fertilizer shall be applied to all disturbed areas at a rate of 21 lbs./1000 sq. ft. Mulching shall consist of small grain straw applied at a rate of 70 lbs./1000 sq. ft. Mulched areas shall be tacked with asphalt or other approved method sufficient to hold the straw in place, at a rate of 150 to 200 gallons per ton of straw.

iii. If active construction ceases in any area for more than thirty (30) days, all disturbed areas must be seeded, mulched, fertilized and tacked at no additional cost to the Owner.

iv. Some areas may require temporary seeding due to an interruption of work exceeding thirty (30) days or seasonal restrictions as specified in the permanent seeding schedule, or a combination thereof. These areas shall be reseeded in accordance with the permanent seeding schedule. If temporary seeding is required due to Contractor delays, there will be no compensation for the temporary seeding. Temporary seeding shall be performed only at the direction of the Engineer or Inspector.

v. When seeding must take place out of season for permanent grass the appropriate temporary seeding shall be done and the contractor shall be responsible for permanent seeding as specified in season at no additional cost to Owner.

C. Cleanup and Inspection:

i. Upon completion of work, the Contractor shall remove from the site all equipment and other articles used. All excess soil, stone, and debris shall be removed and legally disposed of at no additional cost to the Owner. All work areas shall be left in a clean and neat condition. All damage to existing construction caused by landscaping operations shall be repaired to the satisfaction of the Town at the Contractor's expense.

ii. Seeded areas shall be protected and replanted as necessary to establish a uniform stand of specified grass. Scattered bare spots, none of which shall be larger that one (1) square foot, will be allowed up to a maximum of 3% of the seeded area for each property. When seeded areas are ready for inspection, the maintained turf areas shall be neatly mowed to the uniform height of approximately two and one-half (2.5) inches. The lawns shall be considered established only when the specified grass is vigorous and growing well in addition to meeting the other requirements specified.

iii. An inspection of the completed seeding shall be made at the conclusion of the landscape work upon written notice requesting such inspection submitted by the Contractor to the Engineer, at least ten (10) days prior to the anticipated date of inspection.

iv. A final inspection shall be performed when a satisfactory stand of seeded turf grass has been produced, upon written notice requesting such inspection submitted by the Contractor to the Engineer, at least ten (10) days prior to the anticipated date of inspection. If a satisfactory stand of turf has not been produced at the time of final inspection, necessary repairs shall be performed in conformance with the requirements of this

section. Upon completion of these repairs, the seeded grass shall be reinspected upon written notice as above.

D. Basis of Payment:

i. Payment for establishing permanent and temporary ground cover shall be the actual amount of seeding installed and will be paid for at the unit price bid per acre or square yard as indicated on the Itemized Proposal in the contract documents for "Non Lawn Seeding and Mulching" and/or "Temporary Seeding and Mulching." These prices shall be full compensation for all work covered by this section including but not limited to furnishing all permanent and temporary seeding, mulching, fertilizing, tacking, site preparation, cleanup, maintenance, and warranty of work as specified.

ii. Distribution of Billing and Payments for "Non Lawn Seeding and Mulching" and/or "Temporary Seeding and Mulching" shall be made as follows:

a) Fifty percent (50%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment estimate after which the initial seeding has been completed and accepted.

b) Twenty-five percent (25%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment estimate made after which the initial establishment of grass and any required reseeding is complete.

c) Twenty-five percent (25%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment after the final establishment of grass and the project is one hundred percent (100%) complete.

TABLE 1

SHOULDERS, SIDE DITCHES, SLOPES
(For Slopes Between 2:1 and 3:1)

Date	Type	Planting Rate
Mar 1 - June 1	Sericea Lespedeza (scarified) and	50 lbs./acre
Mar 1 - Apr 15	Add Tall Fescue or	120 lbs./acre
Mar 1 - June 30	Add Weeping Lovegrass or	10 lbs./acre
Mar 1 - June 30	Add Hulled Common Bermudagrass	25 lbs./acre
June 1 - Sept 1	***Tall Fescue and ***Browntop Millet or ***Sorghum-Sudan Hybrids	120 lbs./acre 35 lbs./acre 30 lbs./acre
Sept 1 - Mar 1	Sericea Lespedeza (unhulled/unscarified) and Tall Fescue	70 lbs./acre 120 lbs./acre
Nov 1 - Mar 1	Add Abruzzi Rye	25 lbs./acre

TABLE 2 SHOULDERS, SIDE DITCHES, SLOPES (For Slopes 3:1 and Flatter)		
Date	**Type**	**Planting Rate**
Aug 15 - Nov 1	Tall Fescue	300 lbs./acre
Nov 1 - Mar 1	Tall Fescue and Abruzzi Rye	300 lbs./acre
Mar 1 - Apr 15	Tall Fescue	300 lbs./acre
Apr 15 - June 30	Hulled Common Bermudagrass	25 lbs./acre
July 15 - Aug 15	Tall Fescue and ***Browntop Millet or***Sorghum-Sudan Hybrids	35 lbs./acre

Notes:

Consult Stormwater Management Engineer or Natural Resources Conservation Service (NRCS) for additional information concerning other alternatives for vegetation of denuded areas. The above vegetation rates are those, which do well under local conditions; other seeding rate combinations may be possible but must be approved by the Engineer.

***Temporary - Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

PART 4 - PERMANENT LAWN SEEDING MEASURES

A. General

i. The following information shall be applicable for all permanent lawn seeding. Permanent lawn seeding shall take place within all developed areas of disturbance including residential and commercial areas and shall be replaced in kind of existing material by the Contractor. An approved turf type tall fescue blend shall be used per the Contract Documents. Kentucky 31 is not an acceptable blend.

ii. When seeding must take place out of season for permanent grass the appropriate temporary seeding shall be done and the contractor shall be responsible for permanent seeding as specified in season at no additional cost to Owner.

iii. Contractor shall be responsible for lawn maintenance through substantial completion. Lawns must be at 90% coverage at substantial completion review to be accepted. If not at 90% coverage, substantial completion will be delayed until the following growing season.

B. Site Preparation:

i. Remove or kill any undesirable existing turf or vegetation. Herbicide spraying or other chemical treatment shall be approved by the Engineer prior to being used by the contractor. If preexisting turf or other vegetation is mixed with the soil to be reused, the contractor shall use

best judgement in removing it or incorporating it into the soil during preparation.

ii. If topsoil was not used to reestablish the upper soil layer and the upper soil is heavy with high clay content, spread 1.5-2 inches of aged ground pine bark or bagged organic humus over the area to be repaired.

iii. For all grasses except centipedegrass, apply per 1,000 square feet: 75 pounds of ground limestone and one of the following fertilizers: 40 pounds of 5-10-10; 20 pounds of 10-20-20; or 20 pounds of 8-8-8 or 10-10-10 in combination with 4 pounds of 0-46-0. Centipedegrass prefers acidic soils and low levels of phosphorus and may not require the addition of lime and phosphorus.

iv. Incorporate lime and fertilizer (and pine bark if added) into the top 6 inches of the soil using a rototiller or by hand. Rototill or hand cultivate to well incorporate the amendments and get a uniform loosely textured soil of minimum 6-inch depth.

v. Rake or harrow the site to establish a smooth and level final grade. Soil particles should be no larger than marble size, and pea gravel size is even better. Hand raking to level the soil and work out hills and hollows. For areas larger than 100 sq. ft. allow rain or irrigate to settle the soil. In some situations, the Engineer may require rolling or cultipacking to firm the soil before seeding. Hand rake again to break up the crusty surface before seeding or planting.

C. Installation:

i. General:

a) Seed or plant the required grass according to Table 3.

b) The choice of turfgrass type, variety and propagation form shall be specified in the Contract Documents, as specified in the Itemized Proposal, or as designated by the Engineer.

c) Seed shall be tagged certified seed. Germination shall be a minimum of 95%. Seed shall be 98% pure with less than 2% other-crop seed or debris. Seed shall be free of noxious weed seed.

d) Sod, sprigs, plugs or other vegetative plant propagation materials shall be certified free of noxious weeds. Materials shall be in good health and vigor, free of disease or pests, or damage from dryness, adverse temperature, herbicides, fertilizer or other chemicals. Sprigs that are older than 48 hours are not acceptable regardless of condition.

e) The Contractor shall maintain a log of dates that sod, sprigs, plugs, or other seeding installation was completed for each individual property and shall notify the Engineer or Inspector of each day's progress.

ii. Seeding:

a) Sow the seed on freshly prepared soil. Ensure uniform coverage by using a centrifugal (rotary) or drop-type spreader. Areas larger than 100 sq. ft. shall be seeded with a minimum of two passes at the appropriate partial rate for each pass. For areas averaging greater 15 ft. width, apply half the seed in one direction and the other half at right angles to the first direction.

b) Apply a starter-type fertilizer to the soil surface for example, 10 pounds of 5-10-10 or 5 pounds of 10-20-20 per 1,000 square feet at the time of seeding.

c) Lightly cover the seed by hand raking or dragging with a mat or chain-link fence. Roll or tamp the soil lightly to firm the surface and provide good seed-to-soil contact.

d) Mulch grass seed with weed-free small grain straw or hay. Use one bale per 1,000 square feet for warm-season grasses and 1 to 2 bales for cool-season grasses. Stabilize small areas of mulch by rolling, watering or tacking with asphalt tacking spray. Twine netting can be used if wind displacement is a problem. If applied evenly and lightly, these materials need not be removed. Larger areas shall be stabilized by asphalt tacking spray or twine netting.

ii. Sprigging or Broadcasting:

a) Sprigging is the preferred method of installing bermudagrass in larger areas. For smaller areas of bermudagrass, sprigging and plugging are both good options. The less expensive is preferred. In some cases sod may be less expensive or necessary due to circumstances.

b) Broadcasting sprigs uniformly over the entire area. Bermudagrass or zoysiagrass sprigs shall be broadcast at a minimum rate of 5 bushels (yards) of sprigs per 1,000 square feet. Up to 10 bushels (yards) may be used where very fast cover is desired. Press the sprigs into the top ½ to 1 inch of soil by hand, and then by using an old disk, set straight. In the case of very large areas use a sprigging machine, cultipacker, or roller. (Note - St. Augustinegrass is seldom established through broadcasting because the stems are too sensitive.)

iii. Plugging:

a) Plugging is the preferred method of installing zoysia and St. Augustine except where sprigging or sod is less expensive or necessary due to circumstances.

b) Plugs shall consist of individual pieces of sod that are 2 inches or larger. The plugs shall be planted at grade on 8 inch centers.

iv. Sodding:

a) Lay sod as soon as possible after it has been harvested to prevent injury. Sod should be installed within 24 hours of delivery. While installing, take action as necessary to prevent heat buildup within the unlaid sod. Plan to unstack and unroll the sod if it cannot be laid within 48 hours. Soil should be moist (but not overly wet) before laying sod. Irrigating the soil several days before delivery is often adequate.

b) Start sodding from a straight edge (driveway or sidewalk) and butt strips together, staggering them in a brick-like pattern. Avoid stretching sod. Use a knife or sharp spade for trimming to fit irregularly shaped areas. Lay sod lengthwise across the face of slopes and peg or stake the pieces to prevent slippage. After the sod has been placed, roll the lawn to ensure good sod-to-soil contact.

c) Water sod immediately after installation. Soak sod thoroughly enough to penetrate soil below the newly installed sod to a minimum depth of two (2) inches. Contractor is responsible for insuring adequacy of water supply. The Contractor shall provided any necessary temporary means to properly water sod, including temporary pumps and sprinklers. Proper irrigation shall be required by the contractor until the project has been inspected and is accepted by the Town of Cary. (The Contractor shall be required to obtain all applicable watering permits from the Town of Cary prior to beginning watering activities.)

d) In some cases sod can be laid in space planting "semi-checkerboard" fashion in order to lower costs. This method is described here assuming that the sod is cut into the standard 18 in. x 24 in. size. The first piece of sod is laid with the narrow side flush to a straight edge. This will start a row that is 24 in. wide. The next piece of sod is laid likewise but it is spaced 9 in. away and parallel to the first piece along the longer side. This is continued to make the first row. The next row is laid flush with the previous and in the same fashion except it laid offset by 9 inches, i.e. laid beginning at the centerline of the first piece of sod in the previous row. Subsequent rows are laid in this alternating pattern.

D. Cleanup and Inspection:

i. Upon completion of work, the Contractor shall remove from the site all equipment and other articles used. All excess soil, stone, and debris shall be removed and legally disposed of at no additional cost to the Owner. All work areas shall be left in a clean and neat condition. All damage to existing construction caused by landscaping operations shall be repaired to the satisfaction of the Town at the Contractor's expense.

ii. Seeded areas shall be protected and replanted as necessary to establish a uniform stand of specified grass. Scattered bare spots, none of which shall be larger that one (1) square foot, will be allowed up to a maximum of 3% of the seeded area for each property. When seeded areas are ready for inspection, the maintained turf areas shall be neatly mowed to the uniform height of approximately two and one-half (2.5) inches. The lawns shall be considered established only when the specified grass is vigorous and growing well in addition to meeting the other requirements specified.

iii. An inspection of the completed seeding shall be made at the conclusion of the landscape work upon written notice requesting such inspection submitted by the Contractor to the Engineer, at least ten (10) days prior to the anticipated date of inspection.

iv. A final inspection shall be performed when a satisfactory stand of seeded turf grass has been produced, upon written notice requesting such inspection submitted by the Contractor to the Engineer, at least ten (10) days prior to the anticipated date of inspection. If a satisfactory stand of turf has not been produced at the time of final inspection, necessary repairs shall be performed in conformance with the requirements of this section. Upon completion of these repairs, the seeded grass shall be reinspected upon written notice as above.

E. <u>Basis of Payment:</u>

i. Payment for establishing permanent lawn ground cover shall be the actual amount of seeding, sprigging or broadcasting, plugging, and/or sodding installed and will be paid for at the unit price bid per acre or square yard for the appropriate method and grass type as indicated on the Itemized Proposal in the contract documents for "Permanent Lawn Seeding and Mulching." This price shall be full compensation for all work covered by this section including but not limited to furnishing all permanent and temporary seeding, sprigging or broadcasting, plugging, sodding mulching, fertilizing, tacking, watering, site preparation, cleanup, maintenance, and warranty of work as specified.

ii. Distribution of Billing and Payments for "Permanent Lawn Seeding and Mulching" shall be made as follows:

a) Fifty percent (50%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment estimate after which the initial seeding has been completed and accepted.

b) Twenty-five percent (25%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment estimate made after which the initial establishment of grass and any required reseeding is complete.

c) Twenty-five percent (25%) of the total quantity of the seeding and mulching items on the Itemized Proposal on the first partial payment after the final establishment of grass and the project is one hundred percent (100%) complete.

TABLE 3

LAWN SEEDING
(Cool- and Warm-Season Grasses)

	Typical Planting Rate/1,000 sq. ft.			
Lawn Grass	**Planting Dates[1]**	**Seeds[2]**	**Space Planting[3]**	**Sprigging[4]**
Tall fescue	March 1 to Oct. 15 (Aug. 15 to Oct. 1 optimum)	6	-	-
Tall fescue/annual (winter) rye	Oct. 15 to March 1	6 fescue 1 rye		
Bermudagrass(seed)	Apr. 1 to Aug. 15	1 to 2	-	-
Bermudagrass (vegetative)	Apr. 15 to Aug. 30	-	5 [4]	5
Centipedegrass	March to July	0.25 to 0.50	5 [4]	-
Zoysiagrass	April to July	-	5 [4]	5
St. Augustinegrass	Apr. to July	-	5 [4]	-

Notes:

[1] Sod consisting of cool-season grasses can be installed anytime the ground is not frozen. Sod consisting of warm- season grasses can be installed as long as soil temperature exceeds 55°F. (typically April 15 to Oct. 1)

[2] Pounds of seed per 1,000 sq. ft.

[3] Square yards of turf cut into 2-inch centers to plant 1,000 sq. ft.

[4] Bushels of sprigs per 1,000 sq. ft. (1 sq. yd. of turf pulled apart is equivalent to 1 bushel of sprigs.)

PART 5 - MATTING FOR EROSION CONTROL

A. Matting for erosion control shall be jute matting or excelsior matting. Matting for erosion control shall not be dyed, bleached, or otherwise treated in a manner that will result in toxicity to vegetation.

B. Jute Matting: Jute matting shall be of a uniform open plain weave of single jute yarn, forty-eight (48) inches in width, plus or minus one (1) inch. The yarn shall be of a loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter. There shall be 78 warp ends, plus or minus 2, per linear yard; and the weight shall average 1.22 pounds per linear yard of the matting with a tolerance of plus or minus 5 percent.

C. Excelsior Matting: Excelsior matting shall consist of a machine-produced mat of curled wood excelsior at least 47 inches in width. The mat shall weigh 0.975 pounds per square yard with a tolerance of plus or minus 10 percent. At least 80% of the individual excelsior fibers shall be 6 inches or more in length. The excelsior fibers shall be evenly distributed over the entire area of the blanket. One side of the excelsior matting shall be covered with a woven fabric of twisted paper cord or cotton cord, or with an extruded plastic mesh. The mesh size for either the fabric or plastic mesh shall be a minimum of 1” x 1” and a maximum of 1-1/2” x 3”.

D. Wire Staples: Staples shall be machine-made of No. 11 gage new steel wire formed into a “U” shape. The size when formed shall be not less than 6 inches in length with a throat of not less than 1 inch in width.

E. Basis of Payment: Payment for erosion control matting shall be based on the actual quantity of matting in square yards installed in accordance with the project Contract Documents and per unit price indicated on the Itemized Proposal for “Erosion Matting.”

PART 6 - RIPRAP DISSIPATION PADS

A. After construction is complete, all points of stormwater release shall be protected by riprap dissipation pads.

B. Stone for plain riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be sound, tough, dense, resistant to the action of air and water, and suitable in all other respects for the purpose intended. Stone shall vary in weight from 5 to 200 pounds. At least 30 percent of the total weight of the riprap shall be in individual pieces weighing a minimum of 60 pounds each. Not more than 10 percent of the total weight of the riprap may be in individual pieces weighing less than 15 pounds each.

C. Unless otherwise directed by the Engineer, the stone shall be placed on a flat slope or as indicated on the plans. The stone shall be graded so that the smaller stones are uniformly distributed throughout the mass.

D. The Contractor may place the stone by mechanical methods, augmented by hand-placing where necessary, provided that when the riprap is completed it forms a properly graded, dense, neat layer of stone.

E. The completed riprap shall be at least the thickness indicated on the plans, with the top of the riprap pad flush with the surrounding finished grade.

F. Geotextile fabric consisting of Mirafi 14ON or equivalent shall be installed under all riprap unless otherwise noted. No direct payment shall be made for geotextile fabric. The price for geotextile fabric used under riprap shall be included in the unit price bid for "Riprap."

G. Basis of Payment: Payment for riprap shall be based on the actual quantity of riprap in tons provided and per the unit price for the appropriate class as indicated on the Itemized Proposal in the Contract Documents for "Riprap." The unit prices and payments for "Riprap" will be full compensation for all work covered by this section including, but not limited to, all excavation, embankment preparation, backfilling, and furnishing and placing riprap and other materials.

PART 6 - LEVEL SPREADERS

A. Level spreaders shall be constructed in accordance with the most current Town of Cary, NCDOT, and NCDENR standards.

B. Basis of Payment: Payment for "Level Spreader" shall be made under the contract unit price bid per linear foot for the type of level spreader as indicated on the plans and in the Itemized Proposal. The unit prices and payments shall be full compensation for all labor, equipment, and materials necessary to properly install and maintain the level spreader in accordance with the Contract Documents and shall also include any necessary clearing and grubbing, grading, seeding and mulching and other incidentals to satisfactorily install level spreaders.

END SECTION 16000

SECTION 21000
SPECIAL CONSTRUCTION
(03/03/2021)

The following items in Section 21000 are project specific and shall supercede any other conflicting portion of these contract documents.

1. **Debris Disposal**

The Town of Cary does not have a disposal site available to the contractor to receive debris retrieved from the sewers during cleaning operations. It shall be the contractor's responsibility to transport debris to a properly permitted disposal facility and to comply with all pertinent regulations.

The Town will provide a location for the placement of a temporary roll-off type dumpster/filter box for the purpose of temporary storage and dewatering of solids prior to transporting debris offsite for permanent disposal. The Town will assist the contractor by sampling the debris at the beginning of the project and sending it to a certified testing laboratory to generate a waste profile, if requested, to facilitate disposal at an approved facility.

Current note on Sheet C-5:
THE TRANSFER STATION FOR HOLDING SOLIDS REMOVED FROM THE SEWER DURING CLEANING OPERATIONS MAY BE LOCATED IN THIS AREA. COORDINATE WITH THE ENGINEER IN THE FIELD TO DETERMINE THE FINAL LOCATION. SEE SPECIFICATION 02650 - SEWER CLEANING AND TELEVISION INSPECTION AND DETAIL F ON SHEET D-4 FOR MORE INFORMATION.

Current language in **SEWER CLEANING AND TELEVISION INSPECTION:**
In lieu of immediately disposing of the solids off-site and at the Contractor's expense, the Contractor will be permitted to install a temporary transfer station. The Contractor will be permitted to discharge solids and minimal associated liquids removed during cleaning operations into the transfer station. Liquids shall be decanted from the transfer station and discharged into the Owner's collection system at an approved location. Solids shall be disposed of at an approved facility at regular intervals. The Contractor is responsible for odor control at the temporary transfer station. If any complaints are received or if the odor becomes noticeable, the Contractor will be required to immediately dispose of the contents of the transfer station. The Contractor is also responsible for ensuring that all solids and liquids are contained within the temporary transfer station. Any solids or liquids within the containment enclosure surrounding the temporary transfer station shall be immediately remediated. See Detail F on Sheet D-4 for additional information.

2. **Additional Work**

The Town reserves the right to negotiate with the contractor to include additional sewer rehabilitation work anywhere within the Town's wastewater collection system service area. If additional work is deemed necessary by the Town, the contractor's unit prices shall govern, where applicable. No additional payment will be made for mobilization to another location.

3. **Access through Private Property**

Private parking lots, driveways, or other areas for which temporary access has been granted by the property owner shall be maintained in satisfactory condition during construction of the project. If damage occurs to parking or driveway areas that impedes use by the property owners and/or tenants, or if debris, mud or sediment are deposited on private property and left unattended, the Contractor shall remedy the situation immediately upon receiving notice by the Engineer. Failure to do so may result in suspending the use of the specific access until satisfactory repairs are made.

When a specific temporary access location is no longer needed for construction, all final repairs to private property shall be complete within 15 days.

END OF SECTION 21000

FY20-21 SEWER REHABILITATION PROJECT

Appendix A - Approved Products List

APPROVED PRODUCTS LIST - WASTEWATER COLLECTION SYSTEM

updated: May 3, 2018

Product Category	Approved Manufacturer	Model/Series	Pressure/Load Rating	Website	Reference/Standard	Requirements
Ductile Iron Pipe 8-inch & 10-inch Diameter (and 4-inch & 6-inch services) Cement Mortar Lined	US Pipe	Tyton Joint	350 psi	http://www.uspipe.com/Main/	AWWA C150 and AWWA C151	Cement Mortar Lined with Exterior Bituminous Coating McWane Pipe stamped: 'McWane by Atlantic States or Clow' only
	American (ACIPCO)	Fastite Joint		http://www.acipco.com		
	McWane	Tyton Joint		http://atlanticstates.com/		
Ductile Iron Pipe 12-inch & Larger Diameter Protecto 401 Lined	US Pipe	Tyton Joint	250-350 psi see specification	http://www.uspipe.com/Main/	AWWA & DIPRA Standards	40-mils of Protecto 401 Interior Lining with Exterior Bituminous Coating (401 < 1yr old) McWane Pipe stamped: 'McWane by Atlantic States or Clow' only
	American (ACIPCO)	Fastite Joint		http://www.acipco.com		
	McWane	Tyton Joint		http://atlanticstates.com/		
Ductile Iron Fittings 8-inch to 10-inch Diameter (and 4-inch and 6-inch services) Cement Mortar Lined	Sigma	Mechanical Joint	350 psi	http://www.sigmaco.com/Products/Fittings.htm	AWWA C110/C111 and AWWA C153	Shall always meet or exceed pipe pressure rating
	Tyler Union			http://www.tylerunion.com/		
	SIP Industries			http://www.sipindustries.com/main/default.asp		
	Star			http://www.starpipeproducts.com/		
	American (ACIPCO)			http://www.acipco.com		
Ductile Iron Fittings 12-inch & Larger Diameter Protecto 401 Lined	Sigma	Mechanical Joint	250-350 psi see specification	http://www.sigmaco.com/Products/Fittings.htm	AWWA & DIPRA Stds	Shall always receive interior Protecto 401 Lining to meet or exceed main line pipe standards. P401 lining must be less than 1 year old.
	Tyler Union			http://www.tylerunion.com/		
	SIP Industries			http://www.sipindustries.com/main/default.asp		
	Star			http://www.starpipeproducts.com/		
	American (ACIPCO)			http://www.acipco.com		
PVC Pipe, SDR 35, 8-inch to 15-inch diameter Install depth of 4-ft to 14-ft	JM Eagle	ASTM D3034 Ring Tite Joint with Rieber Gasket	N/A	http://www.jmeagle.com/	ASTM and UNIBELL Stds.	ASTM D3034 Pipe with Cell Classification of 12454 or 12364.
	Diamond Plastics	ASTM D3034 Sewer Pipe with Rieber Gasket		http://www.dpcpipe.com/		
	National Pipe & Plastics			http://www.nationalpipe.com/		
	North American Pipe			http://www.northamericanpipe.com/		
PVC Pipe, Heavy Wall SDR 26 (Minimum Pipe Stiffness of 115) 8-inch to 27-inch Diameter and Depth of Install 4-ft to 30-ft	JM Eagle	ASTM D3034 or F679 Ring Tite Joint with Rieber Gasket Joint	N/A	http://www.jmeagle.com/	ASTM and UNIBELL Stds.	ASTM D3034 or ASTM F679 Pipe with Cell Classification of 12454 or 12364.
	Diamond Plastics	ASTM D3034 or F679 Sewer Pipe with Rieber Gasket Joint		http://www.dpcpipe.com/		
	National Pipe & Plastics			http://www.nationalpipe.com/		
	North American Pipe			http://www.northamericanpipe.com/		
Precast Concrete Manholes	Lindsay Precast	4-ft, 5-ft, & 6-ft diameter	H-20 Rating	http://www.stayright.com/	ASTM C478 and C923	All manhole bottoms greater than 5' diameter shall be a minimum of 8-inches thick. A minimum of 6inches for 4' diameter.
	Mack Industries			http://www.mackconcrete.com/		
	Precast Solutions			http://www.precast-solutions.com/		
	CP&P (Hanson, Carolina Precast)			http://www.carolinaprecast.com/		
	Tindall			http://www.tindallcorp.com/		
	OldCastle (NC Products)			ldcastleprecast.com/plants/ncproductsraleigh/Pages/		
	Eastern Vault Co. Inc.			http://easternvault.net		
	Foltz			http://www.foltzconcretepipe.com		
Manhole Frame and Cover for Paved Areas w/ 1 Vent Hole	EJ	Model # V1384	40,000 lb proof load per AASHTO M306	www.ejco.com	CL35B ASTM-A48 Cover=120 lb min.	Type 1 - for installation in and near roadways
	US Foundry	669 Ring and LX Cover		www.usfoundry.com		
Manhole Frame and Rotating Cover for Outfall Areas (watertight)	EJ	41384037R01	12,000 lb proof load	www.ejco.com	CL35B ASTM-A48 Ring=80 lb min. Cover=50 lb min.	Type 2A - watertight for outfalls with elevated manholes (non-traffic bearing)
	US Foundry	8021464		www.usfoundry.com		
Manhole Frame and Rotating Cover w/ 1 vent hole for Outfall Areas (vented)	EJ	41384038R01	12,000 lb proof load	www.ejco.com	CL35B ASTM-A48 Ring=80 lb min. Cover=50 lb min.	Type 2B - vented for outfalls with elevated manholes (non-traffic bearing)
	US Foundry	8021472		www.usfoundry.com		

APPROVED PRODUCTS LIST - WASTEWATER COLLECTION SYSTEM

updated: May 3, 2018

Product Category	Approved Manufacturer	Model/Series	Pressure/Load Rating	Website	Reference/Standard	Requirements
Manhole Frame and Cover with 36-inch clear span opening for Large Diameter Manholes	EJ	Frame: 1581 Outer Cover: 1580EGS Inner Cover: 1040AGS	40,000 lb proof load per AASHTO M306	www.ejco.com	CL35B ASTM-A48 Minimum Weights: Ring=232lb Outer Cover=245lb Inner Cover=145lb	Type 3 - for large diameter outfall manholes
	US Foundry	Assembly: 8021054 Ring: 8020503 Outer Cover: 8015454 Inner Cover: 8015455		www.usfoundry.com		
Manhole Steps	M.A. Industries	PS1-PF or PS1-PF-DF	Horizontal Pull-out Load of 1000 lbs. when	www.maind.com	ASTM C478	Spaced 16" on center
	American Step Co.	ML-10-TDS-NCR		www.americanstep.com		
Exterior Joint Wrap for Manholes	ConSeal	CS-212	N/A	www.conseal.com	ASTM C990, E1745, C877	
	Henry	RN103 - RAM-NEK		www.henry.com		
	Infi-Shield			www.infi-shield.com		
Butyl Rubber Sealant	ConSeal	CS-102	N/A	www.conseal.com	SS-S-210 ASTM C990	
Manhole Epoxy Coating (Interior)	RLS	Raven 405	120-mils	www.ravenlining.com	Installed by:	www.dun-rightservices.com/
	Sherwin Williams	CorCote SC Epoxy		www.sherwin-williams.com	Installed by:	www.cmtcoatings.com
Exterior Manhole Coating for Wet Areas	Pro-Tech Coatings	EP-214	N/A	www.pro-techcoating.com	Corps of Engineers C-200	40-mil minimum thickness required. Interior epoxy coatings may also be used.
	Carboline	Bitumastic 300M		www.carboline.com		
	International	Devtar 5A		www.international-pc.com		
Mini Manhole Frame and Cover for Cleanout in Paved Areas	US Foundry	Ring: 8090167 Cover: 8090179	40,000 lb proof load	www.usfoundry.com	CL35B ASTM-A48 Ring=39 lb min. Cover=14 lb min.	Domestically Made
	EJ	Model # 1566		www.ejco.com		
Marking Tape	3M Marking Tape	7614-XR	N/A	http://solutions.3m.com/en_US/	APWA	Green for Wastewater
4-inch and 6-inch Service Saddle for existing 8-inch thru 12-inch DIP	Romac	Model "CB"	N/A	www.romac.com	ASTM A536 ASTM D2000 MBA 710	Service Line shall be DIP. Strap and Hardware shall be 304 Stainless Steel
	Ford	FSS-1440-4 & FSS-1440-6		www.fordmeterbox.com		
Ductile Iron Service Tee for PVC Main x 4" or 6" DIP Service line	Harco	280523-0804P 280523-0806P	350 psi	www.harcofittings.com	ASTM A536,F477 AWWA C153	Protecto 401 Lined

APPROVED PRODUCTS LIST - SEWER FORCE MAIN & PUMPING SYSTEMS

updated: May 3, 2018

Product Category	Approved Manufacturer	Model/Series	Pressure/Load Rating	Website	Reference/Standard	Requirements
Ductile Iron Pipe 4-inch & Larger Diameter Protecto 401 Lined	US Pipe	Tyton Joint	250-350 psi see specification	http://www.uspipe.com/Main/	AWWA C150 & C151 and DIPRA Stds	40-mils of Protecto 401 Lining (401 lining must be < 1yr old) McWane Pipe stamped: McWane by Atlantic States or Clow only
	American	Fastite Joint		http://www.acipco.com		
	McWane	Tyton Joint		http://atlanticstates.com/		
Ductile Iron Fittings 4-inch & Larger Diameter Protecto 401 Lined	Sigma	Mechanical Joint	250-350 psi see specification	http://www.sigmaco.com/Products/Fittings.htm	AWWA C110 & C153 and DIPRA Stds	Shall always receive interior Protecto 401 Lining to meet or exceed main line pipe standards. (401 lining must be < 1yr old)
	Tyler Union	Mechanical Joint		http://www.tylerunion.com/		
	SIP Industries	Mechanical Joint		http://www.sipindustries.com/main/default.asp		
	Star	Mechanical Joint		http://www.starpipeproducts.com/		
	American	Mechanical Joint		http://www.acipco.com		
Ductile Iron Restrained Joint Pipe 4-inch & Larger Diameter Protecto 401 Lined	Griffin	Snap Lok	250-350 psi see specification	http://www.griffinpipe.com/	AWWA C150 & C151 and DIPRA Stds	Boltless restraint unless otherwise specified
	American	Flex Ring		http://www.acipco.com		
	US Pipe	TR Flex		http://www.uspipe.com/Main/		
Wedge Action Retainer Glands	EBAA	Mega-Lug	350-psi through 12" 250-psi through 48"	http://www.ebaa.com/	UL/FM approved through 12"	All retainer glands shall be epoxy coated or polyester powder coated
	Romac	RomaGrip		http://www.romac.com/		
	Sigma	One Lok Model SLDE		http://www.sigmaco.com		
	SIP	EZ-Grip		http://www.sipindustires.com		
	Star	Stargrip		http://www.starpipeproducts.com		
	Tyler Union	TUFGrip TLD		http://www.tylerunion.com/		
Plug Valve (bi-directional)	Pratt	Ballcentric Plug Valve	4-12-inch, 175psi >12-inch, 150psi	www.henrypratt.com	AWWA C517	4"-12" Round Port & 14"-48" Rectangular, Full Port carrying 100% of pipe flow
	Milliken	600 N1BG		www.millikenvalve.com		
	DeZurik	PEF (14"-36" ONLY)		www.dezurik.com		
Ball Valve	Pratt	Rubber Seated Ball Valve	150 psi	www.henrypratt.com	AWWA C507	For use on large diameter pipe
Valve Box	E. Jordan Iron Works	Screw Type 8550 (or 8560)	N/A	http://www.ejco.com/		Telescoping Box Assembly & 6" lid with 4" skirt labeled "Sewer"
	Bingham & Taylor	Screw Type 4905		http://www.binghamandtaylor.com/		
Combination Air Valve	Vent-O-Mat	RGX	145 psi	www.ventomat.com	AWWA C512	Stainless steel valve bodies
	Vent-Tech	Series C - SWG, SWS	276 psi	http://www.internationalvalve.com/		
	ARI	Site Specific (D-020 or D-023)	250 psi	http://www.arivalves.com/		
Marking Tape & Marker Balls	3M Marker Ball	1404-XR	N/A	http://solutions.3m.com/en_US/	APWA	Green for Wastewater
	3M Marking Tape	7614-XR				
Manhole Epoxy Coating	RLS	Raven 405	120-mils	www.ravenlining.com	Installed by:	www.dun-rightservices.com/
	Sherwin Williams	Duraplate-5900		www.sherwin-williams.com	Installed by:	www.cmtcoatings.com
DIP Epoxy Coating	Induron	Protecto 401	N/A	www.protecto401.com	40-mil thickness required. Pipe must be installed within 1 year of date of lining. High pressure cleaning shall not exceed 1800psi. Lined carrier pipe shall be pulled through casing.	
Grinder	JWC Environmental	CMD-1800	N/A	http://www.jwce.com/		Must have integral rotating screen & a hydraulic power unit

APPROVED PRODUCTS LIST - SEWER FORCE MAIN & PUMPING SYSTEMS

updated: May 3, 2018

Product Category	Approved Manufacturer	Model/Series	Pressure/Load Rating	Website	Reference/Standard	Requirements
Grinder Control Panel	JWC Environmental	B100R	N/A	http://www.jwce.com/		
Grinder Motor	Baldor	Site Specific	N/A	http://www.baldor.com	NEMA Design 'B' and TEFC	Minimum Motor Size: 5hp, 60Hz, 240V or 480V AC.
	Reliance			http://www.reliance.com/		
	US Motor			http://www.usmotors.com/		
Pump	Fairbanks Nijhuis	Site Specific	N/A	http://www.fairbanksnijhuis.com/		
	Xylem			http://www.xylem.com/pumping/us/brands/flygt		
	Sulzer			http://www.sulzer.com		
	Flowserve			www.flowserve.com/		
Flow Meter	ABB	Site Specific	N/A	www.abb.com		316 SS Flanges on meters less than 24-inches. Must have two, three, or four 316 SS or Hastelloy C electrodes
	Krohne			www.krohne.com		
	Rosemount			www.rosemount.com		
Pressure Transmitter	ABB	Site Specific	N/A	www.abb.com		
	Foxboro			www.fielddevices.foxboro.com/products/pressure		
	Rosemount			www.rosemount.com		
Odor Control Unit	Carbtrol	Site Specific	N/A	www.carbtrol.com	Properly sized passive units are preferable to motorized units with a fan. Media canister must provide for clean air intake or provide piping with PVC check valves.	
	Wager	Typically 2050-I or larger		www.wagerusa.com		
Alarm Dialer	Butler National	ADAS II	N/A	www.butlernational.com		Shall be in a lockable NEMA 4 enclosure and have a thermostatically controlled heater
	Capital Controls	1520		www.severntrentservices.com		
Generator	CAT	Site Specific	N/A	www.cat.com		
	MTU			www.mtuonsiteenergy.com		
	ONAN			www.power.cummins.com		

FY20-21 SEWER REHABILITATION PROJECT

Appendix B - Executed Right-of-Entry for Select Properties

Note: The following Executed Right-of-Entries are provided for informational purposes of locations/properties where the Owner has arranged for access based on certain stipulations.

RIGHT OF ENTRY PERMIT

THIS AGREEMENT made this the 1st day of October 2020, by and between **WAKE COUNTY**, a body politic and corporate of the State of North Carolina (hereinafter called Landowner), and **THE TOWN OF CARY**, (hereinafter called Permit Holder).

The parties hereto agree as follows:

The Landowner hereby grants unto the Permit Holder, its employees, agents, consultants, contractors and cooperating parties, the right and privilege to enter the properties, Parcel PIN#0756800223, PIN#0765492268, PIN#0765386915, for the purpose of the Town of Cary FY20-21 Sewer Rehabilitation Project No. SW3501. This project includes rehabilitation of the Crabtree Creek Interceptor and Black Creek Interceptor sewer lines. The *portion* of "property" subject to this right of entry can be more particularly shown and described as:

> Being *portions* of the Landowners properties, located in Cary, NC commonly known as Crabtree Creek Watershed Project Site#23, Wake County PIN# PIN#0756800223, PIN#0765492268, PIN#0765386915, and as further identified on the attached (Maps A-1 & A-2). The Right of Entry areas and scope of work are limited to and outlined in Exhibit A and (Maps A-1 & A-2), which are attached hereto and incorporated herein by reference.

This privilege to enter is subject to the following provisions and conditions:

1. The term of this permit shall be 18 Months. The commencement date for this permit shall begin the day the Permit Holder and Contractor execute a Notice to Proceed for construction of the Sewer Rehabilitation Project. The Permit Holder shall be required to provide the Landowner a fully executed Notice to Proceed to activate this permit. If necessary, said term may be extended subject to mutual agreement on behalf of all parties.

2. This Right of Entry is not assignable.

3. The permitted activities on the certain portions of the Landowners properties under this right of entry are limited to the scope of work and specific areas of said properties outside the Town of Cary existing sewer easement areas identified in the attached Exhibit A (Maps A-1 & A-2). The Permit Holder is responsible for locating all underground utilities in accordance with State and local laws or ordinances prior to boring, digging or excavating. The Permit Holder is responsible for repairing any damaged underground utilities as a result of the boring, digging, installing sewer liners or excavation. The temporary above ground bypass piping

will remain in existing Town of Cary sewer easements unless otherwise noted on (Maps A-1 & A-2). No excavation, equipment storage, or staging is permitted in the auxiliary spillway. No fill material shall be placed within the flood pool of the flood control structure. No excavation is permitted anywhere on the flood control structure without prior review and written approval from Wake County and NRCS. Minor excavation may be performed around a manhole. Minor excavation is defined as a depth not to exceed two times the diameter of the manhole and width not to exceed a radius of two times the manhole diameter from the center point of the manhole cover. Minor excavation is envisioned to address such items as grade ring adjustments/repairs, barrel repairs, or other shallow manhole structural components damaged during the project work.

4. The Permit Holder shall be responsible for any personal injury/death occurring on the Property. The Permit Holder agrees to defend, indemnify, and hold harmless the Landowner from any and all loss, liability, claims or expense (including reasonable attorney's fees) arising from bodily injury, including death or property damage, to any person or persons caused in whole or in part by the negligence or misconduct of the Permit Holder resulting from activities conducted on said property by the Permit Holder, its contractors, subcontractors, agents or employees. It is the intent of this section to require Permit Holder to indemnify Landowner to the extent permitted under North Carolina law.

5. The Permit Holder shall develop a construction sequence that will maintain access to greenways to the extent practical during construction. The sewer rehabilitation work shall be staged in such a manner that will maximize the length and connectivity of greenways accessible to the public during the project. specifically:
   - When bypass piping needs to cross greenway trails, the Permit Holder is requiring the contractor to bury the pipe beneath the greenway and repair the trail immediately thereafter, so that the temporary piping does not block the greenway.
   - The first phase of the project will consist of rehabilitating approximately 7,000 feet of the Crabtree Creek Interceptor, beginning at Evans Road. For the first couple thousand feet, there is adequate separation between the sewer line and the greenway to allow the greenway to remain open.
   - While work is underway on the Crabtree Creek Interceptor, the Black Creek Greenway will remain accessible to the public in its entirety.
   - While work is taking place on the 54-inch pipe on the Black Creek Greenway, the Crabtree Creek Greenway will be open and access to the Black Creek Greenway south of the greenway bridge will be maintained.
   - The Permit Holder shall develop and maintain a communication strategy to the public. The Permit Holder shall install signs informing greenway users of the project and direct them to a website that will provide key project information. The Permit Holder's web page for the project should

be updated as work progresses to inform the public of the project and the status of the greenways within the project limits.

6. The Permit Holder shall be responsible for any damage to the Property or fixtures on the Property. The Permit Holder shall install required erosion control measures and devises for the project within the project limits-existing sewer easements and Permit Areas if required for grading and/or excavation. The Permit Holder shall restore the affected manholes to their previously sealed condition. In any activities undertaken pursuant to this Right of Entry, the Permit Holder, its contractors, subcontractors, agents or employees agree to exercise reasonable care in order to minimize physical damage to Landowner's property and agree to restore the Landowner's property to its original condition. The Permit Holder shall secure the construction areas and equipment at the end of each day.

7. In any activities undertaken pursuant to this Right of Entry, the Permit Holder shall comply and cause its contractors, subcontractors, agents, and employees to comply with all federal, state, and local laws; and shall be responsible for obtaining any permits required to undertake such activities.

8. This right of entry is revocable by the Landowner. In the event the Landowner determines at any time that the Permit Holder, its contractors, agents or employees interferes with the Landowners use or access to the property, violates any law or restriction in this permit, permits sediment from the project to enter Lake Crabtree, and/or creates a safety hazard or nuisance, the Landowner may terminate this permit by providing written notice to the Permit Holder.

9. This Right of Entry does not bind the Landowner to financial responsibility for services rendered on the Property by Permit Holder or any contractors, subcontractors, agents, employees and other designees of Permit Holder and shall not subject the Property to any claimed liens.

10. The Parties designate the following as authorized contacts for their respective organizations:

LANDOWNER'S CONTACT INFORMATION:
Chris Snow
Director, Wake County Parks, Recreation & Open Space
P.O. Box 550, Suite 1000
Raleigh, NC 27602
Telephone: (o) (919) 856-6677, (m) (919) 422-7272
Email: csnow@wakegov.com

Rick Stogner, P.E., CEM, BEP
Facility & Field Services Director
P.O. Box 550
Raleigh, N.C. 27602
Telephone: (o) (919) 870-4025, (m) (919) 623-0646
Email: rick.stogner@wakegov.com

PERMIT HOLDER'S CONTACT INFORMATION:
Lynn A. Brilz, P.E.
Senior Project Manager
Town of Cary Utilities Department
P.O. Box 8005
Cary, N.C. 27512-8005
Telephone: (919) 460-1047
Email: lynn.brilz@townofcary.org

IN WITNESS WHEREOF, the parties have executed this agreement as of the above stated date.

LANDOWNER

WAKE COUNTY

10-1-20
Date

By: Mark Forestieri
Director, Facilities, Design & Construction
P.O. Box 550, Suite 1100
Raleigh, NC 27602
Telephone: (919) 856-6356
Email: mforestieri@wakegov.com

PERMIT HOLDER

TOWN OF CARY

9/25/20
Date

By: Jamie Revels
Utilities Director
P.O. Box 8005
Cary, N.C. 27512-8005
Telephone: (o) (919) 469-4303, (m) (919) 418-7572
Email: jamie.revels@townofcary.org

Exhibit A

UTILITIES DEPARTMENT

June 16, 2020

Mr. Rick Stogner, P.E., CEM, BEP
Wake County Facility and Field Services Director
P.O. Box 550
Raleigh, NC 27602

Re: Right of Entry Authorization Request
FY20-21 Sewer Rehabilitation Project
Town of Cary Project No. SW3501

Dear Mr. Stogner,

The Town of Cary is planning to perform rehabilitation and repairs to deteriorated sewer lines and manholes along Crabtree Lake from Evans Road downstream to the Lake Crabtree Dam and ultimately to the North Cary Water Reclamation Facility on Old Reedy Creek Road near I-40. Rehabilitation of these sewers is needed to ensure continued reliable wastewater service to Town of Cary utility customers, protect the environment and to protect public health. Also, rehabilitation of the 54-inch sewer that runs through the Lake Crabtree Dam property is essential to ensuring the long-term integrity of the dam.

The first step in this process will be to set up temporary bypass pumps and above-ground piping to reroute sewer flows around pipe and manholes being worked on. Once the bypass system is in place for a given area, the sewer lines will be cleaned using high-pressure hydraulic jetting equipment and inspected with sewer cameras. Following review of the camera inspection footage, cured-in-place pipe (CIPP) liners will be installed to renew the sewer lines, assuming no repairs requiring excavation will be necessary. The CIPP liner is fully structural and is designed to extend the life of these sewer lines by 50 or more years. The last stage of this process involves repairing the manholes and applying a corrosion-resistant mortar lining on the inside walls of the manholes.

To complete the above-mentioned work, construction equipment and trucks will need access to the manholes and sewer lines along the construction corridor. Based on our observation of the work area, the contractors should generally be able to perform the work within the existing sewer easements, with additional access needed at a few key areas. Regarding property owned by Wake County, additional access will be needed in the vicinity of the Lake Crabtree Dam. Attached, for reference, are maps identifying the location of the sewer rehabilitation work along Crabtree Lake. As requested, the approximate location of the flood pool at elevation 284.9 is shown on the maps. Construction vehicles and equipment will need access to the dam area from Old Reedy Creek Road and will travel along the greenway at the crest of the dam to access manholes on the 54-inch sewer line running through the dam area as shown on the map for the Black Creek Interceptor sewer rehabilitation. Typical equipment for this type of construction will include combination jet-vacuum trucks to clean sewers, semi tractor-

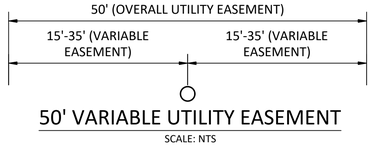
trailers to transport liners to manholes for installation, boiler trucks to cure the liners, and box trucks equipped with specialty camera equipment to video the sewer lines before and after installation of the liners. Additionally, excavators or off-road forklifts are commonly used to lift the liners into place above the manholes for installation. We do not anticipate any excavation being required within the parcel occupied by the dam, except to remove and reinstall the top sections of manholes to provide sufficient access for liner installation. Finally, we anticipate needing to trim tree limbs overhanging the sewer easement in the area just north of Evans Road.

On behalf of the Town of Cary, we are respectfully requesting a Right of Entry Authorization from Wake County to complete the above-mentioned improvements. Please feel free to contact me via email at lynn.brilz@townofcary.org or by calling my personal cell phone at 919-810-0898.

Respectfully submitted,

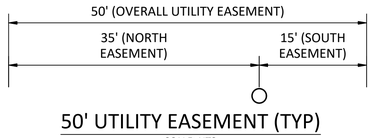
Lynn A. Brilz, P.E.
Senior Project Manager – Utility Engineer

Enclosure: Project Maps



50' VARIABLE UTILITY EASEMENT

SCALE: NTS



50' UTILITY EASEMENT (TYP)

SCALE: NTS

NOTE: NO EXCAVATION IS PERMITTED ANYWHERE ON THE FLOOD CONTROL STRUCTURE WITHOUT PRIOR REVIEW AND WRITTEN APPROVAL FROM WAKE COUNTY AND NRCS. MINOR EXCAVATION MAY BE PERFORMED AROUND A MANHOLE.

APPROXIMATE LOCATION/ELEVATION OF FLOOD POOL AT 284.9 FEET (NGVD 29)

NO EXCAVATION, EQUIPMENT STORAGE, OR STAGING MAY OCCUR IN THE AUXILIARY SPILLWAY.

TEMPORARY ABOVE-GROUND BYPASS PIPING (TYPICAL) TO REMAIN IN 40' EASEMENT UNLESS OTHERWISE NOTED.

LAKE CRABTREE

REMOVE AND REPLACE FENCE AND GATES AS NEEDED DURING CONSTRUCTION.

EXISTING GREENWAY TO BE USED FOR CONSTRUCTION EQUIPMENT, OUTSIDE OF EXISTING SEWER EASEMENT (ROE AREA)

CONSTRUCTION ACCESS POINTS (ROE AREA)

CONSTRUCTION ACCESS POINT (ROE AREA)

CONSTRUCTION ACCESS POINT (ROE AREA)

BYPASS WILL BE LOCATED OUTSIDE OF THE SEWER EASEMENT IN THIS AREA (ROE AREA)

BYPASS WILL BE LOCATED OUTSIDE OF THE SEWER EASEMENT IN THIS AREA (ROE AREA)

50' SEWER EASEMENT BM: 1982 PAGE: 239,240 242, 243, 244,245, 246,247, 249

50' SEWER EASEMENT BM 1982 PGS: 239-249

PROPOSED CONSTRUCTION STAGING AREA

NO ACCESS BEYOND THIS POINT

CHANGE TO FLAT-TOP

15' OPENING

10' OPENING

8' PATH

FENCE

SIDEWALK

FLOW METER

BRIDGE

BRIDGE (END)

BRIDGE (START)

AERIAL CROSSING

AERIAL CROSSING

WEIGHT SENSITIVE BRIDGE

CREEK

50' EASEMENT, SEE DETAIL

50' UTILITY EASEMENT, SEE DETAIL

50' VARIABLE UTILITY EASEMENT, SEE DETAIL

40' UTILITY EASEMENT, SEE DETAIL, NO BOOK AND PAGE FOUND FOR THIS EASEMENT

35% SLOPE

SP76506001
SP76506002
SP76506003
SP76506004
SP76506005
SP76506006
SP76506009
SP76506010
SP76506014
SP76506015
SP76506016
SP76506017
SP76506024
SP76506026
SP76506027
SP76506040
SP76506047
SP76507025

TOWN OF CARY PIN: 0766407480

RALEIGH DURHAM INTERNATIONAL PIN: 0767324317

TOWN OF CARY PIN: 0765680977

TOWN OF CARY PIN: 0765497840

WAKE COUNTY PIN: 0756800223

WAKE COUNTY PIN: 0765492268

WAKE COUNTY PIN: 0756800223

WAKE COUNTY PIN: 0765386915

WAKE COUNTY PIN: 0765388838

WAKE COUNTY PIN: 0765389992

WAKE COUNTY PIN: 0756800223

WAKE COUNTY PIN: 0756800223

SVF WESTON LAKESDE, LLC PIN: 0765389575

SVF WESTON LAKESDE, LLC PIN: 0765389575

SVF WESTON LAKESDE, LLC PIN: 0765389575

LO2 LOFTS AT WESTON LAKESIDE BM2012 -00508 PIN: 0765498113

BRI 1875 WESTON I, LLC PIN: 0765377804

BRI 1875 WESTON I, LLC PIN: 0765471857

ANJAN, LLC PIN: 0765478930

UUM HOLDINGS, LLC PIN: 0765489298

IERNE ENTERPRISES, LLC PIN: 0765581211

IERNE ENTERPRISES, LLC PIN: 0765583135

VENTAS WESTON, LLC PIN: 0765574816

NCHA, INC PIN: 0765670843

LAKESIDE LOFTS CIR

PARKTOP DR

WINSTEAD HOLLOW PLACE

LAKESIDE VIEW CT

CARYLOFTS DR

OLD REEDY CREEK RD

WINSTEAD DRIVE

OLD REEDY CREEK RD

REVISIONS	CARY PROJECT No.: SW3501
	PROJECT No.: TOC-010
	DESIGNED BY: M.COLANGELO
	DRAWN BY: L.RAIMOND
	CHECKED BY: M.COLANGELO
	APPROVED BY: M.LAMBERT
	DATE: JUNE 2020

Frazier Engineering, P.A.
6592 Bob White Trail
Stanley, NC 28164
Office■ 704.822.8444
Fax ■ 704.822.8666

TOWN OF CARY
CARY, NORTH CAROLINA

FY 20-21 SEWER REHABILITATION PROJECT

BLACK CREEK COLLECTOR

SHEET No.

A-1

40' (OVERALL UTILITY EASEMENT)

20' (NORTH EASEMENT) | 20' (SOUTH EASEMENT)

40' UTILITY EASEMENT (TYP)

SCALE: NTS

NOTE: THE 40-FT EASEMENT FOR THE CRABTREE CREEK INTERCEPTOR SHOWN ON THIS MAP COULD NOT BE LOCATED IN THE WAKE COUNTY REGISTRY. THE EASEMENT INFORMATION IS BASED ON PLANS FOR THE CRABTREE CREEK INTERCEPTOR BY MOORE GARDENER ASSOCIATES, DATED 3/28/84 AND AN AGREEMENT BETWEEN WAKE COUNTY AND THE TOWN OF CARY, DATED 10/28/2003 TRANSFERRING OWNERSHIP OF THE CRABTREE CREEK INTERCEPTOR FROM WAKE COUNTY TO THE TOWN OF CARY.

BYPASS WILL BE LOCATED OUTSIDE OF THE SEWER EASEMENT IN THIS AREA (ROE AREA)

TEMPORARY ABOVE-GROUND BYPASS PIPING (TYPICAL) TO REMAIN IN 40' EASEMENT UNLESS OTHERWISE NOTED.

LAKE CRABTREE

APPROXIMATE LOCATION/ELEVATION OF FLOOD POOL AT 284.9 FEET (NGVD 29)

ROE AREA: 15 FT WIDE PARALLEL WITH AND ADJACENT TO EXISTING 40-FT. SEWER EASEMENT, FOR A DISTANCE OF 35 FT. EACH WAY FROM CL OF MANHOLE (APPROX. AREA, LESS EX. EASEMENT = 900 SF)

ADDITIONAL ACCESS REQUESTED FOR TEMPORARY PUMP STAGING AREA AND/OR CONSTRUCTION ACCESS (ROE AREA): 25 FT. X 50 FT. (MINIMAL AMOUNT OF TREE REMOVAL NEEDED IN THIS AREA - APPROX. 10 FT. X 15 FT.)

CONSTRUCTION ACCESS POINT

CONSTRUCTION ACCESS POINT

20' SEWER EASEMENT BM:1991 PAGE:878

40' UTILITY EASEMENT, SEE DETAIL, NO BOOK AND PAGE FOUND FOR THIS EASEMENT

40' UTILITY EASEMENT, SEE DETAIL, NO BOOK AND PAGE FOUND FOR THIS EASEMENT

50' UTILITY EASEMENT, SEE DETAIL

40' UTILITY EASEMENT, SEE DETAIL, NO BOOK AND PAGE FOUND FOR THIS EASEMENT

SP75512015 SP75512014 SP75512012 SP75512011 SP75508004 SP75508003 SP75508005 SP75508009 SP75508006 SP75508010 SP76505001 SP76505014 SP76505013 SP76509024 SP76505012 SP76505011 SP76505015 SP76505004 SP76505005 SP76505007 SP76505006 SP76506010 SP76506024 SP76506027 SP76506009 SP76506026 SP76506014 SP75511019 SP75511011 SP75511023 SP75511010

BRIDGE (START) BRIDGE BRIDGE (END) CULVERT CONCRETE WALKWAY ASPHALT STORM DITCH SWAMP EXISTING CLEARED R.O.W. START PROJECT

WAKE COUNTY PIN: 0756800223 (x3)

METLIFE PIN: 0755973059

HIGHWOODS REALTY LTD PTNRP LTD PTNRP PIN: 0755866680

HIGHWOODS REALTY LIMITED PARTNERSHIP PIN: 0755861286

HIGHWOODS REALTY LIMITED PARTNERSHIP PIN: 0755859496

HIGHWOODS REALTY LIMITED PARTNERSHIP PIN: 0755958530

HIGHWOOD REALTY LIMITED PARTNERSHIP PIN: 0765058738

HIGHWOOD REALTY LIMITED PARTNERSHIP PIN: 0765056371

HIGHWOOD REALTY, LP AP SOUTHEAST PORTFOLIO, LP PIN: 0755969159

HIGHWOOD REALTY LIMITED PARTNERSHIP PIN: 0765067381

HIGHWOODS REALTY LIMITED PARTNERSHIP PIN: 0765071249

LUCY DANIELS CENTER FOR EARLY CHILDHOOD PIN: 0765063655

WESTON PROPERTY OWNERS ASSOC. PIN: 0765161551

WESTON PROPERTY OWNERS ASSOC. PIN: 0765152804

HIGHWOOD FORSYTH LIMITED PARTNERSHIP PIN: 0765166379

ALBANY ROAD-6501 WESTON, LLC PIN: 0765263421

COTTON BOARD PIN: 0765362411

VERIZON PIN: 0765178430

VERIZON (REPAIR LAB) PIN: 0765274411

NORTH CAROLINA BAR ASSOCIATION PIN: 0765170351

MARRIOTT HOTEL PIN: 0755765289

TPS 1 LLC PIN: 0755764026

HIGHWOOD SERVICES, INC PIN: 0755760051

FIRST CITIZENS BANK & TRUST PIN: 0755752748

LANTOWER WESTON CORNERS (APARTMENT COMPLEX) PIN: 0755851663

WESTON OAKS HOMEOWNERS ASSN INC PIN: 0755641407

THE CHANCELLOR MASTERS & SCHOLARS OF THE UNIVERISTY OF OXFORD PIN: 0755755260

JOHN DEERE COMMERCIAL & CONSUMER EQUIPMENT DIVISION OF DEERE, INC PIN: 0755848591

GREENWAY ENTRANCE

WESTON PARKWAY (x2) METLIFE WAY CENTREGREEN WAY OVATION DRIVE KENNICOTT AVENUE MONTELENA PLACE EVANS ROAD (x2) SAGE COMMONS WAY LABNEL COMMONS WAY NORWELL BLVD (x2) LINTON BANKS PLACE BEXLEY BLUFF LN WESTON OAKS CT

REVISIONS	CARY PROJECT No.: SW3501
	PROJECT No.: TOC-010
	DESIGNED BY: M.COLANGELO
	DRAWN BY: L.RAIMOND
	CHECKED BY: M.COLANGELO
	APPROVED BY: M.LAMBERT
	DATE: JUNE 2020

Frazier Engineering, P.A.
6592 Bob White Trail
Stanley, NC 28164
Office■ 704.822.8444
Fax■ 704.822.8666

TOWN OF CARY
CARY, NORTH CAROLINA

FY 20-21 SEWER REHABILITATION PROJECT

CRABTREE CREEK INTERCEPTOR

SHEET No. A-2

UTILITIES DEPARTMENT

June 3, 2020

MCI Worldcom Network Services, Inc.
1133 19TH St. NW
Washington, D.C. 200036-3607

PIN Number: 0765274411 Property: 6400 Weston Parkway, Cary, NC 27513

Subject: Granting of Temporary Right-of-Entry to Rehabilitate Sewer Lines and Manholes

To Whom it May Concern:

The Town of Cary (Town) is planning to rehabilitate existing large diameter sewer lines and manholes along property owned by MCI Worldcom Network Services, Inc. adjacent to Crabtree Lake. Rehabilitation of sewer lines will be accomplished by installing flexible liners in the existing sewers that, when cured are fully structural and resistant to corrosion. This process will extend the service life of these sewer lines by 50 or more years. Manholes will be rehabilitated by application of a corrosion-resistant mortar.

The first step in this process is to assemble a temporary system of pumps and above-ground pipes to redirect the sewer flows around the sewer lines and manholes being rehabilitated. Next, the sewer lines and manholes will be cleaned using special hydraulic cleaning equipment. Once this has been accomplished, liners will be installed in the sewer lines and the manholes will be rehabilitated. To accomplish this work, it will be necessary to access the existing manholes with trucks and equipment. The existing sewer easements, while sufficient for routine maintenance and inspection, do not provide sufficient access, for additional access is needed to perform the above-mentioned sewer rehabilitation work. We are hereby requesting authorization to enter property owned by MCI Worldcom Network Services, Inc. with trucks and construction equipment to perform this work. The proposed access location is identified on the attached map identified as "Exhibit A." Following completion of the proposed sewer system improvements, any disturbed areas will be restored to their previous or better condition.

This letter shall act as your approval for the Town of Cary and/or its contractors to enter upon MCI Worldcom Network Services, Inc. property to complete the above work. By your signature below, you authorize the Town of Cary and/or its contractors to perform the above-referenced construction related activities.

The parcel covered by this Right-of-Entry is identified by Wake County PIN # 0765274411 and is defined in Map Book 1998, Page 1221, Wake County Registry. This Right-of-Entry is temporary and will terminate upon the completion of the work. We anticipate work beginning in late 2020 or early 2021 and taking approximately 18 to 24 months to complete. Any and all improvements made in conjunction with said Right-of-Entry will remain the property of the undersigned.

If you wish to grant the Town the above described Right-of-Entry, please sign where noted below and return to my attention. I can be reached via email at lynn.brilz@townofcary.org or on my personal cell phone at 919-810-0898 if you have any questions or require further information. Thank you for your time and consideration of this request.

Sincerely,

Lynn Brilz, P.E.
Senior Project Manager

Consent and Agreed to:

By: _____ (SEAL)

Title: MGR - GRE Date: 8/21/2020

Enclosure: Exhibit A (Map)