

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION ONE

PROPOSAL

DATE AND TIME OF BID OPENING: FEBRUARY 25, 2015 AT 2:00 P.M.

CONTRACT ID: DA00226

WBS ELEMENT NO.: 17BP.1.R.36

COUNTY: CHOWAN

MILES: 0.08 MILES

ROUTE NO.: SR 1234

LOCATION: 0.37 MILES WEST OF NC 32

TYPE OF WORK: REPLACEMENT OF BRIDGE #34 OVER FILBERTS CREEK

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

THIS IS A STRUCTURE PROJECT.

BID BOND NOT REQUIRED.

NAME OF BIDDER

ADDRESS OF BIDDER

**PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT NO. DA00226 IN CHOWAN COUNTY, NORTH CAROLINA
DATE: JANUARY 28, 2015
DEPARTMENT OF TRANSPORTATION,
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **DA00226**; has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Department of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2012 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **DA00226** in **Chowan County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2012* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer or Division Engineer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

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INSTRUCTIONS TO BIDDERS

**PLEASE READ ALL INSTRUCTIONS CAREFULLY
BEFORE PREPARING AND SUBMITTING YOUR BID.**

All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement may cause the bid to be considered irregular and may be grounds for rejection of the bid.

TRADITIONAL PAPER BIDS:

1. Download the entire proposal from the Connect NCDOT website and return the entire proposal with your bid.
2. All entries on the itemized proposal sheet (bid form) shall be written in ink or typed.
3. The Bidder shall submit a unit price for every item on the itemized proposal sheet. The unit prices for the various contract items shall be written in figures. Unit prices shall be rounded off by the Bidder to contain no more than FOUR decimal places.
4. An amount bid shall be entered on the itemized proposal sheet for every item. The amount bid for each item shall be determined by multiplying each unit bid by the quantity for that item, and shall be written in figures in the "Amount" column of the form.
5. The total amount bid shall be written in figures in the proper place on the bid form. The total amount bid shall be determined by adding the amounts bid for each item.
6. Changes to any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Bidder shall initial the change in ink. Do not use correction fluid, correction tape or similar product to make corrections.
7. The bid shall be properly executed on the included **Execution of Bid – Non-collusion Affidavit, Debarment Certification and Gift Ban Certification** form. All bids shall show the following information:
 - a. Name of corporation, partnership, limited liability company, joint venture, individual or firm, submitting bid.
Corporations that have a corporate seal should include it on the bid.
 - b. Name of individual or representative submitting bid and position or title held on behalf of the bidder.
 - c. Name, signature, and position or title of witness.
 - d. Completed attestation by Notary Public**Note: Signer, Witness and Notary Public must be different individuals.**
8. The bid shall not contain any unauthorized additions, deletions, or conditional bids.
9. The Bidder shall not add any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
10. **11.THE PROPOSAL WITH THE BID SHEET STILL ATTACHED SHALL BE PLACED IN A SEALED ENVELOPE AND SHALL HAVE BEEN DELIVERED TO AND RECEIVED IN THE DIVISION ONE ENGINEER'S OFFICE AT 113 AIRPORT DRIVE, SUITE 100, EDENTON, NC 27932 LOCATED APPROXIMATELY 5 MILES SOUTHEAST OF EDENTON, JUST OFF NC 94 ON AIRPORT DRIVE IN THE NORTHEASTERN REGIONAL AIRPORT BUILDING, BY 2:00 P.M. ON WEDNESDAY, FEBRUARY 25, 2015.**
11. The sealed bid must display the following statement on the front of the sealed envelope:
QUOTATION FOR DA00226 - REPLACEMENT OF BRIDGE #34 OVER FILBERTS CREEK IN CHOWAN COUNTY TO BE OPENED AT 2 P.M. ON WEDNESDAY, FEBRUARY 25, 2015.
12. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope shall be addressed as follows:

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS, DIVISION ONE
ATTN: BARRY HOBBS, P.E.
113 AIRPORT DRIVE, SUITE 100
EDENTON, NC 27932

OPTIONAL COMPUTER BID PREPARATION:

1. All instructions given above for completing and returning TRADITIONAL PAPER BIDS apply, except as modified by the provision "**Computer Bid Preparation (Optional)**", if applicable.
2. Expedite software necessary for electronic bid preparation may be downloaded from the Connect NCDOT website at: <https://connect.ncdot.gov/letting/Pages/EBS-Information.aspx>

PROJECT SPECIAL PROVISIONS

COMPUTER BID PREPARATION (OPTIONAL):

(7-18-11)

102

SPI 1-18

The bidder may elect to prepare his bid and MBE/WBE or DBE participation electronically by means of a personal computer. For electronic bid preparation the Contractor shall download the Expedite program from the NCDOT "Project Letting" website. Then download the appropriate .ebs electronic file of line items and quantities unique to each project from the Division Office's website.

The only entries into the program which will be permitted by the Bidder are the appropriate unit or lump sum prices for those items which must be bid in order to provide a complete bid for the project, and any MBE/WBE or DBE participation in the appropriate section of the Expedite program. When these entries have been made, the program will automatically prepare a complete set of itemized proposal sheets which will include the amount bid for the various items and the total amount bid for the project in addition to the unit or lump sum prices bid. The computer generated itemized proposal sheets shall be printed and signed by a duly authorized representative in accordance with Subarticle 102-8(A)(8). This set of itemized proposal sheets, when submitted together with the appropriate proposal, will constitute the bid and shall be delivered to the appropriate Division Office or location specified in the INSTRUCTIONS TO BIDDERS. If the Bidder submits his bid on computer generated itemized proposal sheets, bid prices shall not be written on the itemized proposal sheets bound in the proposal. The computer generated itemized proposal sheets (.ebs bid file) shall also be copied to a compact disk (CD) furnished by the Contractor and shall be submitted to the Department with the bid.

In the case of a discrepancy between the unit or lump sum prices submitted on the itemized proposal sheets and those contained on the CD furnished by the Contractor, the unit or lump sum prices submitted on the printed and signed itemized proposal sheets shall prevail.

The requirements of the INSTRUCTIONS TO BIDDERS will apply to the preparation of bids except that a bid may be submitted on computer generated itemized proposal sheets in which case the entries on the itemized proposal sheets will not be required to be in ink. Changes to any entry on the computer generated itemized proposal sheets shall be made in accordance with requirement Number (6) of the INSTRUCTIONS TO BIDDERS. When the computer generated itemized proposal sheets are not signed and received with the proposal, the bid will be considered irregular.

CONTRACT TIME AND LIQUIDATED DAMAGES:

The date of availability for this project is May 4, 2015.

The completion date for this contract is the date of acceptance of all erosion control measures in the contract. Liquidated Damages will begin if erosion control items are not accepted within 90 consecutive calendar days following acceptance of roadway and structure items.

The liquidated damages for this contract will be **Five Hundred Dollars (\$500.00)** per calendar day. After award of the project, the Contractor shall notify the Engineer of his expected date for beginning work.

The Contractor may perform work under lane closures in accordance with Standard Drawing 1101.02 during the period May 4, 2015 to June 15, 2015. Road closure may take place on or after June 15, 2015.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

Except for the work required of final establishment of erosion control measures contained in the contract and removal of temporary erosion control measures, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is June 15, 2015.

The completion date for this intermediate contract time is the date of acceptance of all roadway and structure items in the contract. Liquidated Damages will begin if roadway and structure items in the contract are not completed within 110 days from the date construction begins but must be complete no later than October 2, 2015.

The liquidated damages for this intermediate contract time are **Five Hundred Dollars (\$500.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except for the final establishment of erosion control measures and removal of temporary erosion control measures. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway and/or bridge caused by operations performed in final establishment of erosion control measures and removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project. Payment for maintenance and removal of temporary erosion control measures is incidental to the various pay items in the contract. No additional compensation will be made for maintenance and removal of temporary erosion control items.

PROSECUTION OF WORK:

(7-1-95) (Rev. 8-21-12)

108

SP1 G15R

The Contractor will be required to prosecute the work in a continuous and uninterrupted manner from the time he begins the work until completion and final acceptance of the project. The Contractor will not be permitted to suspend his operations except for reasons beyond his control or except where the Engineer has authorized a suspension of the Contractor's operations in writing.

In the event that the Contractor's operations are suspended in violation of the above provisions, the sum of **\$ 250.00** will be charged the Contractor for each and every calendar day that such suspension takes place. The said amount is hereby agreed upon as liquidated damages due to extra engineering and maintenance costs and due to increased public hazard resulting from a suspension of the work. Liquidated damages chargeable due to suspension of the work will be additional to any liquidated damages that may become chargeable due to failure to complete the work on time.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12) (Rev. 10-15-13)

104

SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2012 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed.

The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control, Seeding and Mulching, Repair Seeding, Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation, and Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2012 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

POSTED WEIGHT LIMITS:

(7-1-95) (Rev. 8-21-12)

107

SP1 G24R

The Contractor's attention is directed to the fact that many Primary and Secondary Roads and bridges are posted with weight limits less than the legal limit. Do not exceed the posted weight limits in transporting materials and/or equipment to the projects, unless otherwise indicated below. Make a thorough examination of all projects and haul routes and be prepared to discuss them at the Preconstruction Conference.

NOTE TO CONTRACTOR:

The Contractor must cooperate with State forces working within the limits of this project as directed by the Engineer. The Department reserves the right to make, at any time during the progress of the work, such alterations in plans or the details of construction as may be found necessary or desirable by the Engineer to complete the project. The Contractor shall maintain access to driveways for all residents and property owners throughout the life of the project. The Contractor shall be responsible for maintaining the project as directed by Section 104-10 in the *2012 Standard Specifications*.

The Contractor shall be responsible for returning any disturbed areas back to its original condition. This work may include, but will not be limited to, grading, seeding and mulching, etc. All materials and labor necessary to perform the above mentioned work will be considered incidental to the various contract items and no direct payment will be made for these activities.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of any item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

The Contractor shall note that all steel piles used in the end bents shall be galvanized from the top of the pile to a minimum of 20 feet below the bottom of the end bent cap. Galvanize in accordance with Section 1076 of the Standard Specifications.

Apply an approved epoxy protective coating to the tops of all caps and to the exterior faces of all exterior core slab units. Payment for this work shall be incidental to the contract unit price for Construction of Substructure.

Pavement along the transverse centerline of all caps shall be saw cut to a depth of $\frac{3}{4}$ " \pm , cleaned, and filled with an approved asphalt sealant in accordance with Section 1028 of the Standard Specifications. Payment for this work shall be incidental to the contract unit price for Construction of Superstructure.

SCOPE OF WORK:

Location and Description of Bridge

Bridge No. 34 in Chowan County was built in 1955 and is located on SR 1234 across Filberts Creek and is 0.37 miles west of NC 32. The bridge has an overall length of 20.5 feet and consists of one span, 1 @ 20.5', consisting of 6 lines of 16" I-beams at various centers with reinforced concrete caps, timber piles, and a reinforced concrete floor with no asphalt wearing surface.

Description of Work

This work shall consist of furnishing and installing a prestressed cored slab bridge; removal of the existing structure; clearing and grubbing; excavation and embankment; installation of guardrail, roadway base course and pavement; construction of substructure and superstructure; grading within limits of the project; placement of rip rap; temporary erosion control; seeding and mulching; drainage; traffic control and all other incidental items necessary to complete the project as specified and shown on the plans.

Only control points with a reference station and benchmark location shall be furnished by the Department on an initial one time basis. All other engineering, surveying, layout and measurements shall be the responsibility of the Contractor and shall be in accordance with Section 801 of the 2012 Standard Specifications except that no separate measurement or payment will be made. All costs associated with performing this work will be incidental to the various items in the contract.

CONSTRUCTION MORATORIUM:

There is no moratorium for this project

NO MAJOR CONTRACT ITEMS:

(2-19-02) (Rev. 8-21-07)

104

SP1 G31

None of the items included in this contract will be major items.

SPECIALTY ITEMS:

(7-1-95)(Rev. 1-17-12)

108-6

SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the 2012 Standard Specifications).

Line #	Description
21-22	Guardrail
26	Long-Life Pavement Markings
27-39	Utility Construction
40-63	Erosion Control

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE**(DIVISIONS):**

(10-16-07)(Rev. 12-17-13)

102-15(J)

SP1 G67

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet either the MBE or WBE goal. No submittal of a Letter of Intent is required.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet either the MBE or WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

Contract Goals Requirement - The approved MBE and WBE participation at time of award, but not greater than the advertised contract goals for each.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed MBE and WBE participation along with a listing of the committed MBE and WBE firms.

Manufacturer - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

MBE Goal - A portion of the total contract, expressed as a percentage, that is to be performed by committed MBE subcontractor(s).

Minority Business Enterprise (MBE) - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

WBE Goal - A portion of the total contract, expressed as a percentage, that is to be performed by committed WBE subcontractor(s).

Women Business Enterprise (WBE) - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project.
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

DBE-IS Subcontractor Payment Information - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only.
<http://www.ncdot.org/doh/forms/files/DBE-IS.xls>

RF-1 MBE/WBE Replacement Request Form - Form for replacing a committed MBE or WBE.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>

SAF Subcontract Approval Form - Form required for approval to sublet the contract.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>

JC-1 Joint Check Notification Form - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the amount listed at the time of bid.
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet this MBE and WBE goals. This form is for paper bids only.
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).doc](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).doc)

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.
<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

MBE and WBE Goal

The following goals for participation by Minority Business Enterprises and Women Business Enterprises are established for this contract:

- (A) Minority Business Enterprises **2.0 %**
- (1) *If the MBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above as the MBE goal.
 - (2) *If the MBE goal is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.
- (B) Women Business Enterprises **3.0 %**
- (1) *If the WBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above as the WBE goal.
 - (2) *If the WBE goal is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the MBE and WBE goals respectively. The Directory can be found at the following link. <https://partner.ncdot.gov/VendorDirectory/default.html>

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the MBE goal and the WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

- (A) *If either the MBE or WBE goal is more than zero*,
- (1) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid

to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.

- (2) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.
 - (3) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the corresponding goal.
- (B) *If either the MBE or WBE goal is zero, entries on the Listing of MBE and WBE Subcontractors are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.*

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains MBE and WBE goals, the firm is responsible for meeting the goals or making good faith efforts to meet the goals, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet one of the goals by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goals.

For example, on a proposed contract, the WBE goal is 10%, and the MBE goal is 8%. A WBE bidder puts in a bid where they will perform 40% of the contract work and have a WBE subcontractor which will perform another 5% of the work. Together the two WBE firms submit on the *Listing of MBE and WBE Subcontractors* a value of 45% of the contract which fulfills the WBE goal. The 8% MBE goal shall be obtained through MBE participation with MBE certified subcontractors or documented through a good faith effort. It should be noted that you cannot combine the two goals to meet an overall value. The two goals shall remain separate.

MBE/WBE prime contractors shall also follow Sections A or B listed under *Listing of MBE/WBE Subcontractors* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the MBE and WBE goals of the contract, indicating the bidder's commitment to use the MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the Engineer no later than 12:00 noon of the sixth calendar day following opening of bids, unless the sixth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the MBE and WBE goals, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the MBE/WBE goal. If the lack of this participation drops the commitment below either the MBE or WBE goal, the Contractor shall submit evidence of good faith efforts for the goal not met, completed in its entirety, to the Engineer no later than 12:00 noon of the eighth calendar day following opening of bids, unless the eighth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

Submission of Good Faith Effort

If the bidder fails to meet or exceed either the MBE or the WBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal(s).

One complete set of this information shall be received in the office of the Engineer no later than 12:00 noon of the sixth calendar day following opening of bids, unless the sixth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with MBE/WBE Goals More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

- (B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the MBE and WBE goals will be achieved.
 - (1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
 - (2) Negotiate with subcontractors to assume part of the responsibility to meet the contract MBE/WBE goals when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).
- (C) Providing interested MBEs/WBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
 - (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.
 - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract MBE or WBE goals, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid

opening NCDOT's Business Development Manager in the Business Opportunity and Work Force Development Unit to give notification of the bidder's inability to get MBE or WBE quotes.

- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the MBE and WBE goal.

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the MBE and WBE goals.
- (2) The bidders' past performance in meeting the MBE and WBE goals.
- (3) The performance of other bidders in meeting the MBE and WBE goals. For example, when the apparent successful bidder fails to meet the goals, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goals. If the apparent successful bidder fails to meet the MBE and WBE goals, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the MBE and WBE goals can be met or that an adequate good faith effort has been made to meet the MBE and WBE goals.

Non-Good Faith Appeal

The Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the Engineer. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting MBE/WBE Participation Toward Meeting MBE/WBE Goals

- (A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

- (B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the MBE contract goal requirement. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE subcontracts to a non-MBE firm does not count toward the MBE contract goal requirement. Again, the same holds true for the work that a WBE subcontracts to a non-WBE firm. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function. The MBE/WBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption may be subject to review by the Office of Inspector General, NCDOT.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

A contractor may count toward its MBE or WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its MBE or WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers or regular dealers:

- (1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.
- (2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function**(A) MBE/WBE Utilization**

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

- (1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the MBE or WBE goal.
- (2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the goal requirement. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime liable for meeting the goal.
- (5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE

subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

- (6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE firm (or an approved substitute MBE or WBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate. A MBE/WBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination.

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 (*Replacement Request*). If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE is terminated for good cause as stated above, an additional MBE that was submitted at the time of bid may be used to fulfill the MBE commitment. The same holds true if a committed WBE is terminated for good cause, an additional WBE that was submitted at the time of bid may be used to fulfill the WBE goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBEs/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to MBEs/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with MBEs/WBEs for specific subbids including, at a minimum:

- (a) The names, addresses, and telephone numbers of MBEs/WBEs who were contacted.
 - (b) A description of the information provided to MBEs/WBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why MBE/WBE quotes were not accepted.
 - (4) Efforts made to assist the MBEs/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.
- (B) Decertification Replacement
- (1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
 - (2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another similarly certified MBE/WBE subcontractor to perform at least the same amount of work to meet the MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE and WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for further work on future projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments on the Department's DBE-IS (*Subcontractor Payment Information*) with each invoice. Invoices will not be processed for payment until the DBE-IS is received.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2012 Standard Specifications* may be cause to disqualify the Contractor.

SUBSURFACE INFORMATION:

(7-1-95)

450

SP1 G112 C

Subsurface information is available on the structure portion of this project only.

LOCATING EXISTING UNDERGROUND UTILITIES:

(3-20-12)

105

SP1 G115

Revise the *2012 Standard Specifications* as follows:

Page 1-43, Article 105-8, line 28, after the first sentence, add the following:

Identify excavation locations by means of pre-marking with white paint, flags, or stakes or provide a specific written description of the location in the locate request.

RESOURCE CONSERVATION:

(5-21-13)

104-13

SP1 G118

In accordance with North Carolina Executive Order 156, NCGS 130A-309.14(2), and NCGS 136-28.8, it is the policy of the Department to aid in the reduction of materials that become a part of our solid waste stream, to divert materials from landfills, and to find ways to recycle and reuse materials for the benefit of the Citizens of North Carolina.

Initiate, develop and use products and construction methods that incorporate the use of recycled or solid waste products in accordance with Article 104-13 of the *2012 Standard Specifications*. Report the quantities of reused or recycled materials either incorporated in the project or diverted from landfills on the Project Construction Reuse and Recycling Reporting Form.

A location-based tool for finding local recycling facilities and the Project Construction Reuse and Recycling Reporting Form are available at:

<http://connect.ncdot.gov/resources/Environmental/Pages/North-Carolina-Recycling-Locations.aspx>

DOMESTIC STEEL:

(4-16-13)

106

SP1 G120

Revise the *2012 Standard Specifications* as follows:

Page 1-49, Subarticle 106-1(B) Domestic Steel, lines 2-7, replace the first paragraph with the following:

All steel and iron products that are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined material cost of the items involved does not exceed 0.1% of the total amount bid for the entire project or \$2,500, whichever is greater. If invoices showing the cost of the material are not provided, the amount of the bid item involving the foreign material will be used for calculations. This minimal amount of foreign produced steel and iron products permitted for use is not applicable to high strength fasteners. Domestically produced high strength fasteners are required.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2012 Standard Specifications* as follows:

Page 1-35, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-35, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.*

Page 1-35, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

TWELVE MONTH GUARANTEE:

(7-15-03)

108

SP1 G145

(A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to

force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06)

SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

GIFTS FROM VENDORS AND CONTRACTORS:

(12-15-09)

107-1

SP1 G152

By Executive Order 24, issued by Governor Perdue, and *N.C.G.S. § 133-32*, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e. Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor). This prohibition covers those vendors and contractors who:

- (A) Have a contract with a governmental agency; or
- (B) Have performed under such a contract within the past year; or
- (C) Anticipate bidding on such a contract in the future.

For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review Executive Order 24 and *N.C.G.S. § 133-32*.

Executive Order 24 also encouraged and invited other State Agencies to implement the requirements and prohibitions of the Executive Order to their agencies. Vendors and contractors should contact other State Agencies to determine if those agencies have adopted Executive Order 24.

LIABILITY INSURANCE:

(5-20-14)

SP1 G160

Revise the *2012 Standard Specifications* as follows:

Page 1-60, Article 107-15 LIABILITY INSURANCE, line 16, add the following as the second sentence of the third paragraph:

Prior to beginning services, all contractors shall provide proof of coverage issued by a workers' compensation insurance carrier, or a certificate of compliance issued by the Department of Insurance for self-insured subcontractors, irrespective of whether having regularly in service fewer than three employees.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 9-18-12)

105-16, 225-2, 16

SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

- (A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.
- (B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.
- (C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.
- (D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project

within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:

- (1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
 - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
 - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
 - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
 - (d) Implement the erosion and sediment control/stormwater site plans requested.
 - (e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
 - (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
 - (g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
 - (h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
 - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
 - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
 - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
- (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:
 - (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

- (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days, twice weekly for construction related *Federal Clean Water Act, Section 303(d)* impaired streams with turbidity violations, and within 24 hours after a significant rainfall event of 0.5 inch that occurs within a 24 hour period.
- (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
- (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
- (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
- (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
- (g) Provide secondary containment for bulk storage of liquid materials.
- (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
- (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
 - (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
 - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
 - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
 - (d) Conduct the inspections required by the NPDES permit.
 - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
 - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
 - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
 - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
 - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:
 - (1) Foreman in charge of grading activities
 - (2) Foreman in charge of bridge or culvert construction over jurisdictional areas

(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

- (1) Seeding and Mulching
- (2) Temporary Seeding
- (3) Temporary Mulching
- (4) Sodding
- (5) Silt fence or other perimeter erosion/sediment control device installations
- (6) Erosion control blanket installation
- (7) Hydraulic tackifier installation
- (8) Turbidity curtain installation
- (9) Rock ditch check/sediment dam installation
- (10) Ditch liner/matting installation
- (11) Inlet protection
- (12) Riprap placement
- (13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
- (14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III-B Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III-A Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV),* or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

- (A) Failure to adequately perform the duties as defined within this certification provision.
- (B) Issuance of an ICA, NOV, or Cease and Desist Order.
- (C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
- (D) Demonstration of erroneous documentation or reporting techniques.
- (E) Cheating or copying another candidate's work on an examination.
- (F) Intentional falsification of records.
- (G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
- (H) Dismissal from a company for any of the above reasons.
- (I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and *Certified Designer* will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 3-19-13)

105-16, 230, 801

SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

- (A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or
- (B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.
- (C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.
- (D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2012 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the

Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix*, available at http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

EMPLOYMENT:

(11-15-11) (Rev. 1-17-12)

108, 102

SP1 G184

Revise the *2012 Standard Specifications* as follows:

Page 1-20, Subarticle 102-15(O), delete and replace with the following:

(O) Failure to restrict a former Department employee as prohibited by Article 108-5.

Page 1-65, Article 108-5 Character of Workmen, Methods, and Equipment, line 32, delete all of line 32, the first sentence of the second paragraph and the first word of the second sentence of the second paragraph.

STATE HIGHWAY ADMINISTRATOR TITLE CHANGE:

(9-18-12)

SP1 G185

Revise the *2012 Standard Specifications* as follows:

Replace all references to "State Highway Administrator" with "Chief Engineer".

SUBLETTING OF CONTRACT:

(11-18-2014)

108-6

SP1 G186

Revise the *2012 Standard Specifications* as follows:

Page 1-66, Article 108-6 Subletting of Contract, line 37, add the following as the second sentence of the first paragraph:

All requests to sublet work shall be submitted within 30 days of the date of availability or prior to expiration of 20% of the contract time, whichever date is later, unless otherwise approved by the Engineer.

Page 1-67, Article 108-6 Subletting of Contract, line 7, add the following as the second sentence of the fourth paragraph:

Purchasing materials for subcontractors is not included in the percentage of work required to be performed by the Contractor. If the Contractor sublets items of work but elects to purchase material for the subcontractor, the value of the material purchased will be included in the total dollar amount considered to have been sublet.

ROADWAY SPECIAL PROVISIONS

CLEARING AND GRUBBING - METHOD II MODIFIED:

Perform clearing on this project to the limits established by Method “II” shown on Standard Drawing No. 200.02 of the *2012 Roadway Standard Drawings*. Clearing will be performed five (5’) feet from toe of slope with no grubbing. This is to allow for the installation of erosion control features.

Payment for “Clearing and Grubbing” will be included at the lump sum bid price For “Excavation and Embankment”. This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

PIPE INSTALLATION:

(11-20-12) 300 SP3 R01

Revise the *2012 Standard Specifications* as follows:

Page 3-1, Article 300-2, Materials, line 23-24, replace sentence with:

Provide foundation conditioning geotextile in accordance with Section 1056 for Type 4 geotextile.

BRIDGE APPROACH FILLS:

(10-19-10) (Rev. 1-17-12) 422 SP4 R02

Description

Bridge approach fills include bridge approach fills for sub regional tier bridges and reinforced bridge approach fills. Construct bridge approach fills in accordance with the contract and Standard Drawing No. 422.10 or 422.11 of the *2012 Roadway Standard Drawings*. Define “geosynthetics” as geotextiles or geomembranes.

Materials

Refer to Division 10 of the *2012 Standard Specifications*.

Item	Section
Anchor Pins	1056-2
Geotextiles	1056
Portland Cement Concrete	1000
Select Material	1016
Subsurface Drainage Materials	1044
Wire Staples	1060-8(D)

For bridge approach fills for sub regional tier bridges, provide Type 1 geotextile for filtration geotextiles. For reinforced bridge approach fills, provide Type 5 geotextile for geotextile reinforcement and Type 1 geotextile and No. 78M stone for drains. Use Class B concrete for concrete pads.

Use Class III or V select material for reinforced bridge approach fills and only Class V select

material (standard size No. 78M stone) for bridge approach fills for sub regional tier bridges. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For drains and PVC pipes behind end bents, use pipes with perforations that meet AASHTO M 278.

Use PVC, HDPE or linear low density polyethylene (LLDPE) geomembranes for reinforced bridge approach fills. For PVC geomembranes, provide grade PVC30 geomembranes that meet ASTM D7176. For HDPE and LLDPE geomembranes, use geomembranes with a nominal thickness of at least 30 mils that meet Geosynthetic Research Institute Standard Specifications GM13 or GM17, respectively. Handle and store geomembranes in accordance with Article 1056-2 of the *2012 Standard Specifications*. Provide material certifications for geomembranes in accordance with Article 1056-3 of the *2012 Standard Specifications*.

Construction Methods

Excavate as necessary for bridge approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geomembranes or filtration geotextiles until excavation dimensions and foundation material are approved. Attach geomembranes and filtration geotextiles to end bent cap back and wing walls with adhesives, tapes or other approved methods. Glue or weld geomembrane seams to prevent leakage.

For reinforced bridge approach fills, place geotextile reinforcement within 3" of locations shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and in slight tension free of kinks, folds, wrinkles or creases. Install geotextile reinforcement with the orientation, dimensions and number of layers shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. Place first layer of geotextile reinforcement directly on geomembranes with no void or material in between. Install geotextile reinforcement with the machine direction (MD) parallel to the roadway centerline. The MD is the direction of the length or long dimension of the geotextile roll. Do not splice or overlap geotextile reinforcement in the MD so seams are perpendicular to the roadway centerline. Wrap geotextile reinforcement at end bent cap back and wing walls as shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and directed by the Engineer. Extend geotextile reinforcement at least 4 ft back behind end bent cap back and wing walls into select material.

Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geosynthetics.

For reinforced bridge approach fills, construct one foot square drains consisting of 4" diameter continuous perforated PVC pipes surrounded by No. 78M stone wrapped in Type 1 geotextiles. Install drains in accordance with Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. For bridge approach fills for sub regional tier bridges, install 4" diameter continuous perforated PVC drain pipes in accordance with Standard Drawing No. 422.11 of the *2012 Roadway Standard Drawings*.

Use solvent cement to connect PVC pipes so joints do not leak. Connect perforated pipes to outlet pipes just behind wing walls. Provide drain pipes and drains with positive drainage towards outlets. Place pipe sleeves in or under wing walls for outlet pipes so positive drainage is

maintained. Use sleeves that can withstand wing wall loads.

Place select material in 8" to 10" thick lifts. Use only hand operated compaction equipment to compact select material for bridge approach fills. Compact Class III select material in accordance with Subarticle 235-3(C) of the *2012 Standard Specifications*. Compact No. 78M stone with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, drain pipes or drains when placing and compacting select material. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics, drain pipes or drains until they are covered with at least 8" of select material. Replace any damaged geosynthetics, drain pipes or drains to the satisfaction of the Engineer.

Cover open ends of outlet pipes with rodent screens as shown in Standard Drawing No. 815.03 of the *2012 Roadway Standard Drawings*. Connect ends of outlet pipes to concrete pads or existing drainage structures as directed by the Engineer. Construct concrete pads with an Ordinary surface finish that meets Subarticle 825-6(B) of the *2012 Standard Specifications*.

Measurement and Payment

Reinforced Bridge Approach Fill, Station ____ will be paid at the contract lump sum price. The contract lump sum price for *Reinforced Bridge Approach Fill, Station ____* will be full compensation for labor, tools, equipment and reinforced bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting select material, connecting outlet pipes to existing drainage structures and supplying select materials, geosynthetics, drains, pipe sleeves and outlet components and any incidentals necessary to construct all reinforced bridge approach fills at each bridge.

Bridge Approach Fill - Sub Regional Tier, Station ____ will be paid at the contract lump sum price. The contract lump sum price for *Bridge Approach Fill - Sub Regional Tier, Station ____* will be full compensation for labor, tools, equipment and bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting No. 78M stone, connecting outlet pipes to existing drainage structures and supplying No. 78M stone, filtration geotextiles, drain pipes, pipe sleeves and outlet components and any incidentals necessary to construct all bridge approach fills at each sub regional tier bridge.

Payment will be made under:

Pay Item	Pay Unit
Reinforced Bridge Approach Fill, Station ____	Lump Sum
Bridge Approach Fill - Sub Regional Tier, Station ____	Lump Sum

ASPHALT PAVEMENTS - SUPERPAVE:

(6-19-12) (Rev. 10-21-14)

605, 609, 610, 650, 660

SP6 R01

Revise the *2012 Standard Specifications* as follows:

Page 6-3, Article 605-7 APPLICATION RATES AND TEMPERATURES, replace this article, including Table 601-1, with the following:

Apply tack coat uniformly across the existing surface at target application rates shown in Table 605-1.

TABLE 605-1 APPLICATION RATES FOR TACK COAT	
Existing Surface	Target Rate (gal/sy)
	Emulsified Asphalt
New Asphalt	0.04 ± 0.01
Oxidized or Milled Asphalt	0.06 ± 0.01
Concrete	0.08 ± 0.01

Apply tack coat at a temperature within the ranges shown in Table 605-2. Tack coat shall not be overheated during storage, transport or at application.

TABLE 605-2 APPLICATION TEMPERATURE FOR TACK COAT	
Asphalt Material	Temperature Range
Asphalt Binder, Grade PG 64-22	350 - 400°F
Emulsified Asphalt, Grade RS-1H	130 - 160°F
Emulsified Asphalt, Grade CRS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-1H	130 - 160°F
Emulsified Asphalt, Grade HFMS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-2	130 - 160°F

Page 6-7, Article 609-3 FIELD VERIFICATION OF MIXTURE AND JOB MIX FORMULA ADJUSTMENTS, lines 35-37, delete the second sentence of the second paragraph.

Page 6-18, Article 610-1 DESCRIPTION, lines 40-41, delete the last sentence of the last paragraph.

Page 6-19, Subarticle 610-3(A) Mix Design-General, line 5, add the following as the first paragraph:

Warm mix asphalt (WMA) is allowed for use at the Contractor's option in accordance with the NCDOT Approved Products List for WMA Technologies available at:

<https://connect.ncdot.gov/resources/Materials/MaterialsResources/Warm%20Mix%20Asphalt%20Approved%20List.pdf>

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), replace Table 610-1 with the following:

TABLE 610-1 DESIGN MIXING TEMPERATURE AT THE ASPHALT PLANT ^A		
Binder Grade	HMA JMF Temperature	WMA JMF Temperature Range
PG 64-22	300°F	225 - 275°F
PG 70-22	315°F	240 - 290°F
PG 76-22	335°F	260 - 310°F

- A. The mix temperature, when checked in the truck at the roadway, shall be within plus 15° and minus 25° of the temperature specified on the JMF.

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), lines 4-6, delete first sentence of the second paragraph. Line 7, in the second sentence of the second paragraph, replace “275°F” with “275°F or greater.”

Page 6-22, Article 610-4 WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, lines 15-17, replace the second sentence of the first paragraph with the following:

Do not place asphalt material when the air or surface temperatures, measured at the location of the paving operation away from artificial heat, do not meet Table 610-5.

Page 6-23, Article 610-4 WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, replace Table 610-5 with the following:

TABLE 610-5 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0B, C	35°F
I19.0B, C, D	35°F
SF9.5A, S9.5B	40°F ^A
S9.5C, S12.5C	45°F ^A
S9.5D, S12.5D	50°F

- A. For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-26, Article 610-7 HAULING OF ASPHALT MIXTURE, lines 22-23, in the fourth sentence of the first paragraph replace “so as to overlap the top of the truck bed and” with “to”.

Page 6-41, Subarticle 650-3(B) Mix Design Criteria, replace Table 650-1 with the following:

TABLE 650-1 OGAFC GRADATION CRITERIA			
<i>Sieve Size (mm)</i>	<i>Type FC-1</i>	<i>Type FC-1 Modified</i>	<i>Type FC-2 Modified</i>
19.0	-	-	100
12.5	100	100	80 - 100
9.50	75 - 100	75 - 100	55 - 80
4.75	25 - 45	25 - 45	15 - 30
2.36	5 - 15	5 - 15	5 - 15
0.075	1.0 - 3.0	1.0 - 3.0	2.0 - 4.0

Page 6-50, Table 660-1 MATERIAL APPLICATION RATES AND TEMPERATURES, lines 1-2, replace Note A in Table 660-1 with the following:

- A. Use No. 6M, No. 67, No. 5 and No. 78M aggregate for retreatment before an asphalt overlay on existing pavement based on the width of the cracks in the existing pavement. Choose No. 78M for sections of roadway where the average width of existing cracks is 1/4" or less in width, No. 67 for sections of roadway where the average width of existing cracks are 1/4" to 5/8" in width and choose No. 5 for sections of roadway where the existing crack widths are greater than 5/8".

SHOULDER WEDGE:

(9-20-11) (Rev. 8-21-12)

610

SP6 R03R

Revise the 2012 Standard Specifications as follows:

Page 6-26, Article 610-8, add the following after line 43:

Attach a device, mounted on screed of paving equipment, capable of constructing a shoulder wedge with an angle of 30 degrees plus or minus 4 degrees along the outside edge of the roadway, measured from the horizontal plane in place after final compaction on the final surface course. Use an approved mechanical device which will form the asphalt mixture to produce a wedge with uniform texture, shape and density while automatically adjusting to varying heights.

Payment for use of this device will be incidental to the other pay items in the contract.

ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:

(11-21-00) (Rev. 7-17-12)

609

SP6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0__	4.4%
Asphalt Concrete Intermediate Course	Type I 19.0__	4.8%
Asphalt Concrete Surface Course	Type S 4.75A	6.8%
Asphalt Concrete Surface Course	Type SA-1	6.8%
Asphalt Concrete Surface Course	Type SF 9.5A	6.7%
Asphalt Concrete Surface Course	Type S 9.5__	6.0%
Asphalt Concrete Surface Course	Type S 12.5__	5.6%

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the 2012 Standard Specifications.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00)

620

SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2012 Standard Specifications*.

The base price index for asphalt binder for plant mix is \$ **578.85** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **January 1, 2015**.

ASPHALT PLANT MIXTURES:

(7-1-95)

609

SP6 R20

Place asphalt concrete base course material in trench sections with asphalt pavement spreaders made for the purpose or with other equipment approved by the Engineer.

FINAL SURFACE TESTING NOT REQUIRED:

(5-18-04) (Rev. 5-15-12)

610

SP6 R45

Final surface testing is not required on this project.

ASPHALT CONCRETE SURFACE COURSE COMPACTION:

(7-1-95) (Rev. 8-21-12)

SP6 R49R

Compact the asphalt surface course on this project in accordance with Subarticle 610-9 of the *2012 Standard Specifications* and the following provision:

Perform the first rolling with a steel wheel roller followed by rolling with a self-propelled pneumatic tired roller with the final rolling by a steel wheel roller.

PAVING INTERSECTIONS:

(7-1-95) (Rev. 8-21-12)

610

SP6 R67BR

Condition, prime, and surface all unpaved intersections back from the edge of the pavement on the main line of the project a minimum distance of 50 feet. The pavement placed in the intersections shall be of the same material and thickness placed on the mainline of the project.

Resurface all paved intersections back to the ends of the radii, or as directed by the Engineer.

Widen the pavement on curves as directed by the Engineer.

PAVING DRIVEWAYS AND MAILBOX TURNOUTS:

(8-21-12)

610

SP6 R70BR

Condition, prime, and surface all driveway and mailbox turnouts as directed by the Engineer.

Place pavement on driveway and mailbox turnouts of the same material as used on the main line and in depths directed by the Engineer. Widen the pavement on curves as directed by the Engineer.

GUARDRAIL ANCHOR UNITS, TYPE 350:

(4-20-04) (Rev. 8-16-11)

862

SP8 R65

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2012 Standard Specifications*, and at locations shown in the plans.

Materials

The Contractor may at his option, furnish any one of the guardrail anchor units or approved equal.

Guardrail anchor unit (ET-Plus) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Spring, Texas 79720
Telephone: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2012 Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2012 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item

Guardrail Anchor Units, Type 350

Pay Unit

Each

MATERIALS:

(2-21-12) (Rev. 3-17-15)

1000, 1002, 1005, 1024, 1050, 1056, 1074, 1078, 1080, 1081, 1086, 1084, 1087, 1092

SP10 R01

Revise the 2012 Standard Specifications as follows:

Page 10-1, Article 1000-1, DESCRIPTION, lines 9-10, replace the last sentence of the first paragraph with the following:

Type IL, IP, IS or IT blended cement may be used instead of Portland cement.

Page 10-1, Article 1000-1, DESCRIPTION, line 14, add the following:

Use materials which do not produce a mottled appearance through rusting or other staining of the finished concrete surface.

Page 10-5, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1 REQUIREMENTS FOR CONCRETE											
Class of Concrete	Min. Comp. Strength at 28 days	Maximum Water-Cement Ratio				Consistency Max. Slump		Cement Content			
		Air-Entrained Concrete		Non Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	psi					inch	inch	lb/cy	lb/cy	lb/cy	lb/cy
AA	4,500	0.381	0.426	-	-	3.5	-	639	715	-	-
AA Slip Form	4,500	0.381	0.426	-	-	1.5	-	639	715	-	-
Drilled Pier	4,500	-	-	0.450	0.450	-	5-7 dry 7-9 wet	-	-	640	800
A	3,000	0.488	0.532	0.550	0.594	3.5	4	564	-	602	-
B	2,500	0.488	0.567	0.559	0.630	1.5 machine-placed 2.5 hand-placed	4	508	-	545	-
Sand Light-weight	4,500	-	0.420	-	-	4	-	715	-	-	-
Latex Modified	3,000 7 day	0.400	0.400	-	-	6	-	658	-	-	-
Flowable Fill excavatable	150 max. at 56 days	as needed	as needed	as needed	as needed	-	Flow-able	-	-	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	-	Flow-able	-	-	100	as needed
Pavement	4,500 design, field 650 flexural, design only	0.559	0.559	-	-	1.5 slip form 3.0 hand place	-	526	-	-	-
Precast	See Table 1077-1	as needed	as needed	-	-	6	as needed	as needed	as needed	as needed	as needed
Prestress	per contract	See Table 1078-1	See Table 1078-1	-	-	8	-	564	as needed	-	-

Page 10-1, Article 1000-2, MATERIALS, line 16; Page 10-8, Subarticle 1000-7(A), MATERIALS, line 8; and Page 10-18, Article 1002-2, MATERIALS, line 9, add the following to the table of item references:

Item	Section
Type IL Blended Cement	1024-1

Page 10-7, Table 1000-3, MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO, replace with the following:

TABLE 1000-3		
MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO		
Class of Concrete	Rounded Aggregate	Angular Aggregate
AA and AA Slip Form	.366	.410
A	.469	.512
B	.469	.545
Pavement	.538	.538

Page 10-7, Article 1000-5, HIGH EARLY STRENGTH PORTLAND CEMENT CONCRETE, lines 30-31, delete the second sentence of the third paragraph.

Page 10-23, Table 1005-1, AGGREGATE GRADATION-COARSE AGGREGATE, replace with the following:

TABLE 1005-1 AGGREGATE GRADATION - COARSE AGGREGATE													
Percentage of Total by Weight Passing													
Std. Size #	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#40	#200	Remarks
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A	Asphalt Plant Mix
467M	100	95-100	-	35-70	-	0-30	0-5	-	-	-	-	A	Asphalt Plant Mix
5	-	100	90-100	20-55	0-10	0-5	-	-	-	-	-	A	AST, Sediment Control Stone
57	-	100	95-100	-	25-60	-	0-10	0-5	-	-	-	A	AST, Str. Concrete, Shoulder Drain, Sediment Control Stone
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A	AST, Concrete Pavement
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A	AST
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A	AST, Str. Concrete, Asphalt Plant Mix
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A	Asphalt Plant Mix, AST, Str. Conc, Weep Hole Drains
14M	-	-	-	-	-	100	35-70	5-20	-	0-8	-	A	Asphalt Plant Mix, AST, Weep Hole Drains, Str. Concrete
9	-	-	-	-	-	100	85-100	10-40	-	0-10	-	A	AST
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12 ^B	Aggregate Base Course, Aggregate Stabilization
ABC (M)	-	100	75-100	-	45-79	-	20-40	-	0-25	-	-	0-12 ^B	Maintenance Stabilization
Light-weight C	-	-	-	-	100	80-100	5-40	0-20	-	0-10	-	0-2.5	AST

A. See Subarticle 1005-4(A).

B. See Subarticle 1005-4(B).

C. For Lightweight Aggregate used in Structural Concrete, see Subarticle 1014-2(E)(6).

Page 10-46, Article 1024-1, PORTLAND CEMENT, line 33, add the following as the ninth paragraph:

Use Type IL blended cement that meets AASHTO M 240, except that the limestone content is limited to between 5 and 12% by weight and the constituents shall be interground. Class F fly ash can replace a portion of Type IL blended cement and shall be replaced as outlined in Subarticle 1000-4(I) for Portland cement. For mixes that contain cement with alkali content between 0.6% and 1.0% and for mixes that contain a reactive aggregate documented by the Department, use a pozzolan in the amount shown in Table 1024-1.

Page 10-47, Subarticle 1024-3(B), Approved Sources, lines 16-18, replace the second sentence of the second paragraph with the following:

Tests shall be performed by AASHTO's designated National Transportation Product Evaluation Program (NTPEP) laboratory for concrete admixture testing.

Page 10-65, Article 1050-1, GENERAL, line 41, replace the first sentence with the following:

All fencing material and accessories shall meet Section 106.

Page 10-73, Article 1056-1 DESCRIPTION, lines 7-8, delete the first sentence of the second paragraph and replace with the following:

Use geotextile fabrics that are on the NCDOT Approved Products List.

Page 10-73, Article 1056-2 HANDLING AND STORING, line 17, replace "mechanically stabilized earth (MSE) wall faces" with "temporary wall faces".

Page 10-74, TABLE 1056-1 GEOTEXTILE REQUIREMENTS, replace table with the following:

TABLE 1056-1 GEOTEXTILE REQUIREMENTS						
Property	Requirement (MARV ^A)					Test Method
	Type 1	Type 2	Type 3 ^B	Type 4	Type 5 ^C	
Typical Application	Shoulder Drains	Under Rip Rap	Temporary Silt Fence	Soil Stabilization	Temporary Walls	
Elongation (MD & CD)	≥ 50%	≥ 50%	≤ 25%	< 50%	< 50%	ASTM D4632
Grab Strength (MD & CD)	Table 1 ^D , Class 3	Table 1 ^D , Class 1	100 lb	Table 1 ^D , Class 3	-	ASTM D4632
Tear Strength (MD & CD)			-		-	ASTM D4533
Puncture Strength			-		-	ASTM D6241
Ultimate Tensile Strength (MD & CD)	-	-	-	-	2,400 lb/ft (unless required otherwise in the contract)	ASTM D4595
Permittivity	Table 2 ^D , 15% to 50% <i>in Situ</i> Soil Passing No. 200 ^E		Table 7 ^D	Table 5 ^D	0.20 sec ⁻¹	ASTM D4491
Apparent Opening Size					No. 30 ^E	ASTM D4751
UV Stability (Retained Strength)					70%	ASTM D4355

- A. MARV does not apply to elongation
- B. Minimum roll width of 36" required
- C. Minimum roll width of 13 ft required
- D. AASHTO M 288
- E. US Sieve No. per AASHTO M 92

Page 10-115, Subarticle 1074-7(B), Gray Iron Castings, lines 10-11, replace with the first two sentences with the following:

Supply gray iron castings meeting all facets of AASHTO M 306 excluding proof load. Proof load testing will only be required for new casting designs during the design process, and conformance to M306 loading (40,000 lbs.) will be required only when noted on the design documents.

Page 10-126, Table 1078-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1078-1 REQUIREMENTS FOR CONCRETE		
Property	28 Day Design Compressive Strength 6,000 psi or less	28 Day Design Compressive Strength greater than 6,000 psi
Maximum Water/Cementitious Material Ratio	0.45	0.40
Maximum Slump without HRWR	3.5"	3.5"
Maximum Slump with HRWR	8"	8"
Air Content (upon discharge into forms)	5 + 2%	5 + 2%

Page 10-151, Article 1080-4 Inspection and Sampling, lines 18-22, replace (B), (C) and (D) with the following:

- (B) At least 3 panels prepared as specified in 5.5.10 of AASHTO M 300, Bullet Hole Immersion Test.
- (C) At least 3 panels of 4"x6"x1/4" for the Elcometer Adhesion Pull Off Test, ASTM D4541.
- (D) A certified test report from an approved independent testing laboratory for the Salt Fog Resistance Test, Cyclic Weathering Resistance Test, and Bullet Hole Immersion Test as specified in AASHTO M 300.
- (E) A certified test report from an approved independent testing laboratory that the product has been tested for slip coefficient and meets AASHTO M253, Class B.

Page 10-161, Subarticle 1081-1(A) Classifications, lines 29-33, delete first 3 sentences of the description for Type 2 and replace with the following:

Type 2 - A low-modulus, general-purpose adhesive used in epoxy mortar repairs. It may be used to patch spalled, cracked or broken concrete where vibration, shock or expansion and contraction are expected.

Page 10-162, Subarticle 1081-1(A) Classifications, lines 4-7, delete the second and third sentences of the description for Type 3A. Lines 16-22, delete Types 6A, 6B and 6C.

Page 10-162, Subarticle 1081-1(B) Requirements, lines 26-30, replace the second paragraph with the following:

For epoxy resin systems used for embedding dowel bars, threaded rods, rebar, anchor bolts and other fixtures in hardened concrete, the manufacturer shall submit test results showing that the bonding system will obtain 125% of the specified required yield strength of the fixture. Furnish certification that, for the particular bolt grade, diameter and embedment depth required, the anchor system will not fail by adhesive failure and that there is no movement of the anchor bolt.

For certification and anchorage, use 3,000 psi as the minimum Portland cement concrete compressive strength used in this test. Use adhesives that meet Section 1081.

List the properties of the adhesive on the container and include density, minimum and maximum temperature application, setting time, shelf life, pot life, shear strength and compressive strength.

Page 10-163, Table 1081-1 Properties of Mixed Epoxy Resin Systems, replace table with the following:

TABLE 1081-1 PROPERTIES OF MIXED EPOXY RESIN SYSTEMS							
Property	Type 1	Type 2	Type 3	Type 3A	Type 4A	Type 4B	Type 5
Viscosity-Poises at 77°F ± 2°F	Gel	10-30	25-75	Gel	40-150	40-150	1-6
Spindle No.	-	3	4	--	4	4	2
Speed (RPM)	-	20	20	--	10	10	50
Pot Life (Minutes)	20-50	30-60	20-50	5-50	40-80	40-80	20-60
Minimum Tensile Strength at 7 days (psi)	1,500	2,000	4,000	4,000	1,500	1,500	4,000
Tensile Elongation at 7 days (%)	30 min.	30 min.	2-5	2-5	5-15	5-15	2-5
Min. Compressive Strength of 2" mortar cubes at 24 hours	3,000 (Neat)	4,000-	6,000-	6,000 (Neat)	3,000	3,000	6,000
Min. Compressive Strength of 2" mortar cubes at 7 days	5,000 (Neat)	-	-	-	-	5,000	-
Maximum Water Absorption (%)	1.5	1.0	1.0	1.5	1.0	1.0	1.0
Min. Bond Strength Slant Shear Test at 14 days (psi)	1,500	1,500	2,000	2,000	1,500	1,500	1,500

Page 10-164, Subarticle 1081-1(E) Prequalification, lines 31-33, replace the second sentence of the first paragraph with the following:

Manufacturers choosing to supply material for Department jobs must submit an application through the Value Management Unit with the following information for each type and brand name:

Page 10-164, Subarticle 1081-1(E)(3), line 37, replace this subarticle with the following:

(3) Type of the material in accordance with Articles 1081-1 and 1081-4,

Page 10-165, Subarticle 1081-1(E)(6), line 1, in the first sentence of the first paragraph replace “AASHTO M 237” with “the specifications”.

Page 10-165, Subarticle 1081-1(E) Prequalification, line 9-10, delete the second sentence of the last paragraph.

Page 10-165, Subarticle 1081-1(F) Acceptance, line 14, in the first sentence of the first paragraph replace “Type 1” with “Type 3”.

Page 10-169, Subarticle 1081-3(G) Anchor Bolt Adhesives, delete this subarticle.

Page 10-170, Article 1081-3 Hot Bitumen, line 9, add the following at the end of Section 1081:

1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS

(A) General

This section covers epoxy resin adhesive for bonding traffic markers to pavement surfaces.

(B) Classification

The types of epoxies and their uses are as shown below:

Type I – Rapid Setting, High Viscosity, Epoxy Adhesive. This type of adhesive provides rapid adherence to traffic markers to the surface of pavement.

Type II – Standard Setting, High Viscosity, Epoxy Adhesive. This type of adhesive is recommended for adherence of traffic markers to pavement surfaces when rapid set is not required.

Type III – Rapid Setting, Low Viscosity, Water Resistant, Epoxy Adhesive. This type of rapid setting adhesive, due to its low viscosity, is appropriate only for use with embedded traffic markers.

Type IV – Standard Set Epoxy for Blade Deflecting-Type Plowable Markers.

(C) Requirements

Epoxies shall conform to the requirements set forth in AASHTO M 237.

(D) Prequalification

Refer to Subarticle 1081-1(E).

(E) Acceptance

Refer to Subarticle 1081-1(F).

Page 10-173, Article 1084-2 STEEL SHEET PILES, lines 37-38, replace first paragraph with the following:

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Metallized sheet piles shall be metallized in accordance to the Project Special Provision “Thermal Sprayed Coatings (Metallization)” with an 8 mil, 99.9% aluminum alloy coating and a 0.5 mil seal coating. Any portion of the metallized sheet piling encased in concrete shall receive a barrier coat. The barrier coat shall be an approved waterborne coating with a low-viscosity which readily absorbs into the pores of the aluminum thermal sprayed coating. The waterborne coating shall be applied at a spreading rate that results in a theoretical 1.5 mil dry film thickness. The manufacturer shall issue a letter of certification that the resin chemistry of the waterborne coating is compatible with the 99.9% aluminum thermal sprayed alloy and suitable for tidal water applications.

Page 10-174, Subarticle 1086-1(B)(1) Epoxy, lines 18-24, replace this subarticle with the following:

The epoxy shall meet Article 1081-4.

The 2 types of epoxy adhesive which may be used are Type I, Rapid Setting, and Type II, Standard Setting. Use Type II when the pavement temperature is above 60°F or per the manufacturer’s recommendations whichever is more stringent. Use Type I when the pavement temperature is between 50°F and 60°F or per the manufacturer’s recommendations whichever is more stringent. Epoxy adhesive Type I, Cold Set, may be used to attach temporary pavement markers to the pavement surface when the pavement temperature is between 32°F and 50°F or per the manufacturer’s recommendations whichever is more stringent.

Page 10-175, Subarticle 1086-2(E) Epoxy Adhesives, line 27, replace “Section 1081” with “Article 1081-4”.

Page 10-177, Subarticle 1086-3(E) Epoxy Adhesives, line 22, replace “Section 1081” with “Article 1081-4”.

Page 10-179, Subarticle 1087-4(A) Composition, lines 39-41, replace the third paragraph with the following:

All intermixed and drop-on glass beads shall not contain more than 75 ppm arsenic or 200 ppm lead.

Page 10-180, Subarticle 1087-4(B) Physical Characteristics, line 8, replace the second paragraph with the following:

All intermixed and drop-on glass beads shall comply with NCGS § 136-30.2 and 23 USC § 109(r).

Page 10-181, Subarticle 1087-7(A) Intermixed and Drop-on Glass Beads, line 24, add the following after the first paragraph:

Use X-ray Fluorescence for the normal sampling procedure for intermixed and drop-on beads, without crushing, to check for any levels of arsenic and lead. If any arsenic or lead is detected, the sample shall be crushed and repeat the test using X-ray Fluorescence. If the X-ray Fluorescence test shows more than a LOD of 5 ppm, test the beads using United States Environmental Protection Agency Method 6010B, 6010C or 3052 for no more than 75 ppm arsenic or 200 ppm lead.

Page 10-204, Subarticle 1092-2(A) Performance and Test Requirements, replace **Table 1092-3 Minimum Coefficient of Retroreflection for NC Grade A** with the following:

TABLE 1092-3 MINIMUM COEFFICIENT OF RETROREFLECTION FOR NC GRADE A (Candelas Per Lux Per Square Meter)								
Observation Angle, degrees	Entrance Angle, degrees	White	Yellow	Green	Red	Blue	Fluorescent Yellow Green	Fluorescent Yellow
0.2	-4.0	525	395	52	95	30	420	315
0.2	30.0	215	162	22	43	10	170	130
0.5	-4.0	310	230	31	56	18	245	185
0.5	30.0	135	100	14	27	6	110	81
1.0	-4.0	120	60	8	16	3.6	64	48
1.0	30.0	45	34	4.5	9	2	36	27

SELECT MATERIAL, CLASS III, TYPE 3:

(1-17-12)

1016, 1044

SP10 R05

Revise the *2012 Standard Specifications* as follows:

Page 10-39, Article 1016-3, CLASS III, add the following after line 14:

Type 3 Select Material

Type 3 select material is a natural or manufactured fine aggregate material meeting the following gradation requirements and as described in Sections 1005 and 1006:

Percentage of Total by Weight Passing							
3/8"	#4	#8	#16	#30	#50	#100	#200
100	95-100	65-100	35-95	15-75	5-35	0-25	0-8

Page 10-39, Article 1016-3, CLASS III, line 15, replace “either type” with “Type 1, Type 2 or Type 3”.

Page 10-62, Article 1044-1, line 36, delete the sentence and replace with the following:

Subdrain fine aggregate shall meet Class III select material, Type 1 or Type 3.

Page 10-63, Article 1044-2, line 2, delete the sentence and replace with the following:

Subdrain coarse aggregate shall meet Class V select material.

SHOULDER AND SLOPE BORROW:

(3-19-13)

1019

SP10 R10

Use soil in accordance with Section 1019 of the *2012 Standard Specifications*. Use soil consisting of loose, friable, sandy material with a PI greater than 6 and less than 25 and a pH ranging from 5.5 to 7.0.

Soil with a pH ranging from 4.0 to 5.5 will be accepted without further testing if additional limestone is provided in accordance with the application rates shown in Table 1019-1A. Soil type is identified during the soil analysis. Soils with a pH above 7.0 require acidic amendments to be added. Submit proposed acidic amendments to the Engineer for review and approval. Soils with a pH below 4.0 or that do not meet the PI requirements shall not be used.

TABLE 1019-1A ADDITIONAL LIMESTONE APPLICATION RATE TO RAISE pH			
pH TEST RESULT	Sandy Soils Additional Rate (lbs. / Acre)	Silt Loam Soils Additional Rate (lbs. / Acre)	Clay Loam Soils Additional Rate (lbs. / Acre)
4.0 - 4.4	1,000	4,000	6,000
4.5 - 4.9	500	3,000	5,000
5.0 - 5.4	NA	2,000	4,000

Note: Limestone application rates shown in this table are in addition to the standard rate of 4000 lbs. / acre required for seeding and mulching.

No direct payment will be made for providing additional lime or acidic amendments for Ph adjustment.

PERMANENT SEEDING AND MULCHING:

(7-1-95)

1660

SP16 R02

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660 in the *2012 Standard Specifications* and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

Percentage of Elapsed Contract Time	Percentage Additive
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.

EROSION AND STORMWATER CONTROL FOR SHOULDER CONSTRUCTION AND RECONSTRUCTION:

(11-16-10) (Rev. 8-21-12)

105-16, 225-2, Division 16

SP16 R03R

Land disturbing operations associated with shoulder construction/reconstruction may require erosion and sediment control/stormwater measure installation. National Pollutant Discharge Elimination System (NPDES) inspection and reporting may be required.

Erosion control measures shall be installed per the erosion control detail in any area where the vegetated buffer between the disturbed area and surface waters (streams, wetlands, or open waters) or drainage inlet is less than 10 feet. The Engineer may reduce the vegetated buffer threshold for this requirement to a value between 5 and 10 feet. Erosion control measures shall be spot checked every 14 days until permanent vegetative establishment.

In areas where shoulder construction/reconstruction includes disturbance or grading on the front slope or to the toe of fill, relocating ditch line or backslope, or removing vegetation from the ditch line or swale, NPDES inspection and monitoring are required every 14 days or within 24 hours of a rainfall event of 0.5" or greater. Maintain daily rainfall records. Install erosion control measures per detail.

In areas where the vegetated buffer is less than 10 feet between the disturbed area and waters of the State classified as High Quality Water (HQW), Outstanding Resource Water (ORW), Critical Areas, or Unique Wetlands, NPDES inspection and monitoring are required every 14 days or within 24 hours of a rainfall event of 0.5" or greater. The Engineer may reduce the vegetated buffer threshold for this requirement to a value between 5 and 10 feet. The plans or provisions will indicate the presence of these water classifications. Maintain daily rainfall records. Install erosion control measures per detail.

Land disturbances hardened with aggregate materials receiving sheet flow are considered non-erodible.

Sites that require lengthy sections of silt fence may substitute with rapid permanent seeding and mulching as directed by the Engineer.

NPDES documentation shall be performed by a Level II Erosion and Sediment Control/Stormwater certificate holder.

Materials used for erosion control will be measured and paid as stated in the contract.

STABILIZATION REQUIREMENTS:

(11-4-11)

S-2

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 3, 2011 issued by the North Carolina Department of Environment and Natural Resources Division of Water Quality. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less

- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING:

(East Crimp)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		September 1 - February 28	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 - August 31		September 1 - February 28	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

2 nd Millennium	Duster	Magellan	Rendition
Avenger	Endeavor	Masterpiece	Scorpion
Barlexas	Escalade	Matador	Shelby
Barlexas II	Falcon II, III, IV & V	Matador GT	Signia
Barrera	Fidelity	Millennium	Silverstar
Barrington	Finesse II	Montauk	Southern Choice II
Biltmore	Firebird	Mustang 3	Stetson
Bingo	Focus	Olympic Gold	Tarheel
Bravo	Grande II	Padre	Titan Ltd
Cayenne	Greenkeeper	Paraiso	Titanium
Chapel Hill	Greystone	Picasso	Tomahawk
Chesapeake	Inferno	Piedmont	Tacer
Constitution	Justice	Pure Gold	Trooper
Chipper	Jaguar 3	Prospect	Turbo
Coronado	Kalahari	Quest	Ultimate
Coyote	Kentucky 31	Rebel Exeda	Watchdog
Davinci	Kitty Hawk	Rebel Sentry	Wolfpack
Dynasty	Kitty Hawk 2000	Regiment II	
Dominion	Lexington	Rembrandt	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

NATIVE GRASS SEEDING AND MULCHING: (East)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the

typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31	September 1 - February 28
18# Creeping Red Fescue	18# Creeping Red Fescue
6# Indiangrass	6# Indiangrass
8# Little Bluestem	8# Little Bluestem
4# Switchgrass	4# Switchgrass
25# Browntop Millet	35# Rye Grain
500# Fertilizer	500# Fertilizer
4000# Limestone	4000# Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen Boreal Epic Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Temporary Seeding

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

Fertilizer Topdressing

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

Supplemental Seeding

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed.

Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into

the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

Mowing

The minimum mowing height shall be 4 inches.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

COIR FIBER WATTLE BARRIER:

(8-21-12)

1630

Description

Coir fiber wattle barriers are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting and used at the toe of fills or on slopes to intercept runoff. Coir fiber wattle barriers are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing coir fiber wattle barriers.

Materials

Coir fiber wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12"
Minimum Length	10 ft
Minimum Density	3.5 lb/cf \pm 10%
Net Material	Coir Fiber
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	2.6 lb/ft \pm 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Align coir fiber wattle barriers in an overlapping and alternating pattern. Excavate a trench the entire length of each wattle with a depth of 1" to 2" for the wattle to be placed. Secure coir fiber wattle barriers to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the coir fiber wattle barriers according to the detail provided in the plans. Drive stakes into the ground at

least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

For coir fiber wattle barriers used to reduce runoff velocity for large slopes, use a maximum spacing of 20 ft. for the barrier measured along the slope.

Maintain the coir fiber wattle barriers until the project is accepted or until the coir fiber wattle barriers are removed, and remove and dispose of silt accumulations at the coir fiber wattle barriers when so directed in accordance with Section 1630 of the *2012 Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle will be measured and paid as the actual number of linear feet of coir fiber wattle installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the coir fiber wattle barrier.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Wattle	Linear Foot

COIR FIBER WATTLE:

Description

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, and removing wattles.

Materials

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft ³ +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

The Contractor shall maintain the coir fiber wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Wattle	Linear Foot

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

Payment for "Seeding and Mulching" will be included in the contract bid price per acre for "Seeding and Mulching". This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

No direct payment will be made for providing "Crimping Straw Mulch" as required herein, as the cost of same will be considered incidental to the line item "Seeding and Mulching".

FLOATING TURBIDITY CURTAIN:

Description

This work consists of the installation of a *Floating Turbidity Curtain* to deter silt suspension and movement of silt particles during construction. The floating turbidity curtain shall be constructed at locations as directed.

Materials

The curtain material shall be made of a tightly woven nylon, plastic or other non-deteriorating material meeting the following specifications:

Property	Value
Grab tensile strength	*md-370 lbs *cd-250 lbs
Mullen burst strength	480 psi
Trapezoid tear strength	*md-100 lbs *cd-60 lbs
Apparent opening size	70 US standard sieve
Percent open area	4% permittivity 0.28 sec-1
*md –machine direction	
*cd –cross machine direction	

In the event that more than one width of fabric is required, a 6" overlap of the material shall also be required.

The curtain material shall be supported by a flotation material having over 29 lbs/ft buoyancy. The floating curtain shall have a 5/16" galvanized chain as ballast and dual 5/16" galvanized wire ropes with a heavy vinyl coating as load lines.

Construction Methods

The Contractor shall maintain the *Floating Turbidity Curtain* in a satisfactory condition until its removal is requested by the Engineer. The curtain shall extend to the bottom of the jurisdictional resource. Anchor the curtain according to manufacturer recommendations.

Measurement and Payment

Floating Turbidity Curtain will be measured and paid for as the actual number of square yards of curtain furnished as specified by the Engineer. Such price and payment will be full compensation for the work as described in this section including but not limited to furnishing all materials, tools, equipment, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item

Floating Turbidity Curtain

Pay Unit

Square Yards

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TON
1622	Temporary Slope Drains	LF
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
SP	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in Form 1675. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item	Pay Unit
Response for Erosion Control	Each

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating. Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(3)(d) or

Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item

Safety Fence

Pay Unit

Linear Foot

SILT FENCE COIR FIBER WATTLE BREAK:

(8-21-12)

1605.1630

Description

Silt fence coir fiber wattle breaks are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting and used in conjunction with temporary silt fence at the toe of fills to intercept runoff. Silt fence coir fiber wattle breaks are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing Silt fence coir fiber wattle breaks.

Materials

Coir fiber wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12"
Minimum Length	10 ft
Minimum Density	3.5 lb/cf \pm 10%
Net Material	Coir Fiber
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	2.6 lb/ft \pm 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate a trench the entire length of each wattle with a depth of 1" to 2" for the wattle to be placed. Secure silt fence coir fiber wattle breaks to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the silt fence coir fiber wattle break according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Install temporary silt fence in accordance with Section 1605 of the *2012 Standard Specifications* and overlap each downslope side of silt fence wattle break by 6".

Maintain the silt fence coir fiber wattle breaks until the project is accepted or until the silt fence coir fiber wattle breaks are removed, and remove and dispose of silt accumulations at the silt fence coir fiber wattle breaks when so directed in accordance with Section 1630 of the *2012 Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle will be measured and paid as the actual number of linear feet of wattles installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the silt fence coir fiber wattle break.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Wattle	Linear Foot

SPECIAL SEDIMENT CONTROL FENCE:

Description

This work consists of the construction, maintenance, and removal of *Special Sediment Control Fence*. Place special sediment control fence as shown on the plans or as directed.

Materials

(A) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire in the desired position without displacement.

(B) 1/4" Hardware Cloth

Hardware cloth shall have ¼" openings constructed from #24 gauge wire. Install hardware cloth in accordance with Standard Drawing No. 1606.01.

(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with Standard Drawing No. 1606.01.

Construction Methods

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

¼" *Hardware Cloth* will be measured and paid for in accordance with Article 1632-5 of the *Standard Specifications*.

Sediment Control Stone will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

PERMITS:

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DENR State of North Carolina
Buffer Certification	Division of Environmental Management, DENR State of North Carolina
State Dredge and Fill and/or CAMA	Division of Coastal Management, DENR State of North Carolina
Navigation	U. S. Coast Guard
Trout Buffer Zone Waiver	Department of Energy, Mineral, and Land Resources, DENR, State of North Carolina
CCPCUA	Division of Water Resources, DENR State of North Carolina
TVA	Tennessee Valley Authority
FERC	Federal Energy Regulatory Commission

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2012 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.

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WORK ZONE TRAFFIC CONTROL GENERAL REQUIREMENTS

TEMPORARY TRAFFIC CONTROL (TTC):

(7-16-13) (Rev. 7-15-14)

RWZ-1

DocuSigned by:
Steve Kite
E27CE30E1DFC442...

10/22/2014



Maintain traffic in accordance with Divisions 10, 11 and 12 of the *2012 Standard Specifications* and the following provisions:

Install Work Zone Advance Warning Signs in accordance with the detail drawing provided in these plans prior to beginning any other work. Use a lane closure or slow moving operation to complete the work, as necessary, unless otherwise indicated. Refer to Standard Drawing No. 1101.02, 1101.11, 1110.01, 1110.02, 1130.01, 1135.01 and 1180.01 of the *2012 Roadway Standard Drawings*. Use a moving operation only if the minimum speed maintained at all times is 3 mph with no stops that narrow or close a lane of travel. If the moving operation is progressing slower than 3 mph at any time, install a lane closure. Maintain the existing traffic pattern at all times, except in the immediate work zone where lane closures are allowed as determined by the Engineer.

Refer to attached details and Standard Drawing No. 1101.02, 1101.03, 1101.04, 1101.05, 1101.11, 1110.01, 1110.02, 1115.01, 1130.01, 1135.01, 1145.01, 1150.01, 1165.01, and 1180.01 of the *2012 Roadway Standard Drawings* when closing a lane of travel in a stationary work zone such as pavement patching resurfacing, or pavement marking removal. Properly ballasted cones and skinny drums may be used instead of drums. However, drums are required for the upstream taper portion of lane closures in all applications. The stationary work zone shall be a maximum of 1 mile in length at any given time on 2 Lane, 2 Way facilities unless otherwise approved by the Engineer. A pilot vehicle operation may be used in conjunction with flaggers and the appropriate pilot vehicle warning signing as directed by the Engineer. During periods of construction inactivity, return the traffic pattern to the existing alignment and remove or cover any work zone signs. When covering work zone signs, use an opaque material that prevents reading of the sign at night by a driver using high beam headlights. Use material, which does not damage the sign sheeting. Replace any obliterated markings as required by other sections of the *2012 Standard Specifications* and the Engineer.

When personnel and/or equipment are working on the shoulder adjacent to and within 5 feet of an open travel lane, close the nearest open travel lane using Standard Drawing No. 1101.02 of the *2012 Roadway Standard Drawings*. When personnel and/or equipment are working within a lane of travel of an undivided facility, close the lane according to the traffic control plans, *2012 Roadway Standard Drawings* or as directed by the Engineer. Conduct the work so that all

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personnel and/or equipment remain within the closed travel lane. Do not work simultaneously, on both sides of an open travel way, within the same location, on a two-lane, two-way road. Perform work only when weather and visibility conditions allow safe operations as directed by the Engineer.

When utilizing a slow-moving operation for such items as pavement marking and marker placement, as a minimum the slow moving operation caravan shall consist of the vehicles and devices shown on the Moving Operation Caravan Details according to Roadway Standard Drawing No. 1101.02, sheet 11 of the *2012 Roadway Standard Drawings*. Traffic cones may be used when necessary to provide additional protection of wet pavement markings. Ballast all traffic cones so they will not be blown over by traffic.

TRAFFIC OPERATIONS:

1) Drop-Off Requirements and Time Limitations:

Do not exceed a difference of 2 inches in elevation between open lanes of traffic for nominal lifts of 1.5 inches

During a resurfacing only operation, bring all newly resurfaced lanes to the same elevation within 72 hours for nominal lifts of 1.5 inches or less of asphalt course and by the end of each work day for nominal lifts of greater than 1.5 inches of asphalt course

Backfill at a 6:1 slope up to the edge and elevation of existing pavement in areas adjacent to an open travel lane that has an edge of pavement drop-off as follows:

- (A) Drop-off that exceeds 2 inches on roadways with posted speed limits of 45 mph or greater.
- (B) Drop-off that exceeds 3 inches on roadways with posted speed limits less than 45 mph.

For drop-offs that exceed the above requirements, backfill the unacceptable drop-off with suitable compacted material, as approved by the Engineer. The material, equipment and labor associated with this operation will be at no expense to the Department. This work is not considered part of shoulder reconstruction.

2) Project Requirements:

Failure to comply with the following requirements will result in a suspension of all other operations:

1. Before working on ANY MAP, the Contractor shall submit a written construction sequence for traffic control and construction lighting for ALL MAPS to the Engineer at the first pre-construction meeting and the sequence must be approved before closing a lane of traffic. The Contractor and Engineer will coordinate with the Traffic Management Unit at 919-773-2800 or Traffic Services for additional traffic control guidance, as necessary.

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2. Obtain written approval of the Engineer before working in more than one location or setting up additional lane closures. The maximum length of any one lane closure is 1 mile unless otherwise directed by the Engineer.
3. Contractor shall mill and pave lanes in an order such that water shall not accumulate.
4. Traffic Control for the milling and/or paving of ramps is to be done according to Standard Drawing Number 1101.02, Sheets 9 & 10 unless otherwise approved to be closed by the Engineer. If approved, Contractor will provide plans and devices for the detour at no additional cost to the department.
5. If lane closure restrictions apply, see Special Provision, "Intermediate Contract Times and Liquidated Damages".
6. If milled areas are not paved back within 72 hours, the Contractor is to furnish and install the following portable signs to warn drivers of the conditions. These are to include, but not limited to "Rough Road" (W8-8), "Uneven Lanes" (W8-11), and "Grooved Pavement" (W8-15) w/ Motorcycle Plaque mounted below. These are to be dual indicated on Multi-Lane Roadways with speed limits 45 mph and greater where lateral clearance can be obtained within the median areas. These portable signs are incidental to the other items of work included in the temporary traffic control (Lump Sum) pay item.

3) Work Zone Signing:

Description

Install advance/general warning work zone signs according to the Detail Drawing provided in these plans prior to beginning of work. Install and maintain signing in accordance with the attached drawings and Divisions 11 and 12 of the *2012 Standard Specifications*.

(A) Installation

All stationary Advance/General warning work zone signs require notification to existing Utility owners per Article 105-8 of the *2012 Standard Specifications* and Special Provision SP1 G115 within 3 to 12 full working days prior to installation.

Install all Advance/General warning work zone signs before beginning work on a particular map. If signs are installed more than seven (7) calendar days prior to the beginning of work on a particular map, cover the signs until the work begins. Install each work zone Advance/General warning sign separately and not on the same post or stand with any other sign except where an advisory speed plate or directional arrow is used.

All stationary signing is to be installed as shown on the detail drawing(s) unless otherwise directed by the Engineer. All sign locations to be verified by the Engineer prior to installation. Once the signs have been installed and accepted, any sign relocations requested by the Department will be compensated in accordance with Article 104-7. Any additional signs other than the ones shown in the drawing will be compensated in accordance with Article 104-7.

TC-4

No stationary -Y- Line advance warning signage is required unless there's more than 1,000 feet of resurfacing along the -Y- line. Whenever work proceeds through an intersection, portable signs shall be used for traffic control. There will be no direct compensation for any portable signing.

If there is a period of construction inactivity longer than 14 calendar days, remove or cover advance/general warning work zone signs. Uncover advance/general warning work zone signs no more than 7 calendar days before work resumes. All other operations may be suspended upon failure to comply with the above requirements. Such suspended operations would not be resumed until the above requirements are fulfilled.

(B) Sign Removal

All stationary work zone signs shall be removed once the project is substantially complete. The project is substantially complete when the resurfacing operations are completed and the shoulders are brought up to the same elevation as the proposed pavement and when pavement markings are installed. The pavement marking doesn't have to be the final marking material to be considered substantially complete. Any remaining punch list items are to be completed with portable work zone signing. There will be no compensation for any portable signing. Sign removal is a condition of final project acceptance.

(C) Lane Closure Work Zone Signs

Install any required lane closure signing needed during the life of the project in accordance with the Standard Drawing No. 1101.02, 1101.11 and 1110.02 of the *2012 Roadway Standard Drawings*. Any required portable signs for lane closures are compensated in the contract pay item for *Temporary Traffic Control*.

4) Measurement and Payment:

Temporary traffic control work, including, but not limited to installation and removal of portable signs, cones, drums, skinny drums, flaggers, AFAD's, changeable message boards, truck mounted attenuators, flashing arrow boards, and pilot vehicles will be paid at the contract lump sum price for *Temporary Traffic Control*. The *Temporary Traffic Control* pay item does not include work zone advance or general warning signs. Partial payments for *Temporary Traffic Control* will be made as follows: The cumulative total of the lump sum price for temporary traffic control will be equal to the percent complete (project) as calculated for each partial pay estimate. Additional flashing arrow boards and message boards beyond those shown in the contract, detail drawings or *Roadway Standard Drawings* required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

The work of satisfactorily installing and removing work zone advance and/or general warning signs, including, but not limited to, furnishing, locating, installing, covering, uncovering and removing stationary signs will be measured for each required sign and paid at the contract price for *Work Zone Advance/General Warning Signing (SF)*. Payment for *Work Zone*

TC-5

Advance/General Warning Signing will be limited to a maximum of 90% of the total installed quantity. The remaining 10% will be paid once all signs have been removed.

The Lump Sum price for *Temporary Traffic Control* will include the work of four (4) flaggers per operation per map being utilized at the same time on any day. If a pilot vehicle is used for an operation, the Lump Sum Price for *Temporary Traffic Control* will include the work of five (5) flaggers. The operator of a pilot vehicle will be considered one of the five flaggers.

Any additional flagging beyond the “included” amount covered in the *Temporary Traffic Control* pay item will be considered supplemental flagging and compensated at a rate of \$20.00 per hour for each additional flagger as approved by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Temporary Traffic Control	Lump Sum
Work Zone Advance/General Warning Signing	Square Foot

STANDARD SPECIAL PROVISION**AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS:**

(5-20-08)

Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(E) of the *2012 Standard Specifications*.

CONTRACT PAYMENT AND PERFORMANCE BOND – BRIDGE: REVISED 5/27/14

A performance bond in the amount of one hundred percent (100%) of the contract amount, conditioned upon the faithful performance of the contract in accordance with specifications and conditions of the contract is required on this project if the contract amount exceeds \$300,000. Such bond shall be solely for the protection of the North Carolina Department of Transportation and the State of North Carolina.

A payment bond in the amount of one hundred percent (100%) of the contract amount, conditioned upon the prompt payment for all labor or materials for which the Contractor, or subcontractor, is liable is required on this project if the contract amount exceeds \$300,000. The payment bond shall be solely for the protection of persons or firms furnishing materials or performing labor for this contract for which the Contractor is liable.

The successful bidder, within fourteen (14) days after notice of award, shall provide the Department with a contract payment bond and a contract performance bond each in an amount equal to one hundred percent (100%) of the amount of the contract.

BIDS:

In accordance with GS 136-28.1(b), if the total bid amount of the contract exceeds \$2.5 million, the bid will not be considered for award.

DIVISION LET CONTRACT PREQUALIFICATION:

(07-01-14)

SPD 01-410

Any firm that wishes to bid as a prime contractor shall be prequalified as a Bidder or PO Prime Contractor prior to submitting a bid. Information regarding prequalification can be found at: <https://connect.ncdot.gov/business/Prequal/Pages/default.aspx>.

SAFETY VESTS:

All Contractors' personnel, all subcontractors and their personnel, and any material suppliers and their personnel must wear an OSHA approved reflective vest or outer garment at all times while on the project.

CONTRACTOR CLAIM SUBMITTAL FORM:

If the Contractor elects to file a written claim or requests an extension of contract time, it shall be submitted on the *Contractor Claim Submittal Form (CCSF)* available through the Construction Unit or http://ncdot.org/doh/operations/dp_chief_eng/constructionunit/formsmanuals/

DRIVEWAYS AND PRIVATE PROPERTY:

The Contractor shall maintain access to driveways for all residents and property owners throughout the life of the project. The Contractor shall not perform work for private citizens or agencies in conjunction with this project or within the project limits of this contract.

COOPERATION WITH STATE FORCES:

The Contractor must cooperate with State forces working within the limits of this project as directed by the Engineer.

NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY:

(5-17-11)

Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Korean Lespedeza
Weeping Lovegrass
Carpetgrass

German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass	Japanese Millet
Crownvetch	Reed Canary Grass
Pensacola Bahiagrass	Zoysia
Creeping Red Fescue	

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

ERRATA:

(1-17-12) (Rev. 11-18-14)

Z-4

Revise the *2012 Standard Specifications* as follows:

Division 2

Page 2-7, line 31, Article 215-2 Construction Methods, replace “Article 107-26” with “Article 107-25”.

Page 2-17, Article 226-3, Measurement and Payment, line 2, delete “pipe culverts.”

Page 2-20, Subarticle 230-4(B), Contractor Furnished Sources, change references as follows: Line 1, replace “(4) Buffer Zone” with “(c) Buffer Zone”; **Line 12,** replace “(5) Evaluation for Potential Wetlands and Endangered Species” with “(d) Evaluation for Potential Wetlands and Endangered Species”; and **Line 33,** replace “(6) Approval” with “(4) Approval”.

Division 3

Page 3-1, after line 15, Article 300-2 Materials, replace “1032-9(F)” with “1032-6(F)”.

Division 4

Page 4-77, line 27, Subarticle 452-3(C) Concrete Coping, replace “sheet pile” with “reinforcement”.

Division 6

Page 6-7, line 31, Article 609-3 Field Verification of Mixture and Job Mix Formula Adjustments, replace “30” with “45”.

Page 6-10, line 42, Subarticle 609-6(C)(2), replace “Subarticle 609-6(E)” with “Subarticle 609-6(D)”.

Page 6-11, Table 609-1 Control Limits, replace “Max. Spec. Limit” for the Target Source of $P_{0.075}/P_{be}$ Ratio with “1.0”.

Page 6-40, Article 650-2 Materials, replace “Subarticle 1012-1(F)” with “Subarticle 1012-1(E)”

Division 8

Page 8-23, line 10, Article 838-2 Materials, replace “Portland Cement Concrete, Class B” with “Portland Cement Concrete, Class A”.

Division 10

Page 10-166, Article 1081-3 Hot Bitumen, replace “Table 1081-16” with “Table 1081-2”, replace “Table 1081-17” with “Table 1081-3”, and replace “Table 1081-18” with “Table 1081-4”.

Division 12

Page 12-7, Table 1205-3, add “FOR THERMOPLASTIC” to the end of the title.

Page 12-8, Subarticle 1205-5(B), line 13, replace “Table 1205-2” with “Table 1205-4”.

Page 12-8, Table 1205-4 and 1205-5, replace “THERMOPLASTIC” in the title of these tables with “POLYUREA”.

Page 12-9, Subarticle 1205-6(B), line 21, replace “Table 1205-4” with “Table 1205-6”.

Page 12-11, Subarticle 1205-8(C), line 25, replace “Table 1205-5” with “Table 1205-7”.

Division 15

Page 15-4, Subarticle 1505-3(F) Backfilling, line 26, replace “Subarticle 235-4(C)” with “Subarticle 235-3(C)”.

Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $\square = \square \square \sqrt{\square} \div \square \square \square, \square \square \square$

Page 15-6, Subarticle 1510-3(B), line 32, delete “may be performed concurrently or” and replace with “shall be performed”.

Page 15-17, Subarticle 1540-3(E), line 27, delete “Type 1”.

Division 17

Page 17-26, line 42, Subarticle 1731-3(D) Termination and Splicing within Interconnect Center, delete this subarticle.

Revise the *2012 Roadway Standard Drawings* as follows:

1633.01 Sheet 1 of 1, English Standard Drawing for Matting Installation, replace “1633.01” with “1631.01”.

PLANT AND PEST QUARANTINES:**(Imported Fire Ant, Gypsy Moth, Witchweed, And Other Noxious Weeds)**

(3-18-03) (Rev. 10-15-13)

Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-733-6932, or <http://www.ncagr.gov/plantind/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed or other noxious weeds.

MINIMUM WAGES:

(7-21-09)

Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

ON-THE-JOB TRAINING:

(10-16-07) (Rev. 5-21-13)

Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-

the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year. A sample agreement is available at www.ncbowd.com/section/on-the-job-training.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

STRUCTURES SPECIAL PROVISIONS

SUBMITTAL OF WORKING DRAWINGS:

(8-9-13)

1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, “submittals” refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Resident Engineer. Either the Structure Design Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Resident Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581
Attention: Mr. P. D. Lambert, P. E.

Via other delivery service:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610
Attention: Mr. P. D. Lambert, P. E.

Submittals may also be made via email.

Send submittals to:

plambert@ncdot.gov (Paul Lambert)

Send an additional e-copy of the submittal to the following address:

jgaither@ncdot.gov (James Gaither)

jlbolden@ncdot.gov (James Bolden)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail:

Mr. Eric Williams, P. E.
Western Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via other delivery service:

Mr. Eric Williams, P. E.
Western Region Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

The status of the review of structure-related submittals sent to the Structure Design Unit can be viewed from the Unit's web site, via the "Contractor Submittal" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact:

Paul Lambert
(919) 707 – 6407
(919) 250 – 4082 facsimile
plambert@ncdot.gov

Secondary Structures Contacts:

James Gaither
(919) 707 – 6409

James Bolden
(919) 707 – 6408

Eastern Regional Geotechnical Contact (Divisions 1-7):

K. J. Kim
(919) 662 – 4710
(919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams
(704) 455 – 8902
(704) 455 – 8912 facsimile
ewilliams@ncdot.gov

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.

The first table below covers "Structure Submittals". The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers "Geotechnical Submittals". The Resident Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structure Design Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

Submittal	Copies Required by Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”
Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms ² (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Optional Disc Bearings ⁴	8	0	“Optional Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Pot Bearings ⁴	8	0	“Pot Bearings”
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions

Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8 Article 400-3 &
Temporary Detour Structures	10	2	“Construction, Maintenance and Removal of Temporary Structure at Station _____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structure Design Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18” or greater.

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structure Design Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	1	0	Subarticle 450-3(F)(3)
Retaining Walls ⁴	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	5 drawings, 2 calculations	2 drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

2. Submit one hard copy of submittal to the Resident or Bridge Maintenance Engineer. Submit a second copy of submittal electronically (PDF via email) or by facsimile, US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
3. The Pile Driving Equipment Data Form is available from:
https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
See second page of form for submittal instructions.
4. Electronic copy of submittal is required. See referenced provision.

FALSEWORK AND FORMWORK

(4-5-12)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term “temporary works” is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure. Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS

A. Working Drawings

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer’s catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than 3/4".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft ² for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80

Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

CONSTRUCTION OF SUBSTRUCTURE:

Description:

The work covered by this special provision consists of furnishing all labor, equipment, materials, and incidentals necessary to complete the construction of the substructure as is defined in Article 101-3 of the *2012 Standard Specifications for Roads and Structures*.

Materials:

All material shall conform to the Specifications or any applicable contract special provision.

Construction Methods:

All work shall be performed in accordance with the contract plans and the Standard Specifications or any applicable contract special provision.

Basis of Payment:

All work covered by this section will be paid for at the contract lump sum price for "Construction of Substructure" except as noted below.

Piles will be paid for in accordance with other provisions in this Contract.

CONSTRUCTION OF SUPERSTRUCTURE:

Furnish and erect prestressed concrete cored slabs, prestressed concrete box beams, elastomeric bearings, precast concrete barrier rails on the bridge and applicable grouting.

Complete all work in accordance with the contract plans and the Standard Specifications except payment for these items will be as described below.

No measurement will be made for these items. The price and payment below will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

The removal of the existing structure shall be paid at the contract lump sum price for "Removal of Existing Structure."

Payment will be made under:

Pay Item

Pay Unit

Construction of Superstructure

Lump Sum

EXCAVATION AND EMBANKMENT:**Description:**

Furnish all labor, equipment, materials, and incidentals necessary to complete applicable items of work defined in Division 2, Division 5, Section 410, Section 412, Section 414, and Section 416 of the *2012 Standard Specifications for Roads and Structures*.

Materials:

All material shall conform to the Specifications or any applicable contract special provision.

Construction Methods:

All work shall be performed in accordance with the Specifications or any applicable contract special provision.

Basis of Payment

All work covered by this section will be paid for at the contract lump sum price for "Generic Grading Item (Excavation and Embankment)".

CRANE SAFETY:

(8-15-05)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

Crane Safety Submittal List

- A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane

Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

PILE DRIVING ANALYZER:

(1-17-12)

GENERAL

This special provision governs driving piles with a pile driving analyzer (PDA) in accordance with the plans and as directed by the Engineer. The PDA test method is described in ASTM D4945, "Standard Test Method for High-Strain Dynamic Testing of Piles". Install piles in accordance with Section 450 of the Standard Specifications and this provision.

Submit the proposed pile driving methods and equipment (Pile Driving Equipment Data Form) in accordance with the Submittal of Working Drawings Special Provision and the Standard Specifications. The Engineer will respond with preliminary approval or rejection of the proposed pile driving methods and equipment within 10 calendar days. Preliminary approval is required before driving piles with a PDA. Notify the Engineer of the pile driving schedule a minimum of 14 calendar days in advance.

Either a PDA Consultant or the NCDOT Geotechnical Engineering Unit, as directed by the Engineer, shall perform PDA testing and analysis. If required, retain a PDA Consultant and submit experience documentation with the proposed pile driving methods and equipment.

The Engineer will determine the number of piles and which piles to be tested with the PDA based upon the subsurface conditions and the pile installation sequence and progress.

The Engineer will complete the review of the proposed pile driving methods and equipment and provide the required driving resistance within 10 calendar days after the Engineer receives the PDA report or the Geotechnical Engineering Unit completes the PDA testing. A PDA report for PDA testing on multiple piles may be required as directed by the Engineer before the 10 day time period begins.

PREQUALIFICATION AND EXPERIENCE REQUIREMENTS

Use a PDA Consultant prequalified by the Contractual Services Unit of the Department for Pile Driving Analyzer work (work code 3060).

Submit documentation that the PDA Consultant has successfully completed at least 5 PDA testing projects within the last 3 years of a scope and complexity similar to that anticipated for this project. Documentation should include the General Contractor and Owner's name

and current contact information with descriptions of each past project. Also, submit documentation of experience with PDA manufactured by Pile Dynamics, Inc and the CAsE Pile Wave Analysis Program (CAPWAP).

Provide a list of PDA Operators and the Project Engineer that will be assigned to this project. Submit documentation for each PDA Operator verifying employment with the PDA Consultant and a minimum of 1 year experience in collecting PDA data with past projects of scope and complexity similar to that anticipated for this project. Submit documentation for the Project Engineer verifying employment with the PDA Consultant, registration as professional engineer in North Carolina and a minimum of 5 years experience in PDA testing and analysis with past projects of scope and complexity similar to that anticipated for this project. Documentation should include resumes, references, certifications, project lists, experience descriptions and details, etc.

PREPARATION FOR PDA TESTING

Provide piles for PDA testing that are 5 ft (1.5 m) longer, or as directed by the Engineer, than the estimated pile lengths shown on the plans. Supply 110 V, 60 Hz, 30 Amp of AC electrical power to operate the PDA equipment. Direct current welders or non-constant power sources are unacceptable.

Provide a suitable shelter to protect the PDA equipment and operator from conditions of sun, water, wind and temperature. The shelter should have a minimum floor size of 6 ft x 6 ft (2 m x 2 m) and a minimum roof height of 8 ft (2.5 m). If necessary, heat or cool the shelter to maintain a temperature between 50 and 85 degrees F (10 and 30 degrees C). Place the shelter within 75 ft (23 m) of the pile such that the PDA cables reach the computer and the operator can clearly observe the pile. The Engineer may waive the shelter requirement if weather conditions allow.

Drill up to a total of 16 bolt holes in either 2 or 4 sides of the pile, as directed by the PDA Consultant or the Engineer, at an approximate distance equal to 3 times the pile diameter below the head of the pile. If the PDA Consultant or the Engineer choose to drill the bolt holes, provide the necessary equipment, tools and assistance to do so. A hammer drill is required for concrete piles and up to 2 hours may be required to drill the holes.

Lift, align and rotate the pile to be tested with the PDA as directed by the PDA Consultant or the Engineer. Place the pile in the leads and template so that the PDA instruments and their accompanying wires will not be damaged.

The PDA Consultant or the Engineer will furnish the PDA measuring instruments and materials for installing the instruments. Attach the PDA instruments as directed by the PDA Consultant or the Engineer after the pile is placed in the leads and the template.

PDA TESTING

Use only the preliminarily approved pile driving methods and equipment to drive piles with the PDA instruments attached. Drive the pile as directed by the PDA Operator or the Engineer in order to measure the wavespeed of the pile.

Drive the pile to the required bearing capacity and specified tip elevation, if applicable, as shown on the plans or as directed by the PDA Consultant or the Engineer. During pile driving, the PDA will be used to evaluate, including but not limited to, the following: hammer performance, bearing capacity, distribution of soil resistance, pile driving stresses, energy transfer, pile integrity and various soil parameters such as quake and damping.

The PDA Operator or the Engineer may require the Contractor to modify the pile installation procedure during driving as follows:

- Reduce the hammer energy,
- Drive deeper or shallower because of variations in the subsurface conditions,
- Readjust the transducers, and
- Realign the pile.

The Contractor is responsible in terms of both actual expense and time delays for any damage to the PDA instruments and supporting equipment due to the Contractor's fault or negligence. Replace any damaged equipment at no additional cost to the Department.

REDRIVING PILES

When directed by the Engineer, reattach the PDA instruments and restrike or redrive the pile in accordance with Section 4.0 above and Section 450 of the Standard Specifications. Obtain the required stroke and penetration (at least 6 in or 150 mm) or as directed by the PDA Operator or the Engineer. The PDA Operator or the Engineer will record dynamic measurements during restriking and redriving. The Engineer may require restriking and redriving more than once on the same pile. The Engineer will determine when PDA testing has been satisfactorily completed.

CAPWAP ANALYSIS AND PDA REPORT

The PDA Consultant shall perform analysis of the PDA raw data with the CAPWAP (version 2006 or later). At a minimum, analysis is required for a hammer blow near the end of initial drive and for each restrike and redrive. Additional CAPWAP analysis may be required as determined by the PDA Consultant or the Engineer.

Submit three hard copies and an electronic copy (pdf or jpeg format on CD or DVD) of a PDA report sealed by the Project Engineer within 7 calendar days after field testing is complete. The PDA report shall include but not be limited to the following:

Title Sheet

NCDOT TIP number and WBS element number

Project description

County

Bridge station number

Pile location

Personnel

Report date

Introduction

Site and Subsurface Conditions (including water table elevation)

Pile Details

- Pile type and length
- Required bearing capacity and factor of safety
- Concrete compressive strength and/or steel pile yield strength
- Pile splice type and locations
- Pile batter
- Installation methods including use of jetting, preaugering, spudding, vibratory hammer, template, barge, etc.

Driving Details

- Hammer make, model and type
- Hammer and pile cushion type and thickness
- Pile helmet weight
- Hammer efficiency and operation data including fuel settings, bounce chamber pressure, blows per minute, equipment volume and pressure
- Ground or mud line elevation and template reference elevation at the time of driving
- Final pile tip elevation
- Driving resistance (ram stroke, blows per foot (0.3 meter) and set for last 10 hammer blows)
- Restrike and redrive information

PDA field work details

CAPWAP analysis results

- Table showing percent skin and tip, skin and toe damping, skin and toe quake and match quality

Summary/Conclusions

Attachments

- Boring log(s)

- Pile Driving Equipment Data Form (from Contractor)
- Field pile driving inspection data (from Engineer)
- Accelerometer and strain gauge locations
- Accelerometer and strain gauge serial numbers and calibration information
- PDA hardware model and CAPWAP software version information
- Electronic copy of all PDA raw data and executable CAPWAP input and output files (version 2006 format)

MEASUREMENT AND PAYMENT

The complete and accepted PDA testing will be paid for at the unit bid price for “PDA Testing” per each. Include in the unit bid price for “PDA Testing” all costs for providing the PDA, PDA instruments and materials for installing the instruments and recording the dynamic measurements the first time the pile is tested with the PDA. Costs for providing these items for the same pile after the pile is initially tested with the PDA will be considered incidental to the unit bid price for “Pile Redrives”. Also include in the unit bid price for “PDA Testing” all costs for performing the CAPWAP analysis on data collected during initial drive, restrikes and redrives and preparing and submitting the PDA report. No payment for “PDA Testing” will be made if the PDA report submitted is incomplete as described in Section 6.0. No payment for “PDA Testing” will be made if the Department performs PDA testing. If the Department does not perform PDA testing, the number of “PDA Testing” per pile will be equal to one.

The complete and accepted PDA assistance will be paid for at the unit bid price for “PDA Assistance” per each. Include in the unit bid price for “PDA Assistance” all costs for PDA preparation and support including all materials, labor, tools, equipment, mobilization and incidentals necessary to complete the work described in this provision excluding the costs for the PDA testing described above. Costs for PDA preparation and support for restrikes and redrives will not be paid for separately. The number of “PDA Assistance” per pile will be equal to one for each pile tested with the PDA.

The cost of the pile and the installation including driving, restriking and redriving will be paid for separately in accordance with the Standard Specifications and will not be part of these PDA pay items.

PILE DRIVING CRITERIA:

(9-18-12)

Revise the *2012 Standard Specifications* as follows:

Page 4-72, Subarticle 450-3(D)(3) Required Driving Resistance, lines 26-30, delete first paragraph and replace with the following:

The Engineer will determine if the proposed pile driving methods and equipment are acceptable and provide the blows/ft and equivalent set for the required driving resistance noted in the plans, i.e., “pile driving criteria” except for structures with pile driving analyzer (PDA) testing. For structures with PDA testing, provide pile driving criteria for any bents and end bents with piles in accordance with Subarticle 450-3(F)(4).

Page 4-73, Subarticle 450-3(F) Pile Driving Analyzer, lines 45-48, delete third paragraph and replace with the following:

The Engineer will complete the review of the proposed pile driving methods and equipment within 7 days of receiving PDA reports and pile driving criteria. Do not place concrete for caps or footings on piles until PDA reports and pile driving criteria have been accepted.

Page 4-75, Subarticle 450-3(F) Pile Driving Analyzer, add the following:

(4) Pile Driving Criteria

Analyze pile driving with the GRL Wave Equation Analysis Program (GRLWEAP) manufactured by Pile Dynamics, Inc. Use the same PDA Consultant that provides PDA reports to perform GRLWEAP analyses and develop pile driving criteria. Provide driving criteria sealed by an engineer approved as a Project Engineer (key person) for the same PDA Consultant.

Analyze pile driving so driving stresses, energy transfer, ram stroke and blows/ft from PDA testing and resistances from CAPWAP analyses correlate to GRLWEAP models. Provide pile driving criteria for each combination of required driving resistance and pile length installed for all pile types and sizes. Submit 2 copies of pile driving criteria with PDA reports. Include the following for driving criteria:

- (a) Project information in accordance with Subarticle 450-3(F)(3)(a)
- (b) Table showing blows/ft and equivalent set vs. either stroke for multiple strokes in increments of 6" or bounce chamber pressure for multiple pressures in increments of 1 psi
- (c) Maximum stroke or blows/ft or pile cushion requirements to prevent overstressing piles as needed
- (d) GRLWEAP software version information
- (e) PDF copy of all pile driving criteria and executable GRLWEAP input and output files

Page 4-76, Article 450-4 MEASUREMENT AND PAYMENT, add the following:

The contract unit price for *PDA Testing* will also be full compensation for performing GRLWEAP analysis and developing and providing pile driving criteria.

GROUT FOR STRUCTURES:

9-30-11

DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, or decks. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

MATERIAL REQUIREMENTS

Use a Department approved pre-packaged, non-shrink, non-metallic grout. Contact the Materials and Tests Unit for a list of approved pre-packaged grouts and consult the manufacturer to determine if the pre-packaged grout selected is suitable for the required application.

When using an approved pre-packaged grout, a grout mix design submittal is not required. The grout shall be free of soluble chlorides and contain less than one percent soluble sulfate. Supply water in compliance with Article 1024-4 of the Standard Specifications. Aggregate may be added to the mix only where recommended or permitted by the manufacturer and Engineer. The quantity and gradation of the aggregate shall be in accordance with the manufacturer's recommendations.

Admixtures, if approved by the Department, shall be used in accordance with the manufacturer's recommendations. The manufacture date shall be clearly stamped on each container. Admixtures with an expired shelf life shall not be used.

The Engineer reserves the right to reject material based on unsatisfactory performance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Test the expansion and shrinkage of the grout in accordance with ASTM C1090. The grout shall expand no more than 0.2% and shall exhibit no shrinkage. Furnish a Type 4 material certification showing results of tests conducted to determine the properties listed in the Standard Specifications and to assure the material is non-shrink.

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22. Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

When tested in accordance with ASTM C666, Procedure A, the durability factor of the grout shall not be less than 80.

SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

Do not place grout if the grout temperature is less than 50°F or more than 90°F or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 45°F.

Provide grout at a rate that permits proper handling, placing and finishing in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer. Use grout free of any lumps and undispersed cement. Agitate grout continuously before placement.

Control grout delivery so the interval between placing batches in the same component does not exceed 20 minutes.

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. The compressive strength of the grout will be considered the average compressive strength test results of 3 cube or 2 cylinder specimens at 28 days.

BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

REMOVAL OF EXISTING STRUCTURE:

The Contractor shall be responsible for complete removal of any remaining portion of the existing structures. The Contractor's attention is directed to Article 402-2 of the Standard Specifications.

The removal of the existing structure shall be paid at the contract lump sum price for "Removal of Existing Structure."

VERTICAL CONCRETE BARRIER RAIL:

(1-27-10)

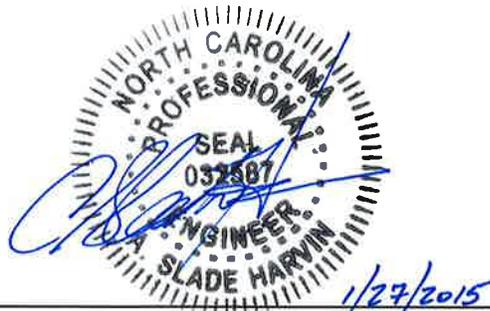
Use Vertical Concrete Barrier Rail in accordance with the concrete barrier rail provisions of Section 460 of the Standard Specifications. Replace references to "concrete barrier rail" with "vertical concrete barrier rail."

The work covered in this section shall be considered incidental to the contract line item "Construction of Superstructure."

PROJECT MANUAL
FOR
FILBERTS CREEK BRIDGE WATER AND SEWER
UTILITY RELOCATION
FOR
THE TOWN OF EDENTON
EDENTON, NORTH CAROLINA
2478-FL

FINAL SPECIFICATIONS
ISSUED FOR CONSTRUCTION

JANUARY 2015



A. SLADE HARVIN, P.E.



THE WOOTEN COMPANY

ENGINEERING | PLANNING | ARCHITECTURE

301 West 14th Street Greenville NC 27834

252.757.1096 fax 252.757.3221

License No. F-0115

CERTIFICATION PAGE

A. Civil Engineering Design

I, A. Slade Harvin, P.E., hereby certify that the Bidding Requirements, Section 00800, Divisions 1 and Division 2 of the Town of Edenton – Filberts Creek Bridge Water and Wastewater Utility Relocation Project Manual were prepared by me or under my direct supervision.



END OF DOCUMENT

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00010	Table of Contents	

Bidding Requirements

Contract Requirements

Technical Specifications

Division 1 - General Requirements

Section	Title	Pages
01100	Summary of Work	
01270	Unit Prices	

Division 2 - Site Construction

02230	Clearing and Grubbing	
02300	Earthwork	
02315	Trenching for Utilities	
02370	Erosion Control	
02445	Bore and Jack of Conduits	
02447	Horizontal Directional Drilling	
02510	Water Distribution System	
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02610	Pavement Patching	
02700	Pavement and Appurtenances	
02920	Lawns and Grasses	

Divisions 3 – 16 – NOT USED

END OF DOCUMENT

SECTION 01100

SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work described in this Project Manual includes the provision of labor, materials, equipment, and services required to complete the Filberts Creek Bridge Water and Sewer Utility Relocation for the Town of Edenton, North Carolina.

1.02 CONTRACTS

- A. Project construction will be let under one Contract with construction including, but not limited to, the following major work items:
- B. Project construction will be let under the following Prime Contract with construction including, but not limited to, the following major work items:
 - 1. Contract I, General
 - a. LF of 6-Inch DIP Waterline
 - b. LF of 12-Inch DIP Waterline
 - c. LF of 18-Inch DIP Sewer Force Main
 - d. One 12-Inch Fusible PVC Waterline by Directional Drill
 - e. One 18-Inch Fusible PVC Sewer Force Main by Directional Drill
 - f. Two New Fire Hydrant Assemblies
 - g. New 6-Inch Gate Valves
 - h. New 10-Inch Gate Valves
 - i. New 18-Inch Plug Valves
 - j. New Air Release Valve and Manhole
 - k. New 6-Inch Tapping Sleeve and Valves
 - l. Associated Site Work.

1.03 DIVISION OF WORK

- A. The following division of the Project Manual by Contract is for general reference for the Contractors and does not relieve each Contractor of reviewing the Work and providing proper coordination between Contracts.
- B. The following Sections of the Project Manual shall be applicable to Contract:
 - 1. Division 1, General Requirements
 - 2. Division 2, Site Construction

1.04 WORK SEQUENCE

- A. Construction Progress Schedule, as required in Section, Submittal Procedures, shall indicate the anticipated items and times that the Work will interfere with normal facility operation.
- B. Contractor is responsible for all bypass pumping required to construct the project as shown. Construction activities that interfere with normal operation of existing facilities shall be specifically noted on construction schedule. For each of these activities provide a detailed construction sequence showing the bypass pumping arrangement.

- C. Indicate switchovers and cut-ins between new work and existing utilities on the construction schedule. Submit proposed date for switchover in writing to Engineer and Owner a minimum of seven (7) days and again 24-hours in advance of actual field work. Owner shall have the right to delay Work due to operational requirements, without additional cost to Owner.
- D. Perform switchovers and cut-ins during low flow periods to the facility. This shall normally require night / weekend operations by Contractor at no additional compensation.
- E. Notice To Proceed shall be based on an agreed upon date between Owner and Contractor, but shall not be issued later than 60 days after the Agreement.

1.05 OWNER OCCUPANCY

- A. Owner will occupy site during entire period of construction.
- B. Contractors shall cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

1.06 CONTRACTOR USE OF SITE

- A. Work is located within Rights-of-way of the NC Department of Transportation. Requirements of the owners of the rights-of-way must be complied with and specifically as required in the permits provided by NCDOT.
- B. Only Owner's right to perform construction and maintenance operations with its own forces and to employ separate contractors on portions of the Project limits contractor's use of site during the construction period. Work at the Project site by Owner will be coordinated with the Contractor.
- C. Contractor shall provide his own staging area as necessary for his Work.
- D. Contractor's use of the site during the construction period may be limited by Owner's necessity to operate the existing facilities.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01270

UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Delineation of measurement and payment criteria applicable to Work performed under Contract by the unit price payment method.

1.02 FIELD MEASUREMENT

- A. Take measurements and compute quantities for submittal of the monthly pay request unless specified otherwise in the measurement paragraphs as indicated in this Section.

1.03 CHANGE IN QUANTITIES

- A. Increase in the quantity of a bid item above what is indicated in the Bid Form shall only be made by a Change Order as required by the Contract Documents.
- B. A final adjusting Change Order shall be made for adjustment of the actual quantities installed prior to submittal of the final pay request.

1.04 GENERAL

- A. Items with a "(X)" in the title of the following bid items represents the size or depth as indicated on the Bid Form.
- B. Method of measurement for the individual Bid Items shall be as specified below.
- C. Payment for each item shall be in accordance with the Contract Unit Price times the number of units installed in accordance with the Contract Documents.
- D. Work for each bid item shall include, but not be limited to, the work listed below and the labor, materials, equipment, and services required and reasonably implied by the Contract Documents for a complete installation.
- E. Administrative cost including, but not limited to, mobilization, bonds, insurance, shop drawing submittal, project signage, video and photographic records, coordination of construction activities (including but not limited to updating master construction schedule, providing weekly tasks schedule, coordination with owner, engineer, utility providers, permitting agencies, etc.), as-built documentation, construction trailers, and office administration for the Project construction shall be included in the individual unit price items.

1.05 UTILITY PIPING

- A. Measurement: Measure horizontally or from station to station as shown or indicated on the Drawings for the various types and sizes of pipes installed.
 - 1. (X)-inch Water Main: No deduction will be made for space occupied by valves or fittings.
 - 2. (X)-inch Force Main: No deduction will be made for space occupied by valves or fittings.
- B. Work shall include, but not be limited to (unless specifically noted otherwise on the Bid Form and this specification Section), the following:
 - 1. Clearing and grubbing where necessary.

2. Traffic control.
3. Temporary removal and restoration or temporary support of, but not limited to, existing mail boxes, signs, fences, shrubs, plants (under 6 feet in height), guard rails, power and telephone poles.
4. Excavating, shoring and bracing where required, dewatering as required, installing, backfilling (including Class I material as specified for the pipe bedding, haunching, and initial backfill).
5. Installation of warning / identification tape over utilities.
6. Installation of tracer wire on non-metallic utilities.
7. Temporary support and protection of existing underground facilities.
8. Pipe, concrete blocking and encasement, connection to existing piping, and fittings.
9. Flushing and testing.
10. Repair to damaged new and existing utilities.
11. Repair to asphalt and concrete paved surfaces including curb and gutter. Repair to gravel drives.
12. Adjust existing and new manhole and valve boxes to finished surface elevations.
13. Cutting and removal of existing paved surfaces. Patching of existing paved surfaces shall be paid as indicated in the paragraph, "Patching of Asphalt and Concrete Pavement."
14. Grade disturbed areas to original surface profile prior to seeding.
15. Clean up and seeding.

C. Water: Work shall include disinfection.

D. Payment: The first Application for Payment will be approved based on the utilities installed during the agreed upon payment period without testing. Subsequent Application for Payments shall not be approved by the Engineer unless utilities installed during the previous payment period have passed the specified tests and clean up and seeding is complete.

1.06 CLEANUP AND SEEDING ALONG UTILITY PIPELINES

A. Measurement: Lump sum.

B. Work: Shall include the full width of the disturbed area for the cleanup and seeding along pipeline construction. Work shall include, but not be limited to, the following:

1. Removal and proper disposal of debris and excess material.
2. Grade disturbed areas to original surface profile prior to trench excavation.
3. Cleaning of paved surfaces.
4. Repair to asphalt and concrete paved surfaces including curb and gutter. Repair to gravel drives.
5. Proper seeding of disturbed area including mulching.
6. Obtain approval of cleanup from owner of right-of-way.

1.07 BID ITEMS LISTED BY THE UNIT "EACH" (EA)

A. Measurement: By the number installed.

B. Water work items:

1. (X)-inch Valve and Box: Valve, valve box, concrete setting pad, concrete top collar, and valve markers as shown in contract.
2. (X)-inch x (X)-inch Tapping Sleeve and Valve: Tapping sleeve, valve, valve box, concrete setting pad and concrete top collar.

3. Fire Hydrant Assembly: Fire hydrant, hydrant tee, hydrant elbow, standpipe extension(s), concrete base, blocking, bridle rods and rod collars, the 6 inch gate valve (including valve box, concrete setting pad and concrete top collar) and 6-inch pipe from the water main to hydrant.
 4. Replace Existing Fire Hydrant Assembly: Fire hydrant, standpipe extension(s), concrete base, blocking, bridle rods and rod collars.
 5. Relocate Existing Fire Hydrant Assembly: Fire hydrant, standpipe extension(s), 6-inch pipe extension, concrete base, blocking, bridle rods and rod collars.
- C. Sanitary sewer work items:
1. Air Release Valve in Manhole: Air release valve, pipe tap, and 5 foot diameter flat top manhole (including stone base, frame and cover).
- D. Erosion control work items:
1. Rock Check Dam: Excavation, riprap, #5 washed stone, maintenance during construction, and final removal and clean up.
 2. Inlet Protection: Silt fence installation with #5 washed stone, maintenance during construction, and final removal and clean up.
 3. Erosion Control Matting: Provide matting at locations as directed by the Engineer.
 4. Stone Construction Entrance: Excavation, washed stone, maintenance during construction, and final removal and clean up.
 5. Arc Check Dam: Excavation, riprap, #5 washed stone, maintenance during construction, and final removal and clean up. Dams will located as directed by Engineer.

1.08 (X)-INCH WATER LINE BY HORIZONTAL DIRECTIONAL DRILL

- A. Measurement: Measurement for one complete directional drill installed.
- B. Work: Complete installation from station to station as indicated on the Drawings including, but not limited to, access to launching and target pitsexcavating, installing, horizontal directional drilling, backfilling, (including class I material as specified for the pipe bedding, haunching, and initial backfill), off-site borrow material, compacting, testing, flushing, disinfection, pipe material (including fusible PVC (or HDPE), RJDIP, and DI piping, MJ adapter, reducer, and fittings), valves, transition to open cut installation, as necessary, seeding, mulching and tacking, associated erosion control measures, and all labor, materials, and accessories required for a complete installation. No payment shall be made for failed attempts to install pipe by directional drill.

1.09 (X)-INCH SEWER LINE BY HORIZONTAL DIRECTIONAL DRILL

- A. Measurement: Measurement for one complete directional drill installed.
- B. Work: Complete installation from station to station as indicated on the Drawings including, but not limited to, access to launching and target pits excavating, installing, horizontal directional drilling, backfilling, (including class I material as specified for the pipe bedding, haunching, and initial backfill), off-site borrow material, compacting, testing, flushing, disinfection, pipe material (including fusible PVC or (HDPE)), RJDIP, and DI piping, MJ adapter, reducer, and fittings), valves, transition to open cut installation, as necessary, seeding, mulching and tacking, associated erosion control measures, and all labor, materials, and accessories required for a complete installation. No payment shall be made for failed attempts to install pipe by directional drill.

1.10 UNDERCUT UNSTABLE PIPE FOUNDATION

- A. Measurement: Measure along the centerline of the trench times the undercut depth below the pipe bedding as approved by Engineer times the pipe OD plus two feet. Measure unstable soils at manholes on the maximum basis of 1 foot greater diameter than the outside diameter of the manhole and a depth as approved by the Engineer. Measurement shall be based on the actual quantities removed but not exceeding the maximum specified trench dimensions. Take measurements in the presence of the Engineer. Maintain daily log sheets of measured quantities. Log sheets must be signed by Engineer and submitted with payment request. Payment shall not be made for quantities that have not been field verified by the Engineer.
- B. Work: Complete removal and disposal of unstable soil including, but not limited to, excavating, loading, hauling, properly disposing of excavated material, and providing stone for backfill. Providing stone material for backfilling shall include, but not be limited to, material, loading, hauling, placing and compacting.

1.11 ASPHALT PAVEMENT PATCHING

- A. Measurement: Measure by the square yard along centerline of pavement cut times the pipe OD plus two feet. Payment shall not be made for pavement repair required due to excessive open cut caused by Contractor.
- B. Work: Backfilling, compacting, stone sub-base, asphalt at the depths as specified.

1.12 SILT FENCE

- A. Measure along the base of the silt fence installed.
- B. Work: Posts, wire mesh, fabric, base trench, stone, and maintenance during construction, removal and clean up.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01312

PROJECT COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
1. Coordination.
 2. Administrative and supervisory personnel.
 3. General installation provisions.
 4. Cleaning and protection.

1.02 GENERAL COORDINATION REQUIREMENTS

- A. Responsibilities of Contractor:
1. Coordinate construction activities for the Project to assure efficient and proper installation of each part of the Work.
 2. Where availability of space is limited, coordinate installation of components to assure maximum accessibility for maintenance. Make adequate provisions to accommodate components scheduled for later installation.
 3. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. A copy of all memoranda shall be submitted to the Engineer.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Installation meetings.
 6. Project Close-out activities.
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 SPECIAL REQUIREMENTS

END OF SECTION

SECTION 02230

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor shall perform clearing and grubbing. Work shall include, but not be limited, to the following:
 1. Access roads.
 2. Clearing and grubbing.
 3. Removal of surface debris.
 4. Demolition and removal of existing paving and structures.
 5. Temporary and permanent ground cover.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 1. Section 02370 Erosion Control
 2. Section 02920 Lawns and Grasses.

1.03 WARRANTY AND FINES

- A. Contractor is liable for damages to public and private property and fines as may be placed on the Project by the governing agencies due to failure to provide adequate erosion control devices.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PROTECTION

- A. Take reasonable care during construction to avoid damage to vegetation outside of the construction limits. Temporarily tie back ornamental shrubbery and tree branches, where appropriate, to minimize damage. Trees that receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Treat tree trunks damaged by equipment with a tree dressing.
- B. Locate and protect property corners and survey control stakes prior to start of clearing operations.
- C. Provide temporary gates and fences as necessary to prevent unauthorized vehicular access to the site.
- D. Mark clearing limits.

3.02 ACCESS ROADS AND STAGING AREA

- A. Clear for access roads.
- B. Limit clearing and grubbing for access roads to a maximum width for two-way traffic of 30 feet for 20-foot drive and 5 foot shoulders.

- C. Access roads shall have the following:
 - 1. Provide "Temporary Construction Entrance" per the standard detail on the Drawings at connection to State Roads.
 - 2. 6 inches of ABC stone.
 - 3. Provide temporary seeding of shoulders as access drives are installed.
 - 4. Provide storm pipes under drives at points of concentrated water flow.
- D. Clear for a staging area as indicated on the Drawings. Total area to be cleared shall be approved by the Engineer. Area for parking and storage of material shall have 6 inches of ABC stone.
- E. Allow reasonable use of access drive by other Contractors, Owner, Engineer, and others authorized to be on the site by the Owner.
- F. When no longer required remove stone and restore access drives and staging area to original contours. Scarify and seed access drives and staging areas.

3.03 INSTALL EROSION CONTROL DEVICES

- A. Clear areas required to install erosion control devices, which shall be in place and operational prior to other land disturbing activity. Install erosion control devices in accordance with Section, Erosion Control.

3.04 BORROW AND DISPOSAL AREAS

- A. Obtain and pay for erosion control permit for borrow and disposal areas as required by Contractor.
- B. Install and maintain erosion control devices in accordance with Contractor's approved plan.

3.05 CLEARING AND GRUBBING

- A. Clear total width of permanent easement. Clear within temporary construction easement only as necessary for construction.
- B. Grub within the permanent easement only as necessary for the installation of the work. Do not grub within the temporary construction easement.
- C. Clear and grub area within the proposed fence line of the pump stations.
- D. Clear and grub area within the construction limit and easements unless noted otherwise.
- E. Clearing shall consist of cutting and removal of vegetation to the existing ground surface and removal of debris. Debris shall include, but not be limited to, fences, steps, walls, chimneys, footings, foundation slabs, basements, signs, junked vehicles, and other rubble.
- F. Grubbing shall consist of the removal of roots over 3 inches in diameter, matted roots, stumps, and other vegetable matter to 12 inches below existing grade.
- G. Do not precede grading operation by grubbing operation by more than seven days.
- H. When the depth of embankment exceeds 6 feet, cut sound stumps off at the existing ground level and do not grub. Remove decayed stumps to a depth of approximately 2 feet below the existing grade.
- I. Fill holes and depressions and bring cleared and grubbed area to a uniform contour to match existing grade. Provide positive drainage.

- J. Remove and properly dispose of cleared and grubbed material from the site. Make reasonable effort to channel timber resulting from clearing operations into a beneficial use.
- K. Burning shall not be permitted at the site.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provide labor, equipment, and material to perform site preparation and earthwork as specified herein and indicated on the Drawings. Work shall include, but is not limited to, the following:
 - 1. Survey staking as required for construction.
 - 2. Topsoil stripping and stockpiling.
 - 3. Dewatering.
 - 4. Protection of existing facilities.
 - 5. Site grading.
 - 6. Excavation, trenching, and backfilling for structures and foundation including stone base as indicated on the Drawings.
 - 7. Borrow material including, but not limited to, material, excavating, hauling, placing, and compacting.
 - 8. Maintenance and stability of site.
 - 9. Disposal of waste and surplus material.
 - 10. Soil testing.
- B. Examine the site to determine the extent of excavating, grading, and related items necessary to complete the work.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02315 Trenching for Utilities
 - 3. Section 02370 Erosion Control

1.03 REFERENCES

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. American Society of Testing Materials (ASTM)
 - a. C33 Concrete Aggregates.
 - b. D698 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49 Kg) Rammer and 12-inch Drop (Standard Proctor).
 - c. D1556 Density of Soil in Place by the Sand-Cone Method.
 - d. D1586 Penetration Test and Spilt-Barrel Sampling of Soils.
 - e. D2167 Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - f. D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
 - g. D2487 Classification of Soils for Engineering Purposes.
 - h. D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.04 DEFINITIONS

- A. Backfill: A specified material used in refilling a cut, trench, or other excavation, placed at a specified degree of compaction.
- B. Capillary Water Barrier: A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity, which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of water to the area immediately below the slab.
- C. Compaction: Process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of compaction" shall be expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698 (Standard Proctor).
- D. Excavation: The removal of soil or rock to obtain a specified depth or elevation.
- E. Fill: Specified material placed at a specified degree of compaction to obtain an indicated grade or elevation.
- F. Hard Material: Solid, homogeneous material which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment with ripper teeth. Material having a standard penetration resistance as determined by ASTM D1586 60 and 150 blows per foot is defined as "hard material."
- G. Lift: Layer of soil placed on top of a previously prepared or placed soil.
- H. Rock: Solid, homogeneous material which cannot be removed without the systematic drilling and blasting exceeding one (1) cubic yard in volume. Material having a standard penetration resistance as determined by ASTM D1586 greater than 150 blows per foot is defined as "rock." Removal of "hard material" will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.
- I. Soil classification shall be in accordance with ASTM D2487.
 - 1. Satisfactory materials: Soils classified as GW, GP, GC, GM, SP, SC, SM, SW, ML, and CL.
 - 2. Unsuitable materials: Soils considered as unsatisfactory shall be materials that do not comply with the requirements of satisfactory above and include, but shall not be limited to, the following:
 - a. Soil containing organic matter, debris, stones larger than 6 inches, or frozen material. Stones greater than 4 inches will not be permitted in the top 12 inches.
 - b. Soils classified as Pt, CH, MH, OH, and OL.
 - 3. Cohesionless: Classified as GW, GP, SW, and SP. Soils classified as GM and SM shall be classified as cohesionless only when the fines have a plasticity index of less than 10.
 - 4. Cohesive: Classified as GC, SC, ML, CL, MH, and CH. Soils classified as GM and SM shall be classified as cohesive only when the fines have a plasticity index greater than 10.
- J. Subgrade: Lowest elevation upon which fill or other work will be placed in the absence of unsuitable material.
- K. Topsoil: Natural, friable soil, representative of productive soils in the vicinity of the site. Topsoil shall be free from roots, stones larger than 1 inch, objectionable weed

seeds, toxic substances, and materials that hinder grading, planting, and maintenance operations.

1.05 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following.
 - a. Structural fabric.
 - 2. Manufacturer's Installation Procedures.
 - a. Structural fabric
 - 3. Test Reports: Submit for the following:
 - a. Moisture-density relations of soils.
 - b. Field moisture content.
 - c. Soil classification.
 - d. In-place field density.
 - e. Geotechnical engineer's daily field reports.
 - 4. Permits
 - a. Erosion control permits for borrow and disposal site(s).

PART 2 PRODUCTS

2.01 MATERIAL

- A. Capillary water barrier: A clean crushed stone, crushed gravel, or uncrushed gravel conforming to ASTM C33 coarse aggregate grading size 57, 67, or 7.
- B. Stone Base: A clean crushed stone, crushed gravel, or uncrushed gravel conforming to ASTM C33 coarse aggregate grading size ABC
- C. Structural Fabric: Provide structural fabric specifically designed and manufactured to stabilize soft soils under an aggregate base for roads and parking areas. Fabric shall provide a permeable layer, planar flow, and tensile reinforcement for retaining the soil matrix. Fabric shall be inert to commonly encountered chemicals, hydrocarbons, resistant to mildew, rot, and ultraviolet light exposure, and meet or exceed the following test standards:

1. Test	ASTM	
2. Fabric weight (oz / sq yd)	D-1910	6
3. Grab tensile strength (lbs.)	D-1682	200
4. Mullen burst strength (psi)	D-3786	320
5. Puncture strength (lbs.)	D-751	80

PART 3 EXECUTION

3.01 GENERAL

- A. Provide erosion control measures as specified in Section, Erosion Control and clearing and grubbing as specified in Section, Clearing and Grubbing.
- B. Protect existing structures and features to remain.
- C. Dispose of excavated material in such a manner that it will not obstruct the water flow, endanger existing improvements or Work in progress, impair the use or appearance of the existing facilities, or be detrimental to the completed Work.

- D. Weather Limitations: Proceed with fill and backfill operations based on the following weather conditions:
 - 1. Temperature must be above freezing.
 - 2. In windy, hot, or arid conditions with a high rate of evaporation add moisture to the material to maintain the optimum moisture content.
 - 3. Do not proceed in rain or on saturated subgrade.
- E. Repair or undercut and backfill soils that become damaged by construction activity or unsuitable due to being left exposed to the weather at no additional cost.
- F. Do not place material on surfaces that are muddy, frozen, or contain frost.
- G. Excavation carried below the elevation indicated on the Drawings shall be backfilled and compacted in accordance with these specifications.
- H. Remove and properly dispose of unsatisfactory and excess material from the site.

3.02 CONSTRUCTION STAKING

- A. Provide construction staking. Owner will provide key reference points and benchmarks for construction, which in the Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work as necessary for construction. Contractor shall protect and preserve the established reference points and property monuments.
- B. Contractor shall report to Engineer whenever a reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations. Contractor shall be responsible for the accurate replacement or relocation of such reference points or property monuments by a registered professional surveyor in the State of North Carolina.

3.03 PROTECTION OF UNDERGROUND FACILITIES

- A. Approximate locations of existing underground facilities at the site are indicated on the Drawings based on information available to the Engineer. Engineer and Owner do not take responsibility for the accuracy of the information.
- B. Investigate underground facility locations prior to the start of construction.
- C. Repair damage to existing facilities at no additional cost to the Owner.
- D. A change in conditions may be considered due to the location of the existing facilities as allowed in the General Conditions. This does not include the cost for repair of damaged facilities not properly located in advance of construction.

3.04 WATER CONTROL

- A. Inspect the site prior to mobilizing to determine the appropriate equipment for site grading and foundation work.
- B. Perform work to prevent surface water from accumulating in excavations, and unfinished fill areas. Perform grading and excavation so the work area and affected operations shall be continually and effectively drained.
- C. Install a dewatering system prior to excavating beneath the ground water table. Maintain the water table approximately 2 feet below the bottom of the excavation.
- D. Maintain dewatering until backfilling has proceeded above the natural ground water level and the structural weight is sufficient to prevent "floating" of the structure. Provide a job superintendent experienced in dewatering work.

- E. Water from dewatering operations must be disposed of in accordance with the North Carolina Sedimentation Pollution Control Act.

3.05 USE OF EXPLOSIVES

- A. Explosives may not be used on the Project.

3.06 TOPSOIL

- A. Strip topsoil from areas to be disturbed to a depth of 8 inches and stockpile separate from other excavated material. Locate topsoil so that the material can be used readily for the finished grading. Protect and maintain topsoil until needed. Place topsoil after completion of work in accordance with Section, Lawns and Grasses.
- B. Perform stripping with wide track dozer or other appropriate equipment to minimize disturbance to subgrade soils. Do not use rubber-tired equipment.

3.07 SITE GRADING

- A. Proofroll exposed soils following topsoil stripping with a partially loaded tandem axle dump truck to identify unsuitable subgrade areas as determined by the Engineer. Unsuitable areas will be repaired in place or undercut to firm soils as directed by the Engineer.
- B. Perform undercutting of unsuitable soils with a backhoe top loading dump truck or similar equipment approved for the use by the Engineer. Backfill undercut areas immediately.
- C. In undercut areas where the exposed soils may be wet and compaction of the initial fill may be difficult, a bridge lift of about 18 to 24 inches may be allowed at the direction of the Engineer.
- D. In-Place repair shall consist of discing and recompaction of existing soils to a depth of approximately 12 inches.
- E. At the direction of the Engineer provide a structural fabric for stabilization of unsuitable soil areas. Install fabric in accordance with the manufacturer's recommendation and the following minimum requirements.
 - 1. Provide a fabric overlap of 24 inches.
 - 2. Back dump and spread aggregate over fabric at the aggregate specified thickness.
 - 3. Compact aggregate with vibratory roller prior to allowing additional construction traffic.
- F. Site grading shall be unclassified except as specifically indicated otherwise. Perform grading within the limits of the Project. Finished surface shall conform to the grades and cross sections indicated on the Drawings and be uniformly sloped for a positive drainage away from structures.
- G. Excavate rock encountered in cut sections to a depth of 6 inches below finished subgrade and backfill with satisfactory material.
- H. Scarify the existing subgrade surface to a minimum depth of 6 inches and recompact if subgrade density is less than the degree of compaction for the proposed fill material. Plow or bench existing ground surfaces steeper than one vertical to four horizontal in such a manner that the fill material will bond with or be keyed to the existing surface. Use compaction equipment suitable for the soil being compacted. Moisten or aerate material as necessary to obtain the optimum moisture content within plus or minus one percent to obtain specified compaction.

- I. Soils used for fill and backfill shall be satisfactory soils classified SP, SM, or SW in accordance with ASTM D2487. Dry or wet soil as necessary to maintain optimum moisture.
- J. Place backfill and fill material in accordance with the following:
 - 1. Maximum uniform loose lifts: 8 inches
 - 2. Optimum moisture content: 11 - 14 percent
 - 3. Percent compaction at optimum moisture content:
 - a. From ex. grade to within one (1) foot of struc. subgrade: 95
 - b. Final foot to subgrade under floor slabs and pavements: 98
 - c. Under sidewalks and grass areas: 90
- K. Approved compacted subgrade that is disturbed by construction or adverse weather shall be scarified and re-compacted as specified previously. Re-compaction over utilities shall be by hand tamping.

3.08 FILL AND BACKFILL

- A. Place and compact fill and backfill material adjacent to structures in a manner that prevents wedging and eccentric loading on or against structures. Do not use equipment adjacent to structures that may overload structure. Backfill against structure only after concrete has attained the specified 28-day compressive strength.
- B. Stone Base: Structures shall have a compacted crushed stone subgrade to the depth of 12 inches.

3.09 ROCK EXCAVATION

- A. Notify Engineer immediately in the event that rock is encountered when the Contract requires payment by the unit price.

3.10 BORROW MATERIAL

- A. Provide borrow material required for fill and backfill to bring the site to the elevations indicated on the Drawings. Borrow material shall be subject to the approval of the Engineer. Notify Engineer as to the site selected for inspection and approval prior to transporting borrow material to the site.
- B. Obtain erosion control permit as necessary for borrow pit grading operations.
- C. Provide soil analysis for each type of material from proposed borrow pit(s) for Engineer's approval prior to placing borrow material. Contractor shall do necessary work to bring the borrow material to within plus or minus 1-1/2 percent of the optimum moisture content. A minimum of one sample per structure shall be obtained for analysis.

3.11 MAINTENANCE AND STABILITY

- A. Maintain fills and embankments to the grade and cross section indicated on the Drawings until the final completion and acceptance of the Project. Repair areas that are damaged.

3.12 DISPOSAL OF SURPLUS MATERIAL

- A. Dispose of surplus material not required or unsuitable for filling, backfilling, or grading in an approved spoil area in accordance with local ordinances.
- B. Obtain erosion control permit as necessary for disposal site(s).

3.13 SOIL TESTING

- A. Provide the services of an independent soil and material testing firm. Testing firm shall have the following qualifications:
 - 1. Authorized to operate in the state in which Project is located.
 - 2. Have a full-time registered Engineer on staff to review services.
 - 3. Testing equipment shall be calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.
 - 4. Prior to start of Work, submit testing laboratory name, address, and telephone number, names of full-time registered engineer, field inspector, and responsible project manager. Laboratory subject to the approval of the Engineer.
 - 5. The same independent firm shall perform retesting.
- B. Testing Laboratory shall have the following responsibilities for the Project:
 - 1. Attend pre-construction conferences and progress meetings as required by the Engineer.
 - 2. Test samples of mixes submitted by Contractor.
 - 3. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 - 4. Perform specified inspection, sampling, and testing of Soil and Materials in accordance with Contract Documents and specified standards.
 - 5. Ascertain compliance of soil compaction and material mixes with requirements of Contract Documents.
 - 6. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or Products.
 - 7. Perform additional inspections and tests required by Engineer when specified tests have failed.
 - 8. Submit test reports and soil specialist daily logs to the Engineer.
- C. Authority of the Testing Laboratory is limited as follows:
 - 1. May not alter requirements of Contract Documents.
 - 2. May not approve or accept any portion of the Work.
 - 3. May not assume duties of Contractor.
 - 4. Has no authority to stop the Work.
- D. The testing laboratory soil specialist, as a minimum, shall be at the project site for the following:
 - 1. Monitor proofrolling of existing soils to determine requirements for undercutting unsuitable soils
 - 2. Monitor grading for the separation and wasting of unacceptable soils.
 - 3. Providing tests in accordance with the following schedule:
 - a. Optimum moisture and laboratory maximum density: Provide one (1) test per type of material to determine optimum moisture and maximum density values in accordance with ASTM D698.
 - b. Moisture content: Provide two (2) tests per day per type of material in accordance with ASTM D2216.
 - 4. Provide in-place field density in accordance with ASTM D1556 or other approved test and the following schedule:
 - a. Provide a minimum of one (1) in-place bearing capacity test for every 1,200 sq ft of subgrade area under structures prior to the start of foundation work.
 - b. While filling activities are in progress for structures and paved areas. Provide a minimum of one (1) in-place density test for every 1,200 sq ft of lift with a minimum of one (1) test for every lift.

- c. Provide a minimum of one (1) in-place bearing capacity test for every 100 feet of foundation trench.
- 5. Monitor for settlement due to construction activities during excavation work adjacent to existing building.
- E. Submit test reports and soil specialist daily logs in accordance with Section, Quality Control.
- F. Contractor responsibilities for soil testing shall include, but not be limited to, the following:
 - 1. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services as indicated above.
 - 2. Cooperate with laboratory personnel, and provide access to the Work.
 - 3. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site, to facilitate tests and inspections, storage, and curing of test samples.
 - 4. Based on test results, make corrections, adjustments, and modifications of methods, materials, and moisture content for proper placing and compaction of fill and backfill material.

END OF SECTION

SECTION 02315

TRENCHING FOR UTILITIES

PART 1 GENERAL

1.01 SCOPE

- A. Provide labor, equipment, and material to perform required excavating, backfilling, and compacting for utilities and related structures as specified herein and indicated on the Drawings. Work shall include, but not be limited to, the following:
1. Survey staking as required for construction.
 2. Protection of existing improvements.
 3. Location of installed utilities.
 4. Use of explosives.
 5. Dewatering.
 6. Excavating, backfilling, and compacting for utilities.
 7. Installation of electronic marker balls.
 8. Installation of warning / identification tape and tracer wire.
 9. Borrow material.
 10. Disposal of surplus material.
 11. Demolition and removal of existing structures.
 12. Soil Testing.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
1. Section 02230 Clearing and Grubbing
 2. Section 02370 Erosion Control
 3. Section 02510 Water Distribution System
 4. Section 02530 Sanitary Sewer System
 5. Section 02920 Lawns and Grasses

1.03 REFERENCED STANDARDS

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
1. N.C. Department of Transportation - Standard Specifications for Roads and Structures (NCDOT).
 2. American Society of Testing Materials (ASTM)
 - a. D698 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49 Kg) Rammer and 12-inch Drop (Standard Proctor).
 - b. D1556 Density of Soil in Place by the Sand-Cone Method.
 - c. D1586 Penetration Test and Spilt-Barrel Sampling of Soils.
 - d. D2049 Test for Relative Density of Cohesionless Soils.
 - e. D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
 - f. D2487 Classification of Soils for Engineering Purposes.
 3. Uni-Bell PVC Pipe Association

- a. B-5-89 Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Sewer Pipe.

1.04 DEFINITIONS

- A. Backfill: A specified material used in filling the excavated trench and placed at a specified degree of compaction.
 1. Materials: Materials listed herein include processed materials plus the soil classifications listed under the Unified Soil Classification System, (USCS) (Method D2487 and Practice D2488). The soil materials are grouped into five broad categories according to their suitability for this application.
 - a. Class I: Angular, 6 to 40-mm (1/4 to 1-1/2-in), graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shell.
 - b. Class II: Coarse sands and gravels with maximum particle size of 40 mm (1-1/2 in.), including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class.
 - c. Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class.
 - d. Class IV: Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. These materials shall not be used for bedding, haunching, or initial backfill.
 - e. Class V: This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rock larger than 40 mm (1 1/2 in.) in diameter, and other foreign materials. These materials shall not be used for bedding, haunching, or initial backfill.
 2. Backfill Zones: Each backfill zone shall extend the full width of the trench bottom.
 - a. Foundation: Extending down from the bottom of bedding zone as defined below.
 - b. Pipe Embedment
 - 1) Bedding: Extending from 4 inches below the pipe bottom to the pipe bottom for 30-inch diameter and smaller and 6 inches below the pipe bottom for pipes larger than 30 inches in diameter.
 - 2) Haunching: Extending from the bedding (bottom of the pipe) to the pipe spring line.
 - 3) Initial Backfill: Extending from the haunching (pipe spring line) to 1 foot above the top of the pipe.
 - c. Final Backfill: Extending from the initial backfill to the finish ground elevation.
- B. Laying Conditions:
 1. Type 1: Flat bottom trench with loose backfill.
 2. Type 2: Flat bottom trench with backfill lightly consolidated to centerline of pipe.
 3. Type 3: Pipe bedded in 4 inches minimum of loose soil and backfill lightly consolidated to top of pipe.
 4. Type 4: Pipe bedded on Class I material to 1/8 pipe diameter (4 inch minimum) Backfill compacted to top of pipe a minimum of 80 percent of standard proctor.

- 5. Type 5: Pipe bedded in compacted Class I material to pipe centerline with 4-inch minimum under pipe. Backfill to top of pipe with Class I, II, or III and compact to 90 percent of standard proctor.
- C. Compaction: Process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of compaction" shall be expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698 (Standard Proctor).
- D. Excavation: The removal of soil or rock to obtain a specified depth or elevation.
- E. Hard Material: Solid, homogeneous material which is not included in the definition of "rock" but which may require the use of heavy excavation equipment with ripper teeth. Amount must exceed 1 cubic yard in volume. Material having a standard penetration resistance as determined by ASTM D1586 between 60 and 150 blows per foot is defined as "hard material."
- F. Lift: Layer of soil placed on top of a previously prepared or placed soil.
- G. Rock: Solid, homogeneous material which cannot be removed without the systematic drilling and blasting exceeding 1 cubic yard in volume. Material having a standard penetration resistance as determined by ASTM D1586 greater than 150 blows per foot is defined as "rock." Removal of "hard material" will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.
- H. Pipe Springline: A line running horizontally through the center of the pipe.
- I. Topsoil: Natural, friable soil, representative of productive soils in the vicinity of the site. Topsoil shall be free from roots, stones larger than 1 inch, objectionable weed seeds, toxic substances, and materials that hinder grading, planting, and maintenance operations.

1.05 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. Warning / Identification tape.
 - 2. Test Reports: Submit for the following:
 - a. Moisture-density relations of soils.
 - b. Field moisture content.
 - c. Soil classification.
 - d. In-place field density.
 - e. Geotechnical engineer's daily field reports.

PART 2 PRODUCTS

2.01 STONE

- A. Class I material shall be #67 or #78M stone in accordance with NCDOT specifications Section 1005, General Requirements for Aggregate.

2.02 WARNING AND IDENTIFICATION TAPE

- A. Tape shall be a minimum 3-inch wide polyethylene plastic tape manufactured specifically for identification of buried utilities with means of enabling detection by a

metal detector to a minimum depth of 3 feet. Tape shall be color coded and continuously imprinted with warning and identification markings in bold black letters to read "CAUTION - BURIED (utility) LINE BELOW." Color and printing shall be permanent, unaffected by moisture or soil and shall be as follows:

Utility	Color	Marking
1. Water	Blue	Caution - Buried Water Line Below
2. Gravity Sewer	Green	Caution - Buried Sewer Line Below
3. Force Main	Green	Caution - Buried Force Main Below
4. Electric	Red	Caution - Buried Electric Line Below
5. Gas	Yellow	Caution - Buried Gas Line Below
6. Telephone	Orange	Caution - Buried Telephone Line Below
7. SCADA	Orange	Caution - Buried SCADA Line Below

- B. Tape shall be by Blackburn Manufacturing, Joseph G. Pollard Co., or Reef Industries Inc.

2.03 TRACER WIRE

- A. Tracer wire shall be #12 solid copper wire. All connections shall be by wire nuts and taped.
- B. Splices in tracer wire are to be kept to a minimum and joined with copper split nuts of appropriate size.

PART 3 EXECUTION

3.01 PROJECT SAFETY

- A. Contractor is responsible for Project safety.
- B. Perform work in conformance with applicable State and Federal safety regulations including, but not limited, to the following:
 - 1. North Carolina Safety and Health Standards for the Construction Industry (29CFR 1926 Subpart P).
 - 2. NC OSHA Industry Guide No. 14, Excavations.
 - 3. NC OSHA Industry Guide No. 20, Crane Safety.
- C. Provide barriers, warning lights, and other protective devices at excavations as necessary for safety of workers and the public.
- D. Provide sloping of bank, shoring, sheeting, or other means of maintaining the stability of the trench in accordance with the requirements of the Associated Contractor's Manual of Accident Prevention OSHA, Part 1926.P.

3.02 PROTECTION OF UNDERGROUND FACILITIES

- A. Approximate locations of existing underground facilities at the site are indicated on the Drawings based on information available to the Engineer. Engineer and Owner do not take responsibility for the accuracy of the information.
- B. Investigate underground facility locations prior to the start of construction.
- C. Repair damage to existing facilities at no additional cost to the Owner.
- D. A change in conditions may be considered due to the location of the existing facilities as allowed in the General Conditions. This does not include the cost for repair of damaged facilities not properly located in advance of construction.

E. Separation distances shall be in accordance with utilities requirements.

3.03 CONSTRUCTION STAKING

A. Provide construction staking. Owner will provide key reference points and benchmarks for construction, which in the Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work as necessary for construction. Contractor shall protect and preserve the established reference points and property monuments.

B. Contractor shall report to Engineer whenever a reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations. Contractor shall be responsible for the accurate replacement or relocation of such reference points or property monuments by a registered professional surveyor in the State of North Carolina.

3.04 LOCATION OF INSTALLED UTILITIES

A. Contractor shall be responsible for locating contract installed utilities as requested by third parties proposing to dig in the contract area until the date that the entire contract is recommended for final payment by Engineer to Owner.

3.05 WATER CONTROL

A. Prevent surface water from entering the trench.

B. When trench bottom is below the existing ground water table, install a dewatering system to maintain water table 1 foot below trench bottom. Provide a man experienced in dewatering work at the job site.

C. Maintain dewatering until backfilling has proceeded above the existing ground water level.

D. Dispose of water from dewatering operations in accordance with the North Carolina Sedimentation Pollution Control Act.

3.06 USE OF EXPLOSIVES

A. Explosives may not be used on the Project.

3.07 EXCAVATING

A. Excavation shall be by open cut, unless otherwise indicated on the Drawings or specified herein. Short sections of trench may be tunneled or direct bored with the approval of the Engineer.

B. Stockpile excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger Work, impair the use or appearance of existing facilities, or be detrimental to the completed Work.

C. Contractor shall segregate excavated material so as to maintain material suitable for backfill separate from material that is unsuitable.

D. Trench dimensions at the pipe embedment and foundation zone unless noted otherwise shall be as follows:

1. Minimum width: Pipe outside diameter plus 18 inches.

2. Maximum width: Pipe outside diameter plus 24 inches.

3. Sides shall be vertical to a minimum of one foot above the top of pipe.

- E. Shape trench bedding to provide uniform bearing for the full pipe length. Bottom shall be free of protrusions that could cause point loading on pipe. Provide bell holes as required for properly making pipe joint.
- F. Do not over excavate. Excavation below grade without approval of Engineer shall be backfilled with Class I material at no additional cost.
- G. Undercut soils that become unsatisfactory by construction activity or by being left exposed to the weather and backfill with Class I material at no additional cost.
- H. Remove shoring, bracing, and sheeting, unless otherwise noted, as the trench is backfilled. Engineer shall have the authority to require that the sheeting be left in place.
- I. Excavation of trench shall not advance more than 200 feet ahead of the installation. In no case should the excavation extend beyond that which can be backfilled by the end of the workday.
- J. Correct unstable soil conditions encountered at trench foundation by one of the following methods:
 - 1. Excavate below grade as approved by Engineer and backfill with Class I material or approved substitute material at unit price bid or the cost to be included in pipe unit bid price as indicated in Section, Unit Prices.
 - 2. Provide piling and / or timber cradles in a manner approved by the Engineer. Payment will be made as a change to the Contract Price.
 - 3. Provide concrete cradle or encasement of concrete at unit price bid or the cost to be included in the lump sum price as indicated in Section, Unit Prices.
- K. Rock and Hard Material
 - 1. Excavate rock and hard material to a minimum depth of 4 inches below the pipe for pipes smaller than 30 inches and 6 inches for pipes 30 inches and larger.
- L. Pressure Lines:
 - 1. Provide a minimum 3 feet of cover, unless indicated otherwise on the Drawings.
 - 2. Excavate trenches to provide vertical curve chords that will not exceed the pipe manufacturer's recommended joint deflection.
 - 3. Provide concrete thrust blocks having a compressive strength of 3,000 psi at 28 days at change in horizontal and vertical direction and reduction in the pipe size, unless other restraint systems are indicated otherwise on the Drawings. Cut trench sides vertical and square to receive concrete. Provide bearing area against trench wall as indicated on the Drawings.
- M. Utility Structures: Provide a minimum of 12 inches below subgrade and backfill with Class I compacted to 95 percent maximum density. If the soil conditions are found to be unsuitable for structural stability of the manhole, Engineer may require additional depth of Class I material.

3.08 BACKFILLING

- A. Weather Limitations: Proceed with backfill operations based on the following weather conditions:
 - 1. Temperature must be above freezing and rising.
 - 2. In windy, hot, or arid conditions with a high rate of evaporation add moisture to the material to maintain the optimum moisture content.
 - 3. Do not proceed in rain or on saturated subgrade.
 - 4. Do not place material on surfaces that are muddy, frozen, or contain frost.

B. General

1. Maintain backfill operation within 200 feet from pipe laying operation.
2. Backfill trench to existing ground surface with select excavated material at the specified compaction.
3. If excavated material is unsuitable to obtain specified compaction, provide suitable off-site borrow material for backfill.
4. Re-excavate trenches improperly compacted. Backfill and compact as specified.
5. Provide appropriate tamping equipment, and water to obtain proper moisture content, to achieve specified compaction of backfill.
6. Conduct operation of heavy equipment above pipe installation as to prevent damage to pipe.
7. Install warning / identification tape over utilities. Bury tape one foot below finished grade above the utility.
8. Install tracer wire for non-metallic pressure pipe. Bury tracer wire with pipe. Wire shall be looped into valve boxes to allow access for direct contact location.

C. Backfill in pipe embedment zone (bedding, haunching, and initial backfill).

1. General:

- a. Backfill with material as specified below. Material shall be free from objects larger than 2 inches.
 - b. Where rock and hard material has been excavated below pipe bottom, backfill and compact bedding with Class I material. Class II or III material may be used for bedding with Engineer's approval.
 - c. Place backfill material to assure placement of material under pipe haunches.
 - d. Take care during placement and compacting of material to avoid movement of pipe.
2. Place backfill in bedding and haunching zones in 6 inch maximum lifts and compact to 90 percent density. Place initial backfill in one lift do not compact. Provide backfill material in pipe embedment zone as specified below.
- a. Pressure Lines (Flexible and Rigid Pipe)
 - 1) Excavation in Class I, Class II, and Class III soils suitable for bedding, the bedding surface shall provide a firm foundation of uniform density. Backfill with select excavated material.
 - 2) Excavation in Class IV or Class V, running water, and other unstable soil conditions, excavate a minimum of 4 inches below pipe bottom and provide Class I material for bedding and haunch zone. Backfill with Class I, II, or III material in initial backfill.

D. Final Backfill

1. Backfill with materials free of stones and free of debris larger than 6 inches in dimension. Place backfill in lifts not exceeding the thickness and compacted to the minimum density specified below.
2. Trench backfilled with noncohesive materials may be compacted with water flooding; except under roadways, shoulders of roadways, and other areas subject to vehicular movement, provided the method of compaction is approved by the Engineer and provides the degree of compaction required.
3. Lifts and density:
 - a. Undeveloped areas (i.e., forests, fields, and, croplands): Trench may be filled with bulldozer blade provided material fall will not damage pipe. Mound soil over the trench area sufficiently to settle level over time. Degree of compaction shall be 85 percent.

- b. Lawns: Backfill in 12-inch lifts and compact to 90 percent. Top 12 inches shall be free of material with a dimension over 2 inches.
 - c. Roads (including Rights-of-way), drives, parking areas (including areas within 20 feet), and adjacent to existing utilities: Backfill in 6 inch lifts compact to 95 percent.
 - d. Within 20 feet of foundations: Backfill in 6-inch lifts compacted to 95 percent.
- E. Utility Structures: Bring backfill to grade in even lifts on all sides. Lift depths and compaction densities shall be as specified according to area of installation for pipe above. Backfill against cast-in-place concrete structure only after concrete has attained the specified 28-day compressive strength.

3.09 ANTI-SEEP COLLARS

- A. Anti-seep Collars: Provide anti-seep collars to prevent groundwater flow along pipe in wetlands as indicated on the Drawings. Use select clay material for collars. Collars shall extend past trench walls and bear against undisturbed soils. Dimension of collars shall be as indicated on the Drawings. Do not place stone in area of anti-seep collars.
- B. Concrete Collar: Provide Class B concrete with minimum cement content of 5 sacks per cubic yard (5.5 sacks for angular course aggregate); 6.8 gallons of water per sack water-cement ratio; 2-4 inch slump range; and 28-day strength of 2,500 psi.

3.10 SOIL TESTING

- A. Provide services of a soil-testing firm.
- B. Testing laboratory soil specialist, as a minimum, shall be at the project site for the following:
 - 1. Provide a minimum of one (1) in-place density test for every 1,000 lf of trench.
- C. Density tests shall be made in accordance with ASTM D-698, Standard Proctor Method.
- D. Submit test reports and soil specialist daily logs in accordance with NCDOT requirements.
- E. Based on test results, make corrections, adjustments, and modifications of methods, materials, and moisture content for proper trench compaction.

3.11 PAVEMENT PATCHING

- A. Repair damaged pavement structure.
- B. Cut existing pavement for utility installation in straight lines generally parallel to the utility. Properly dispose of removed pavement structure.
- C. Extend pavement patch 1 foot beyond each side of trench on firm subgrade. Slope new surface to drain.
- D. Asphalt Pavements: Replace asphalt pavement with a pavement structure equal to existing but no less than as detailed on the Drawings.
- E. Concrete Pavements: Replace concrete pavement with pavement structure equal to existing but no less than as detailed as Drawings. Concrete shall be minimum 3,000 psi. When existing concrete joint is within 5 feet of trench remove existing concrete to joint. Provide expansion joint at edge of existing concrete. Surface treatment shall match existing.

- F. Curbs, Gutters, and Sidewalks: Replace curbs and gutters, and sidewalks removed or damaged with similar sections to match the existing. Remove to nearest existing joint.
- G. Approval of Other Authorities: Pavements under the jurisdiction of the NC Division of Highways shall be subject to the approval of a representative of that Division.
- H. Raise existing and new manholes and valve boxes to finished pavement grade. Excavate around top of existing manhole and valve box as necessary. Remove existing top ring, and install new grade ring(s) as necessary. Install existing cover. Raise existing valve box. Provide concrete collar around manhole ring and valve box.
- I. Pavement patching shall include the cost to adjust existing and new manhole and valve boxes to finished pavement elevations.

3.12 GRADING AND CLEAN-UP:

- A. Provide for testing and clean up as soon as practicable, so these operations do not lag far behind the pipe installation. Perform preliminary clean up and grading as soon as backfill is complete.
- B. Provide positive drainage of finished grade and drain away from structures. Finished grade shall be reasonably smooth, compacted, free from irregular surface changes and comparable to the adjacent existing ground surface.
- C. Seed disturbed areas in accordance with Section, Lawns and Grasses.
- D. Upon completion of backfilling, remove and properly dispose of excess material and waste.

END OF SECTION

SECTION 02370

EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor shall provide erosion control work. Work shall include, but not be limited to, the following:
 - 1. Erosion control at project site.
 - 2. Erosion control at borrows and disposal areas as required by Contractor. Cost shall include erosion control permits as necessary for borrow and disposal areas.
 - 3. Removal of surface debris.
 - 4. Temporary and permanent ground cover.
 - 5. Maintain and remove erosion control devices.
 - 6. Self Inspection and Monitoring

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02920 Lawns and Grasses

1.03 REFERENCED STANDARDS

- A. "Erosion and Sediment Control Planning and Design Manual," issued by the N. C. Sedimentation Control Commission.

1.04 QUALITY ASSURANCE

- A. Conform to rules and regulations of the Erosion Control Laws of the State of North Carolina, specifically the Sedimentation Pollution Control Act of 1973 (G.S. 113A) as amended, and the local jurisdiction where the project is located.
- B. Post a copy of the approved erosion control permit, furnished by Owner, at the site prior to starting work. Maintain a copy of the approved erosion control plan at the site.
- C. Provide permanent ground cover as soon as possible, and no later than 15 working days after completion of work in a specific area.

1.05 WARRANTY

- A. Contractor is liable for damages to public and private property and fines as may be placed on the Project by the governing agencies due to failure to provide adequate erosion control devices.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Matting / Erosion Control Fabric (ECF): Matting and ECF shall be heavy jute mesh over mulch held in place by staples. Commercially available ECFs may be used upon approval of the engineer. Approval of fabrics will require manufacturer's design

data regarding velocity, ditch slopes, method of installation, decay cycle, repair techniques, and grass growth enhancement characteristics.

- B. Wire Staples: 16 gauge steel wire, with minimum of 3" top and 4" long legs.
- C. Gravel for Stone Filters: #57 crushed stone.
- D. Filter Fabric: 7-1/2 oz. burlap fabric or other silt filtering fabric.
- E. Riprap:
 - 1. Class A: Stone shall conform to NCDOT standards and shall range in size from 2 to 6-inches with the stone gradation being equally distributed within the required size range.
 - 2. Class B: Stone shall conform to NCDOT standards and shall range in size from 5 to 12-inches with the stone gradation being equally distributed within the required size range.
 - 3. Type 1: Stone shall conform to NCDOT standards and shall range in size from 5 to 17-inches with the stone gradation being equally distributed within the required size range.

PART 3 EXECUTION

3.01 INSTALL EROSION CONTROL DEVICES

- A. Install erosion control devices, which shall be in place and operational prior to other land disturbing activity.
- B. After installing erosion control devices as indicated on the Drawings, verify that reasonable measures have been taken to prevent the sedimentation of nearby watercourses, existing and new facilities, and adjacent property.
- C. Should Contractor believe that additional measures are necessary to adequately prevent erosion, immediately notify Engineer. If rain is predicted before the Engineer can be notified, take measures as necessary to prevent siltation of nearby water courses and work will be paid for as provided in the General Conditions.
- D. After installing erosion control devices, request an inspection by the local agency having jurisdiction and the Engineer.
- E. Incorporate permanent erosion control work into the project at the earliest practicable time. Coordinate temporary erosion control measures with permanent erosion control measures and other work on the project to assure effective and continuous erosion control throughout the construction and post construction period.
- F. Maintain erosion control devices during construction until the disturbed areas are stabilized and the agency having jurisdiction and the Engineer have approved the removal of the erosion control devices.

3.02 BORROW AND DISPOSAL AREAS:

- A. Obtain and pay for erosion control permit for borrow and disposal areas as required by Contractor.
- B. Install and maintain erosion control devices in accordance with Contractor's approved plan.

3.03 MAINTENANCE

- A. Inspect erosion control devices after each rainfall. Make required repairs immediately. Remove sediment deposits when deposits reach approximately one-half of the capacity of the erosion control device.
- B. Respread accumulated sediments on the project site in a manner that will not adversely affect erosion control facilities and permanent ground cover.
- C. Silt Fence: Should the filter fabric decompose or become ineffective before approval of its removal by the Engineer, replace fabric immediately at no additional cost to the Owner.
- D. Temporary Construction Entrance: Maintain entrance in a condition that will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with 2 inches of stone, as conditions require, at no additional cost to the Owner.

3.04 SEEDING

- A. Disturbed areas not covered by new construction shall be seeded.
- B. Provide temporary and permanent seeding in accordance with Section, Lawns and Grasses.

3.05 STABILIZATION AND CLEAN-UP

- A. Remove erosion control devices upon the approval of the permanent stabilization of this site by the agency having jurisdiction of the area and the Engineer. Dress sediment deposits remaining in place after the erosion control devices are removed to conform to the existing grade, prepared and seeded. Include cost of removal and cleanup in the cost of the installation of the device.

3.06 SELF INSPECTION AND MONITORING

- A. Provide self-inspection and reporting as required by the Sedimentation Pollution Control Act for the duration of the project. These inspections will be performed to ensure that the approved sedimentation and erosion control measures on the Drawings are installed, maintained, and working adequately.
 - 1. The inspections need to be conducted after each phase of the project, and continue until permanent ground cover is established.
 - 2. The self-inspection forms and information regarding this program are provided at the following website: http://www.dlr.enr.state.nc.us/pages/sedimentation_new.html.
 - 3. Documentation of inspections shall be recorded on a single copy of the approved erosion and sedimentation control drawings. These Drawings and inspection reports shall be made available at the project site.
- B. Provide weekly self-monitoring in accordance with the NPDES Stormwater permit for all construction activities.

END OF SECTION

SECTION 02445

BORE AND JACK OF CONDUITS

PART 1 GENERAL

1.01 SCOPE

- A. Provide, complete in place, carrier pipe installed within steel encasement pipe under railroads and highways as indicated on the Drawings.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02315 Trenching for Utilities
 - 2. Section 02510 Water Distribution System
 - 3. Section 02530 Sanitary Sewer System

1.03 INDUSTRY REFERENCES

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification.
 - 1. Highway Crossing: Install pipe under highways in accordance with "Policies and Procedures for Accommodating Utilities on Highway Rights-of-Way," NC Department of Transportation, as a minimum.

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that all tests set forth in each applicable referenced publication have been performed and that all test requirements have been met. Submit for each of the following materials:
 - a. Encasement Pipe.
 - 2. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. Pipe support.
 - b. Casing seal.

1.05 QUALITY ASSURANCE

- A. Work covered in this Section of the specifications is within the right(s)-of-way of the following:
 - 1. N.C. Department of Transportation (NCDOT)
 - a. All Work in Chowan County
 - b. Division 1, District 3
 - c. Darrick S. Lee, P.E. – District Engineer
19210 US Hwy. 64 East
Williamston, NC 27892
Phone: (252) 789-6150
- B. Bear costs, including but not limited to, bonds, insurance, coordination, inspection fees, flagmen, permanent and temporary signage, etc. as required by the respective agency indicated above. Specific agency requirements are indicated in the Encroachment Agreement as attached to Section, Supplementary Conditions.

- C. Comply with requirements of the Encroachment Agreement(s).
- D. Prior to start of Work provide notifications as indicated in the Encroachment Agreement.
- E. Work shall conform to the requirements and be subject to the approval of the above agency.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Encasement Pipe: Encasement pipe shall be uncoated, welded steel meeting ASTM A-139, Grade B, with minimum yield strength of 35,000 psi. Pipe length, and size shall be as indicated on the Drawings. The minimum wall thickness shall be as shown below. Encasement thickness shall be stenciled on exterior of pipe.

- 1. N.C. Department of Transportation

Pipe Size (O.D.-inches)	Wall Thickness (inches)
4 - 12-3/4	0.188
16 – 24	0.250
30	0.312
36	0.375
42	0.500
48	0.500

- B. Carrier Pipe: Carrier pipe shall be of the type, size, and joints as indicated on the Drawings and specified in Section, Water Distribution System and Section, Sanitary Sewer System.
- C. Pipe Support: Provide pipe supports designed and manufactured for the support of the carrier pipe size and material to be used for the Project within the encasement size indicated on the Drawings. Supports shall be designed to carry the pipe at the support spacing specified and meet the following minimum requirements:
 - 1. Band Width: 8 inches for pipes 14 inches and under and 12 inches for pipes 16 inches and over.
 - 2. Band and Riser Material: 14 gauge steel for band and riser except if the riser is over 6 inches high the steel shall be 10 gauge for riser. Riser shall be of the channel shape. Band with risers shall a fusion bonded PVC coating of a minimum of 10-mil thickness. Band shall be bolted together with stainless steel bolts, nuts, and washers.
 - 3. Band Liner: Provide PVC liner a minimum of 0.09 inches.
 - 4. Runners: Glass Reinforced Polyester or UHMW Polymer plastic. Runner shall be a minimum of 1 inch wide and not more than 1 inch shorter than the bandwidth. Provide 2 top and 2 bottom runners for pipe sizes through 12 inches and 2 top and 4 bottom runners for pipes over 12 inches.
 - 5. Pipe position within casing: Centered and Restrained.
 - 6. Support Spacing:
 - a. General:

- 1) Provide a support within one foot on each side of joints. Provide a support within one foot of each end of casing.
 - 2) Provide additional supports as needed per manufacturer's recommendations.
 - b. PVC: Provide pipe supports at a maximum of 6 foot spacing along pipe in addition to the above requirement.
 7. Supports shall be as manufactured by Advance Products & Systems, Inc., Pipeline Seal and Insulator, Inc or equal.
- D. Casing End Seal: Provide casing seal designed and manufactured for sealing around the casing and carrier pipe. The seal may be a wrap-around or a pull-on. Seal shall be made of 1/8-inch thick synthetic rubber. Seal shall be secured with stainless steel banding straps with worm gear tightening device.

PART 3 EXECUTION

3.01 GENERAL

- A. Verify the subsurface conditions at each boring site. Payment will not be made for encasement pipe installed but not usable.
- B. Stabilize and maintain bore pit bottom to provide proper equipment support and maintain pipe alignment. Dewater as necessary for site. Excavate bore pit in accordance with OSHA regulations. Provide adequate barricades, railings, and warning lights throughout the boring operation. Conduct operation in such a manner so as not to create a hazard to, nor impede the flow of traffic.
- C. Install encasement pipe by dry boring and jacking.
- D. Boring auger diameter shall not be greater than the outside diameter of the encasement pipe and shall not extend more than 6-inches ahead of the cutting edge of the encasement pipe. Fill voids that are formed during the operation with a 1:3 portland cement grout pumped at 50 psi to ensure that there will be no settlement of the roadway.
- E. As the boring operation progresses, butt weld each new section of the encasement pipe to the section previously jacked into place. Maintain proper alignment. Confirm the grade of the encasement pipe as the Work progresses.
- F. If an obstruction is encountered during the boring operation, efforts should be made to remove the obstruction. If obstruction cannot be removed, withdraw the encasement pipe and fill the void with 1:3 portland cement grout at 50 psi. If the encasement pipe cannot be withdrawn, seal ends before moving to another bore site. Engineer shall approve location of new bore site. A maximum of two (2) attempts as described above as necessary, including additional bore pits, shall be made by the Contractor at the bid unit price.
- G. If, after the second attempt, it is found to be impossible to install the encasement pipe by boring due to rock or some other obstruction, a change order will be negotiated for placing the pipeline by open-cut or tunneling in accordance with the Contract Documents.
- H. Provide seals at each end of encasement pipe.

3.02 CARRIER PIPE

- A. Install carrier pipe in the encasement pipe using manufactured pipe supports. Supports shall prevent movement of the carrier pipe within the encasement. Space supports as specified.

END OF SECTION

SECTION 02447
HORIZONTAL DIRECTIONAL DRILLING
FOR (HDPE) PIPE INSTALLATION

PART 1 GENERAL

1.01 SCOPE

- A. Provide complete installation of high density polyethylene (HDPE) pressure pipe at stream crossings by horizontal directional drilling (HDD) as indicated on the drawings.
- B. Work shall include, but not be limited, to the following:
 - 1. General site and access preparation necessary for construction operations.
 - 2. Assembly of HDPE pipe.
 - 3. Hydrostatic testing of the pipe prior to installation (Contractor's option).
 - 4. Erection of drilling equipment.
 - 5. Drilling of a small diameter pilot hole.
 - 6. Reaming the pilot hole as specified herein to a diameter suitable for installation of the pipe.
 - 7. Pulling the assembled pipe through the reamed hole along with the detector wire.
 - 8. Hydrostatic testing of pipe after installation.
 - 9. Cleanup and final restoration of work area.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02315 Trenching for Utilities
 - 3. Section 02510 Water Distribution System
 - 4. Section 02530 Sanitary Sewer System

1.03 REFERENCES

- A. Publications are referred to in the text by basic designation only.
 - 1. American Society for Testing and Materials (ASTM)
 - a. D3350 Polyethylene Plastics Pipe and Fittings Materials
 - 2. American Water Works Association (AWWA)
 - a. B300 Hypochlorites
 - b. B301 Liquid Chlorine
 - c. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - d. C105 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
 - e. C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - f. C150 Thickness Design of Ductile Iron Pipe
 - g. C151 Ductile-Iron Pipe, Centrifugally Cast, for Water
 - h. C153 Ductile-Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch, for Water Service
 - i. C600 Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
 - j. C651 Disinfecting Water Mains

- k. C906 Polyethylene (PE) pressure Pipe and Fittings, 4 - 63 inch for Water Distribution and Transmission

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that all tests set forth in each applicable referenced publication have been performed and that all test requirements have been met. Submit for each of the following materials:
 - a. HDPE Pipe.
 - b. Ductile Iron Pipe with Restrained Joints
 - 2. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. HDPE Pipe.
 - b. Ductile Iron Pipe with Restrained Joints
 - c. Polyethylene encasement
 - 3. Test Reports: Submit for the following:
 - a. Field test including calibration report and pressure testing.
 - 4. Description of the arrangement of directional drilling including method of monitoring and controlling line and grade, schedule, and procedure of installation.
 - 5. Provide pipe manufacturer's recommended pull-back pressure to be utilized during installation.
 - 6. Log sheets as required herein.
 - 7. Provide certified as-built drawing (profile) upon completion of drilling.

1.05 QUALITY ASSURANCE

- A. Pipe manufacturer shall have an established quality control program responsible for inspecting and testing incoming and outgoing material.
- B. Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance records.
- C. Contractor shall employ personal that have a minimum of ten (10) similar installations of HDPE by horizontal directional drilling as appropriate for the installation.
- D. Directional drilling method shall be mechanical with fluid assistance. Pneumatic, water jetting, jacking, and boring method will not be permitted.
- E. Install HDPE pressure pipe by directional drilling in accordance with the best industry practice, manufacturer's recommendations and the Contract Documents.
- F. Equipment used to monitor pull-back pressure shall be calibrated prior to each installation.

PART 2 PRODUCTS

2.01 GENERAL

- A. Products with surfaces intended to be in contact with the drinking water shall be certified and listed in accordance with NSF 61 for potable drinking water and bear the NSF seal on each section of pipe.

2.02 MATERIALS

- A. Polyethylene (PE) Pressure Pipe: The pipe shall conform to AWWA C906 and the following requirements:
 - 1. Pipe shall be certified and listed for potable water distribution products in accordance with NSF 61 and bear the NSF seal on each section of pipe.
 - 2. Outside diameter shall conform with ductile-iron pipe for pipes 20-inch and smaller and iron pipe size for 24-inch and above.
 - 3. Material for pipe manufacturing shall be PE 3408 high density polyethylene (HDPE) meeting ASTM D3350 cell classification of 345444C.
 - 4. Pipe shall be pressure class 200 with a standard dimension ratio (DR) 9.
 - 5. Fittings shall be made of material meeting the same requirements as the pipe.

PART 3 EXECUTION

3.01 GENERAL

- A. Investigate the subsurface conditions at the crossing location.
- B. Provide water for the drilling process.
- C. Handle pipe in accordance with manufacturer's recommendation.
- D. Utilize pipe rollers during layout and pull-back operations to prevent excess sagging of the pipe. Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested before installation and during pull-back operations.
- E. Directional drilling procedure shall include provisions to guard against electrical shock such as ground mats, ground cables, hot boots and gloves. Drilling equipment shall include an alarm system capable of detecting electrical current as it nears electrical lines.
- F. Maintain log sheets for drilling fluid pressure, flow rate, drill thrust pressure, pull-back pressure, drill head torque and drill head location plots at 20 foot intervals.
- G. Drilling fluids shall be inert and of no risk to the environment. No fluid will be utilized that does not comply with permit requirements and environmental regulations. Drilling fluid should remain in the bore hole to increase the stability of the surrounding soil and to reduce the drag on the pulled pipe.
- H. If an obstruction is encountered during the drilling operation, efforts should be made to remove the obstruction. If obstruction cannot be removed, withdraw the drilling head and fill the void with 1:3 portland cement grout at 50 psi. If the head cannot be withdrawn, seal ends before moving to another site. Engineer shall approve location of new drilling site. A maximum of two (2) attempts as described above shall be made by the Contractor at the bid unit or lump sum price.
- I. If after the second attempt it is found to be impossible to install the pipe by drilling due to rock or some other obstruction, a change order will be negotiated for placing the pipeline by open-cut or tunneling in accordance with the Contract Documents.
- J. No additional payment will be made for failed attempts.

3.02 DIRECTIONAL DRILLING

- A. General
 - 1. Drill pilot hole along the path shown on the Drawings to the following tolerances:

- a. Vertical Location - Plus or minus 1 foot
 - b. Horizontal Location - Plus or minus 6 feet.
 2. At the completion of the pilot hole drilling, provide a tabulation of coordinates referenced to the drilled entry point which accurately describes the location of the pilot hole.
 3. For drills under non-structural conditions, perform reaming diameter to 1.25 to 1.5 times the outside diameter of the HDPE pipe (bell joints for DIP) being installed. Prepare pipe to facilitate connection to the remainder of the pipeline being installed.
 4. For drills under structural conditions (i.e., roadways), perform reaming diameter to 2 inches maximum greater than outside diameter of the pipe being installed. If larger size is necessary, provide statement from North Carolina Professional Engineer stating that "an overbore in excess of 2-inches will arch and no damage will be done to pavement or sub-grade".
- B. Polyethylene (PE) Pressure Pipe
1. Joints at the ends of directionally drilled runs shall be fusion bonded to the adjacent pipe section. Mechanical couplings are not permitted. Fusion bonding may be accomplished through the use of butt fusion or electrofusion coupling techniques as specified.
 2. Use care to protect the pipe from scarring, gouging, or excessive abrasion.
 3. Method of connection between HDPE pipe and other pipe materials shall be as indicated on the Drawings
 4. Pipe shall be deflected within the tolerances as provided by the pipe manufacturer.
 5. Allow one week from the time of installation for pipe to be connected other piping systems to allow tensional stresses to relax.

3.03 CLEAN UP

- A. Upon completion of the pipe installation, backfill the drilling pit and receiving pit as specified.
- B. Properly remove and dispose of drilling fluid and spoil material in compliance with relative environmental regulations, right-of-way and work space agreements under permit requirements. Drilling fluid returns at locations other than the entry and exit points shall be minimized. Immediately clean up drilling fluid that inadvertently surfaces.

3.04 FIELD TESTS

- A. Prior to Installation Contractor may elect, at his expense, to hydrostatically test or perform a low pressure air test on the pipe line to determine the integrity of the joints. This shall not be considered an alternative to the testing required after installation.
- B. Following installation test pipe in accordance with pressure testing in Section, Water Distribution System.

END OF SECTION

SECTION 02447A

HORIZONTAL DIRECTIONAL DRILLING FOR PIPE INSTALLATION (FUSIBLE PVC)

PART 1 GENERAL

1.01 SCOPE

- A. Provide complete installation of fusible polyvinylchloride pipe (FPVCP) by horizontal directional drilling (HDD) as indicated on the drawings.
- B. Work shall include, but not be limited, to the following:
 - 1. General site and access preparation necessary for construction operations.
 - 2. Assembly of pipe.
 - 3. Hydrostatic testing of the pipe prior to installation (Contractor's option).
 - 4. Erection of drilling equipment.
 - 5. Drilling of a small diameter pilot hole.
 - 6. Reaming the pilot hole as specified herein to a diameter suitable for installation of the pipe.
 - 7. Pulling the assembled pipe through the reamed hole along with the detector wire.
 - 8. Hydrostatic testing of pipe after installation.
 - 9. Cleanup and final restoration of work area.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02315 Trenching for Utilities
 - 3. Section 02510 Water Distribution System
 - 4. Section 02530 Sanitary Sewer System
- B. The North Carolina Department of Transportation Standard Specifications are made reference to as they pertain to horizontal directional drilling beneath roadways. Construction shall comply with these specifications. Upon a conflict between this section and the NCDOT specifications, the more stringent requirement shall prevail.

1.03 REFERENCES

- A. Publications are referred to in the text by basic designation only.
 - 1. American Society for Testing and Materials (ASTM)
 - a. D1784 Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - b. D2152 Test Method for Degree of Fusion of Extruded PVC Pipe and Molded Fittings by Acetone Immersion
 - c. D3350 Polyethylene Plastics Pipe and Fittings Materials
 - 2. American Water Works Association (AWWA)
 - a. B300 Hypochlorites
 - b. B301 Liquid Chlorine
 - c. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - d. C105 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids

- e. C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- f. C150 Thickness Design of Ductile Iron Pipe
- g. C151 Ductile-Iron Pipe, Centrifugally Cast, for Water
- h. C153 Ductile-Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch, for Water Service
- i. C600 Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
- j. C651 Disinfecting Water Mains
- k. C900 PVC Pressure Pipe for Water Distribution
- l. C905 PVC Pressure Pipe for Water Distribution and Transmission
- m. C906 Polyethylene (PE) pressure Pipe and Fittings, 4 - 63 inch for Water Distribution and Transmission
- n. M23 Manual of Supply Practices PVC Pipe – Design and Installation
- 3. National Sanitation Foundation (NSF) Standards
 - a. 14 Plastic Piping Components and Related Materials
 - b. 61 Drinking Water System Components – Health Effects

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that all tests set forth in each applicable referenced publication have been performed and that all test requirements have been met. Submit for each of the following materials:
 - a. FPVCP
 - 2. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. FPVCP
 - 3. Test Reports: Submit for the following:
 - a. Field test including calibration report and pressure testing.
 - 4. Description of the arrangement of directional drilling including method of monitoring and controlling line and grade, schedule, and procedure of installation.
 - 5. Provide pipe manufacturer's recommended pull-back pressure to be utilized during installation.
 - 6. Log sheets as required herein.
 - 7. Provide certified as-built drawing (profile) upon completion of drilling.

1.05 QUALITY ASSURANCE

- A. Pipe manufacturer shall have an established quality control program responsible for inspecting and testing incoming and outgoing material.
- B. Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance records.
- C. Contractor shall employ personnel that have a minimum of ten (10) similar HDD installations of FPVCP by horizontal directional drilling as appropriate for the installation. For FPVC pipe, fusing technician shall be qualified by the pipe supplier to install the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.
- D. Directional drilling method shall be mechanical with fluid assistance. Pneumatic, water jetting, jacking, and boring method will not be permitted.

- E. Install pipe by directional drilling in accordance with the best industry practice, manufacturer's recommendations and the Contract Documents.
- F. Equipment used to monitor pull-back pressure shall be calibrated prior to each installation.
- G. Pipe and fusion services shall be warrantied for a minimum of one year from date of acceptance.

PART 2 PRODUCTS

2.01 GENERAL

- A. Products with surfaces intended to be in contact with the drinking water shall be certified and listed in accordance with NSF 61 for potable drinking water and bear the NSF seal on each section of pipe.

2.02 MATERIALS

- A. Fusible Polyvinylchloride Pipe
 1. Fusible polyvinylchloride pipe shall conform to AWWA C900 or AWWA C905, as applicable. Testing shall be in accordance with AWWA standards for all of these pipe types.
 2. Pipe shall be DIPS standard dimensions with a minimum pressure rating of 235 psi (DR18) and the size as indicated on the Drawings.
 3. Piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784.
 4. Fusible polyvinylchloride pipe may conform to ASTM D3034 or ASTM F679 for non-pressure use, as indicated in the drawings.
 5. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
 6. Fusible polyvinylchloride pipe shall be manufactured in standard 40 foot nominal lengths.
 7. Fusible polyvinylchloride pipe shall be blue in color for potable water use. Fusible polyvinylchloride pipe shall be purple in color for reclaim, reuse, or other non-potable distribution or conveyance. Fusible polyvinylchloride pipe shall be white in color for raw water collection and transmission, surface run-off, storm water use, or other non-potable resource or irrigation water uses, as indicated in the drawings. Fusible polyvinylchloride pipe shall be green in color for wastewater use.
 8. Pipe generally shall be marked per industry standards, and shall include as a minimum:
 - a. Nominal pipe size
 - b. PVC
 - c. Dimension Ratio, Standard Dimension Ratio or Schedule
 - d. Pipe legend or stiffness designation, or AWWA pressure class, or standard pressure rating for non-AWWA pipe
 - e. AWWA Standard designation number or pipe type for non-AWWA pipe (omit for ASTM D3034 or ASTM F679 pipe)
 - f. Extrusion production-record code
 - g. Trademark or trade name
 - h. Cell Classification 12454 and/or PVC material code 1120 may also be included.

9. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

PART 3 EXECUTION

3.01 GENERAL

- A. Investigate the subsurface conditions at the crossing location.
- B. Provide water for the drilling process.
- C. Handle pipe in accordance with manufacturer's recommendation.
- D. Utilize pipe rollers during layout and pull-back operations to prevent excess sagging of the pipe. Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested before installation and during pull-back operations.
- E. Directional drilling procedure shall include provisions to guard against electrical shock such as ground mats, ground cables, hot boots and gloves. Drilling equipment shall include an alarm system capable of detecting electrical current as it nears electrical lines.
- F. Maintain log sheets for drilling fluid pressure, flow rate, drill thrust pressure, pull-back pressure, drill head torque and drill head location plots at 20 foot intervals.
- G. Drilling fluids shall be inert and of no risk to the environment. No fluid will be utilized that does not comply with permit requirements and environmental regulations. Drilling fluid should remain in the bore hole to increase the stability of the surrounding soil and to reduce the drag on the pulled pipe.

3.02 DIRECTIONAL DRILLING

- A. General
 1. Drill pilot hole along the path shown on the Drawings to the following tolerances:
 - a. Vertical Location - Plus or minus 0.5 feet
 - b. Horizontal Location - Plus or minus 3 feet.
 2. At the completion of the pilot hole drilling, provide a tabulation of coordinates referenced to the drilled entry point which accurately describes the location of the pilot hole.
 3. Perform reaming diameter to 1.25 to 1.5 times the outside diameter of the pipe being installed. Prepare pipe to facilitate connection to the remainder of the pipeline being installed.
- B. Fusible Polyvinylchloride (FPVC) pipe
 1. General
 - a. Installation guidelines from the pipe supplier shall be followed for all installations.
 - b. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius guidelines.
 - c. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended maximum safe pulling force, established by the pipe supplier, shall not be exceeded
 2. Handling and Storage
 - a. Pipe shall be offloaded, loaded, installed, handled, stored and stacked per the pipe supplier's guidelines. These guidelines include compliance with

- the minimum recommended bend radius and maximum safe pull force for the specific pipe being used.
- b. The general best practices of the industry per AWWA M23 shall also be observed.
3. Fusion Joints
 - a. Fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The fusion technician shall follow the pipe supplier's guidelines for this procedure. All fusion joints shall be completed as described in this specification.
 4. Fusion Process
 - a. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.
 - b. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians holding current qualification credentials for the pipe size being fused, as documented by the pipe supplier.
 - c. Pipe supplier's procedures shall be followed at all times during fusion operations.
 - d. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine, which utilizes a current version of the pipe supplier's recommended and compatible software.
 - e. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. This includes requirements for safety, maintenance, and operation with minor modifications made for PVC.
 5. Installation:
 - a. Pull heads for use with FPVCP
 - 1) Pipe pull heads shall be utilized that employ a positive through-bolt design assuring a smooth wall against the pipe cross-section at all times.
 - 2) Pipe pull heads shall be specifically designed for use with fusible polyvinylchloride pipe, and shall be as recommended by the pipe supplier.
 - b. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.
 - c. Contractor shall handle the pipe in a manner that will not over-stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not bend past the pipe supplier's minimum allowable bend radius, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.
 - d. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.
 - 1) The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.
 - 2) The fusible polyvinylchloride pipe may be continuously or partially supported on rollers or other Owner and Engineer approved friction decreasing implement during joining and insertion, as long as the pipe is not over-stressed or critically abraded prior to, or during installation.
 - 3) A swivel shall be used between the reaming head and the fusible polyvinylchloride pipe to minimize torsion stress on the pipe assembly.
 - e. Buoyancy modification shall be at the sole discretion of the Contractor, and shall not exceed the pipe supplier's guidelines in regards to maximum pull

force or minimum bend radius of the pipe. Damage caused by buoyancy modifications shall be the responsibility of the Contractor.

- f. Once pull-back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole.
- g. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the Contractor's operations shall be corrected by the Contractor.
- h. Once installed, the contractor shall make connections to the open cut pipe by means of mechanical joint fittings, taking care to correct horizontal or vertical alignment with the fittings rather than the Fusible PVC.

3.03 CLEAN UP

- A. Upon completion of the pipe installation, backfill the drilling pit and receiving pit as specified.
- B. Properly remove and dispose of drilling fluid and spoil material in compliance with relative environmental regulations, right-of-way and work space agreements under permit requirements. Drilling fluid returns at locations other than the entry and exit points shall be minimized. Immediately clean up drilling fluid that inadvertently surfaces.
- C. Provide a certified as-built drawing with profile indicating the depth from existing grade to the new top of pipe. Measurements, using available technology, shall be taken at the beginning and end of the drill and a minimum of every 50' along the drill length. A minimum of 3 measurements shall be obtained regardless of length.

3.04 CONNECTIONS TO INSTALLED HDD

- A. Where connections are necessary to the installed Horizontal directional drill, follow manufacturer's recommendations for making connections.
- B. For service taps on fusible PVC, no direct taps pipe will be allowed. Use either a saddle or sleeve made specifically for PVC pipe when tapping. Tapping equipment shall be motor driven and have a PVC proper cutting tool. Provide proper restraints for taps if recommended by manufacturer.
- C. Tees for fire hydrants and water main connections shall be cut-in and conform to specification Section, Water Distribution System.

3.05 FIELD TESTS

- A. Prior to Installation, Contractor may elect at his expense, to hydrostatically test or perform a low pressure air test on the pipe line to determine the integrity of the joints. This shall not be considered an alternative to the testing required after installation.

- B. Following installation and prior to connection with other piping sections, test pipe segment in accordance with pressure testing procedure in Section, Water Distribution System. No leakage is allowable during this test. Use proper methods to seal pipe ends and include proper restraints (e.g., MJ caps and megalugs).
- C. Upon acceptance of a successful segment test by Engineer, test pipe system in accordance with pressure testing procedure in Section, Water Distribution System.

END OF SECTION

SECTION 02510

WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work under this section includes, but is not limited to, piping, valves, fire hydrants, water service line, and appurtenances for a complete potable water distribution system.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
1. Section 02315 Trenching for Utilities
 2. Section 02445 Bore and Jack of Conduits

1.03 REFERENCES

- A. Publications are referred to in the text by basic designation only.
1. American Society of Sanitary Engineering (ASSE) Standards
 - a. 1013 Reduced Pressure Principle Backflow Preventers
 - b. 1015 Double Check Backflow Prevention Assembly
 - c. 1069 Outdoor Enclosures for Backflow Prevention Assemblies
 2. American Society for Testing and Materials (ASTM)
 - a. C443 Flexible Watertight Joints for Precast Manhole Sections
 - b. C478 Precast Reinforced Concrete Manhole Sections
 - c. C828 Low-Pressure Air Test of Vitrified Clay Pipe Lines (4 to 12 inch)
 - d. C890 Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
 - e. C923 Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
 - f. D1784 Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - g. D1785 Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
 - h. D2241 Poly(Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series)
 - i. D2466 Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
 - j. D2467 Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
 - k. D3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
 - l. D3350 Polyethylene Plastics Pipe and Fittings Materials.
 - m. F477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - n. F1483 Specification for Oriented Poly(Vinyl Chloride) PVCO, Pressure Pipe
 3. American Water Works Association (AWWA)
 - a. B300 Hypochlorites
 - b. B301 Liquid Chlorine
 - c. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - d. C105 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids

- e. C110 Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids
- f. C115 Flanged Ductile-Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
- g. C150 Thickness Design of Ductile Iron Pipe
- h. C151 Ductile-Iron Pipe, Centrifugally Cast, for Water
- i. C153 Ductile-Iron Compact Fittings, 3 inch through 24 inch and 54 inch through 64 inch, for Water Service
- j. C502 Dry-Barrel Fire Hydrants
- k. C504 Rubber-Seated Butterfly Valves
- l. C508 Swing-Check Valves for Waterworks Service, 2 inch Through 24 inch NPS
- m. C509 Resilient Seated Gate Valves for Water and Sewerage Systems
- n. C510 Double Check Valve Backflow-Prevention Assembly
- o. C511 Reduced-Pressure Principle Backflow-Prevention Assembly
- p. C512 Air-Release, Air / Vacuum, and Combination Air Valves for Waterworks Service
- q. C515 Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service
- r. C550 Protective Epoxy Interior Coatings for Valves and Hydrants
- s. C600 Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
- t. C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
- u. C651 Disinfecting Water Mains
- v. C700 Cold-Water Meters-Displacement Type, Bronze Main Case
- w. C701 Cold-Water Meters-Turbine Type, for Customer Service
- x. C702 Cold-Water Meters-Compound Type
- y. C704 Cold-Water Meters-Propeller Type for Waterworks Applications
- z. C800 Underground Service Line Valves and Fittings
- aa. C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water Distribution
- bb. C901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inch through 3 inch for Water Service
- cc. C905 Polyvinyl Chloride (PVC) Water Transmission Pipe, 14 inch through 36 inch, for Water Distribution
- dd. M23 PVC Pipe - Design Installation
- 4. National Sanitation Foundation (NSF) Standards
 - a. 14 Plastic Piping Components and Related Materials
 - b. 60 Drinking Water Treatment Chemicals – Health Effects
 - c. 61 Drinking Water System Components - Health Effects
 - d. 372 Drinking Water System Components – Lead Content

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that all tests set forth in each applicable referenced publication have been performed and that all test requirements have been met. Submit for each of the following materials:
 - a. Pipe and Fittings
 - 1) Ductile iron
 - 2) Polyvinyl Chloride (PVC)

- i) AWWA C900
 - b. Valves
 - 1) Gate
 - i) Resilient-Seated
 - ii) Tapping
 - 2) Butterfly
 - c. Fire hydrants
- 2. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. Pipe and Fittings
 - 1) Ductile iron
 - 2) Polyvinyl Chloride (PVC)
 - i) AWWA C900
 - b. Valves
 - 1) Gate
 - i) Resilient-Seated
 - ii) Tapping
 - 2) Butterfly
 - c. Castings
 - d. Tapping sleeves
 - e. Valve boxes
 - f. Fire hydrants
- 3. Reports:
 - a. Field test report for each section of pipe for the following:
 - 1) Measured chlorine residual
 - 2) Bacteriological test
 - 3) Pressure test
 - b. Field test report for each backflow prevention device.
- 4. Operation and Maintenance Instructions: Submit complete operation and maintenance manual for the following:
 - a. Valves
 - b. Fire hydrants

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Provide a suitable pipe hook or rope sling when handling the pipe with a crane. Lifting of the pipe shall be done in a vertical plane. Under no conditions shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to both the tongue and groove ends.
- B. Deliver pipe in the field as near as practicable to the place where it is to be installed. Distribute pipe along the side of the trench opposite to the spoil bank. Where necessary to move the pipe longitudinally along the trench, it shall be done in such a manner as not to injure the pipe or coating.
- C. Shield PVC pipe and fittings stored on site from the sun's ultraviolet rays by suitable cover, or indoor storage.

PART 2 PRODUCTS

2.01 GENERAL

- A. Products with surfaces intended to be in contact with the drinking water shall be certified and listed in accordance with NSF 61 for potable drinking water.

2.02 DUCTILE IRON PIPE

- A. Pipe and fittings 3-inch to 64-inch shall conform to AWWA C150 and C151 and the following requirements:
 - 1. Size shall be as indicated on the Drawings.
 - 2. Minimum pipe pressure class shall be 250 unless indicated otherwise on the Drawings.
 - 3. Suitable for a system working pressure of 150 psi at the depth indicated on the Drawings with a laying condition as indicated in Section, Trenching for Utilities.
 - 4. Interior lining to be used in a drinking water system shall be certified and listed in accordance with NSF 61.
 - 5. Interior shall be lined with cement-mortar with seal coat in accordance with AWWA C104.
- B. Ductile-iron pipe for below ground service shall have push-on or mechanical joints, unless noted otherwise on the Drawings, conforming to AWWA C150 and C151, and to the following requirements:
 - 1. Provide mechanical joint fittings, unless noted otherwise on the Drawings.
 - 2. Encase pipe in polyethylene conforming to AWWA C105.
- C. Ductile-iron pipe for above ground service shall have flanged joints, unless noted otherwise on the Drawings, conforming to AWWA C115.
 - 1. Pipes to be painted shall have only a shop primer on the outside by the manufacturer. Verify that proposed manufacturer's primer is compatible with the proposed paint system.
- D. Fittings for ductile-iron pipe shall conform to AWWA C110, or C153 and to the following requirements:
 - 1. Joint type shall be as specified above for the supplied ductile-iron pipe.
 - 2. In lieu of exterior asphaltic coating and interior cement lining, fittings may be provided with a 6-8 mil nominal thickness fusion bonded epoxy coating inside and out in conformance with AWWA C550.
 - 3. Fittings shall be made of ductile-iron.
- E. Gaskets shall be nitrile material for installation in areas as designated on the Drawings.
- F. Special Pipe Joints
 - 1. Restrained
 - a. Provide restrained joint pipe at fittings and valves on water mains. Length of restrained pipe shall be as indicated on the Drawings. Restrained joints shall be Snap-Lok (Griffin Pipe), Flex Ring and Lok-Ring (American), TR Flex (U.S. Pipe) or approved equal.
 - b. Restrained joint pipe and fittings shall meet all AWWA standards and other requirements as specified above for standard ductile iron pipe and fittings unless addressed herein.
 - c. Field made joints are allowable but should be avoided where possible. Careful planning to locate field cuts in standard pipe sections is preferred. For field made joints in restrained piping, use field weldments or an insert

equal to TR Flex Gripper Rings or approved equal. Gasket type field made joints will not be allowed.

- d. Restrained joint fittings shall be provided by the restrained joint pipe supplier where located within restrained joint pipe sections.. Fittings shall be of the same model / type as the pipe supplied from the pipe manufacturer.
- e. Restrained joint fittings may be push-on joint type.
- f. Megalugs, Series 1100, as manufactured by EBAA Iron Sales or approved equal shall be allowable for restraint where fittings or valves are not available with restrained joints from the pipe manufacturer.
- g. Where additional fittings/valves are required for pipes not shown on Drawings, consult with Engineer for length of restrained joint pipe necessary each side of fittings/valve prior to installation of pipe/fitting.
- h. Tees for hydrants do not have to be restrained along the main line except where they are within required restrained length of nearby fittings or valves.
- i. Contractor shall develop a field layout schedule and drawing for restrained joint pipe installations.

2.03 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

A. General

1. Pipe and fitting size shall be as indicated on the Drawings.
2. PVC materials shall comply with ASTM D1784 with a cell classification of 12454-B.
3. Pipe shall be certified and listed for potable water distribution products in accordance with NSF 14 or 61 and bear the NSF seal on each section of pipe.

B. AWWA C900: C900 PVC pipe 4-inch to 12-inch shall conform to AWWA C900 and the following requirements:

1. Outside diameter shall conform to ductile-iron pipe.
2. Pipe shall be suitable for a minimum working pressure of 150 PSI. .
3. Pipe shall have plain end and elastomeric-gasket bell ends.
4. Fittings shall conform to AWWA C110 or C153 and have mechanical joints. Fittings shall be made of gray-iron or ductile-iron. Interior of fittings shall be cement-mortar lined with seal coat in accordance with AWWA C104.

2.04 TAPPING SLEEVE

- ### A. Tapping Sleeve: Tapping sleeves shall be 304 stainless steel, flanged for the tapping valve and manufactured for a working pressure of 150 psi. Sleeve shall have a full body 360-degree gasket. Sleeve shall have a 3/4-inch test plug. Bolts and nuts shall be stainless steel.

2.05 VALVES

A. General: Valves shall meet the following requirements:

1. Size shall be as required for the pipe size and material as indicated on the Drawings and specified.
2. Open by counterclockwise rotation.
3. Provide an interior protective epoxy coating in accordance with AWWA C550 on ferrous surfaces in contact with the liquid.
4. Components in contact with the liquid shall be in compliance with NSF 61.
5. Standard system working pressure is 150 psi.
6. Equip valves with a suitable means of operation.

7. Ends shall be mechanical joint for underground location and flanged joint for above ground location/underground utility vaults.
 8. For buried valves over 5 feet deep, provide extension stems of cold rolled steel to bring the operating nut to within 2 feet of the ground surface. Extension stems shall also be provided as required for floor stands and to floor valve box.
 9. Provide valve accessories as required for proper valve operation for valve locations as indicated on the Drawings and as recommended by valve manufacturer.
 10. Similar valve types shall be of one manufacturer.
- B. Gate Valves, Resilient-Seated: Gate valves 3-inch to 20-inch shall conform to AWWA C509 or AWWA C515 and to the following requirements:
1. O-ring stem seal on non-rising (NRS) stem valves.
 2. Ends shall be mechanical joint for underground locations and flanged joint for above ground locations.
 3. Valves shall be non-rising stem (NRS) with wrench nut for underground locations and Outside Screw and Yoke (OS&Y) with handwheel for above ground locations unless noted otherwise on the Drawings.
- C. Tapping Valves: Tapping valves shall conform to the specifications for the gate valves as indicated in this Section and the following:
1. Valve shall be specifically modified for the passage and clearance of the tapping machine cutter.
 2. The mating end to the tapping sleeve shall be raised male surface to provide true alignment to the sleeve and tapping machine. The valve shall be compatible with the tapping sleeve.
- D. Butterfly Valves: Butterfly valves 3-inch through 72-inch shall conform to AWWA C504 for potable water and to the following requirements:
1. Valve body shall be ductile iron and mechanical joint for below ground locations and flanged short body in underground vaults and above ground locations. End mechanical joints shall conform to ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11. End flanges shall conform to ANSI B16.1, class 125 and ANSI/AWWA C110/21.10.
 2. Valves shall be class 150B.
 3. Rubber seats shall mate with stainless steel or nickel-copper alloy seat surfaces.
 4. Valve shafts shall consist of one-piece unit extending completely through the valve disc for valves under 12-inches. Above this size, shaft shall be one piece or the stub-shaft type. Shafts shall be type 304 stainless steel.
 5. Valve discs shall be cast iron, ductile iron, or stainless steel.
 6. Valve Actuator
 - a. Manual Actuator: Manual actuator shall be of the traveling nut type. Valves for buried service shall have a standard AWWA nut. Valves for above ground shall have a handwheel, or chain wheel as indicated on the Drawings.

2.06 VALVE ACCESSORIES

- A. Valve Box, Below Ground: Boxes shall be high strength cast iron of the screw or telescopic type. Box shall consist of a flare base section, center extension as required, and a top section with the word "WATER" cast in the cover. Length of box shall be such that full extension of box is not required at the depth of water main cover.

- B. Extension Stem (if necessary): Stem shall be sized so as to transmit full torque from the operating mechanism to the valve stem without binding, twisting, or bending. Stem shall be made from stainless steel. Stem shall be complete with couplings for connection to valve and floor stand where required. When valve extension kits are used they must be as recommended by the valve manufacturer.

2.07 FIRE HYDRANTS

- A. Fire hydrants shall conform to AWWA C502 and to the following requirements:
 1. Nozzles: Two (2) 2-1/2-inch hose and One (1) 4-1/2-inch pumper connections.
 2. Nozzle threads: Match Owners.
 3. Main valve diameter: 5-1/4- or 4-1/2 inch.
 4. Minimum depth of bury: 42-inches.
 5. Inlet connection: 6-inch mechanical joint.
 6. Open counterclockwise.
 7. Close with water pressure.
 8. O-ring seals
 9. Traffic model with frangible sections near the ground line designed to break on impact.
 10. Provide extension for hydrant standpipe as required to set centerline of hydrant nozzle a minimum of 15-inches and a maximum of 24-inches.
 11. Exterior color above ground line shall match Owners.
 12. All hydrants of one manufacturer.

2.08 THRUST BLOCKING

- A. Provide concrete thrust blocking in accordance with the detail on the Drawings.
- B. Thrust blocking is not required where restrained joint fittings and equivalent length of restrained joint pipe are used unless shown otherwise on the Drawings.

2.09 DISINFECTANT

- A. The following products may be used as the disinfectant:
 1. Chlorine, liquid: AWWA B301.
 2. Hypochlorite, calcium and sodium: AWWA B300.

PART 3 EXECUTION

3.01 GENERAL

- A. Pipe installation shall meet the following general guidelines:
 1. Lay pipe in the presence of Engineer, unless specifically approved otherwise.
 2. Handle pipe and accessories in accordance with manufacturer's recommendations. Take particular care not to damage pipe coatings.
 3. Carefully inspect pipe immediately prior to laying. Do not use defective pipe. Replace pipe damaged during construction.
 4. Lay pipe to grade and alignment indicated on the Drawings.
 5. Provide proper equipment for lowering pipe into trench.
 6. Do not lay pipe in water or when the trench or weather conditions are unsuitable for the work.
 7. Provide tight closure pipe ends when work is not in progress.
 8. Keep pipe interior free of foreign materials.
 9. Clean bell and spigots before joining. Make joints and lubricate gasket in accordance with pipe manufacturer recommendation.

10. Disinfection of pipe during installation:
 - a. Soak gaskets for minimum of one hour in a 50 - 100 ppm hypochlorite solution prior to installation.
 - b. Mop bells and spigots of pipe, fittings and valves with a 50 - 100 ppm hypochlorite solution immediately prior to making joints.
11. Block fittings with concrete, or restrain as indicated on the Drawings or as required to prevent movement.

3.02 RELATION OF WATER MAINS TO SEWERS

- A. Lateral Separation: Lay water mains at least 10 feet laterally from existing and proposed sewers. Where existing conditions prevent a 10-foot lateral separation, the following shall be followed with approval of the Engineer:
 1. Lay water main in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
 2. Lay water main in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
- B. Crossing Separation: Lay bottom of water main at least 18-inches above the top of the sewer. Where existing conditions prevent an 18-inch vertical separation, construct both the water main and sewer of ferrous materials and with joints that are equivalent to water main standards for a distance of 10 feet on each side of the point of crossing.
- C. Crossing a Water Main Under a Sewer: When it is necessary for a water main to cross under a sewer, construct both the water main and the sewer of ferrous materials and with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

3.03 DUCTILE IRON PIPE

- A. Install pipe in conformance with AWWA C600 and the following:
 1. For laying pipe in a vertical or horizontal curve, each full length pipe may be deflected by the following offset distance:
 - a. Push-on joint
 - 1) 3 to 12-inch pipe: 14-inch offset
 - 2) 14 to 36-inch pipe: 8-inch offset
 - b. Mechanical joint
 - 1) 3 to 6-inch pipe: 20-inch offset
 - 2) 8 to 12-inch pipe: 15-inch offset
 - 3) 14 to 20-inch pipe: 8-inch offset
 - 4) 24 to 36-inch pipe: 6-inch offset
 2. For laying restrained joint pipe in a vertical or horizontal curve, except for horizontal directional drills (HDD), each full length pipe may be deflected by the following offset distance:
 - a. 6 to 12-inch pipe: 11-inch offset
 - b. 16 to 20-inch pipe: 7-inch offset
 - c. 24 to 30-inch pipe: 5-inch offset
 - d. 36-inch pipe: 4-inch offset
 - e. 42 to 48-inch pipe: 1 ¼ -inch offset

3.04 PVC PRESSURE PIPE

- A. Install PVC C900 pipe in conformance with AWWA C605.

- B. Solvent Weld: Field cut ends shall be sanded to roughing the surface. Joints shall be cleaned of foreign material. Solvent shall be applied to the joint and joint made as recommended by the manufacturer. Excess solvent shall be wiped off. Joint should not be moved until sufficiently set up.
- C. Bell and Spigot Joints: Clean bell and spigot ends prior to jointing. Ends of field cut pipe shall be beveled with file. Gasket shall be clean and lightly lubricated. Joint shall be made as recommended by the manufacturer.

3.05 VALVES AND FITTINGS

- A. Install buried valves on top of an 18-inch square, 3-inch thick, solid concrete pad (minimum dimensions). The concrete pad may be provided by a pre-cast manufacturer or cast-in-place in the field above grade. Concrete used for the pads shall be a minimum 3,000 psi mix. The pads may not be cast-in-place in the pipe trench. Connection to pipe shall be such that there shall be no stress at the joint caused by misalignment or inadequate support of pipe or valve.
- B. Valve Box: Set a valve box over each buried valve. Support box so that no stress shall be transmitted to the valve or pipe line. Install box plumb and set top flush with finished grade. Operating nut shall be centered in box. Provide a 24-inch x 24-inch wide by 6-inch thick concrete pad at top of valve boxes outside paved areas.
- C. Valve operation nut shall be within 30 inches of the top of box. Provide stem extension if necessary to bring operating nut to within 30 inches of the top of box.
- D. Install fittings as recommended by the manufacturer. Fittings shall be blocked or otherwise restrained from movement.
- E. Install valves, gates, and accessories indicated on the Drawings and in complete accordance with the manufacturer's recommendations.
- F. Install air / vacuum valve inside a manhole.

3.06 HYDRANT

- A. Set hydrant in accordance with detail on Drawings.

3.07 PAINTING

- A. Equipment shall receive the manufacturer's standard coating for the intended application. Coatings shall be suitable for the intended application.
- B. Repaint damaged paint services.
- C. Above ground piping and piping within vaults shall be painted in accordance with Section, Painting.

3.08 PRESSURE TESTING

- A. Pressure test in accordance with AWWA C600 for ductile iron pipe and AWWA C605 and M23 for PVC pipe and as specified herein
- B. General:
 - 1. The Engineer shall approve the source, quality, and method of disposal of water to be used in test procedures.
 - 2. Obtain Owner's permission 48 hours prior to filling or flushing of pipe system with water from Owner's water system. Owner shall operate valves connected to the existing water system. Where large quantities of water may be required for flushing, Owner reserves the right to require that flushing be done at periods of low demand.

3. Clean and flush pipe system of foreign matter prior to testing.
4. Provide air vents at the high points in the line section to be tested for releasing of air during filling. Service corporation stops may be used for air vent when located at a high point. Include cost of air vents in price of testing. Leave corporation stops in place after testing and note locations on As-Built Drawings.
5. Allow concrete blocking to reach design strength prior to pressure testing.
6. Test main prior to installation of service taps.
7. Repair defects in the pipe system. Make repairs to the same standard as specified for the pipe system.
8. Retest repaired sections until acceptance.
9. Repair visible leaks regardless of the test results.
10. Pipe sections shall not be accepted and placed into service until specified test limits have been met.

C. Testing

1. Notify Owner and Engineer a minimum of 48 hours prior to testing.
2. Perform tests in the presence of Engineer.
3. Make pressure tests between valves. Furnish suitable test plugs where line ends in "free flow."
4. Upon completing a section of pipe between valves, test pipe by maintaining for a two hour period a hydrostatic pressure of 150 psig.
5. Test pressure shall not vary by more than +/- 5 psi for the duration of the test.
6. No length of line shall be accepted if the leakage is greater than that determined by the following formula based on the appropriate test pressure:
 - L = Allowable leakage per 1,000 feet of pipe in gallons per hour.
 - D = Nominal diameter of the pipe in inches.
 - 100 psi: $L = D \times 0.07$
 - 150 psi: $L = D \times 0.08$
 - 200 psi: $L = D \times 0.09$
 - 250 psi: $L = D \times 0.10$

3.09 DISINFECTION

- A. After satisfactory completion of the pressure test, disinfect new potable water mains and existing mains that have required repair in accordance with AWWA C651 and as specified herein.
- B. General:
 1. Provide a superintendent experienced in the required procedures for disinfecting with chlorine.
 2. Obtain Owner's permission 48 hours prior to filling, flushing, and chlorinating of the water mains. Owner shall operate valves connected to the existing water system.
 3. Do not allow highly chlorinated water into the existing distribution system.
 4. If there is any question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to neutralize the residual chlorine. Federal, state, or local environmental regulations may require special provisions or permits prior to disposal of highly chlorinated water.
 5. Perform disinfection and testing in presence of Engineer.
- C. Connection to Existing System: Notify Owner 48 hours prior to making connections to the existing system. Thoroughly clean the existing water main exterior prior to the installation of tapping sleeves and corporation stops. Lightly dust with calcium

hypochlorite powder the water main exterior and the interior surface of the tapping sleeve, and corporation stops.

- D. After satisfactory flushing of the main, disinfect by the injection of a chlorine solution. Induce chlorine in sufficient quantity to maintain a chlorine residual of at least 50 ppm throughout the system to be tested. Maintain the chlorine solution in the system for at least 24 hours.
- E. Valves and Fire Hydrants: Open and close valves on the mains being disinfected a minimum of three times during the chlorine contact period and a minimum of three times during flushing. Fire hydrants and other appurtenances should receive special attention to insure proper disinfection.
- F. For Cut-In Construction: Use the following procedures for disinfecting of the new installation and the existing main at the cut-in point in accordance with AWWA C651, Section 9:
 - 1. Apply liberal quantities of hypochlorite, in the form of tablets, to the open trench.
 - 2. Interior of new pipe and fittings and the ends of the existing mains shall be swabbed or sprayed with a one percent hypochlorite solution before installation.
 - 3. Install a 2-inch tap downstream of the work area. Tap shall be used for blowing off the main, or use the next fire hydrant downstream of the work area for blowing off the main.
 - 4. Install a 2-inch tap just upstream of the new installation. Control Water from the existing system so as to flow slowly into the work area during the application of chlorine. After the line is thoroughly flushed, add chlorine solution at a concentration of 100 ppm by the continuous feed method and hold in the main for one (1) hour.
- G. Prior to flushing, the free chlorine residual shall be a minimum of 10 ppm. Flushing of the lines shall proceed until the lines contain the normal chlorine residual of the system.
- H. Test in the field for free chlorine residual:
 - 1. Sample location shall be the same as required for the bacteriological test samples.
 - 2. Immediately after injection of the chlorine solution. Sample shall have a chlorine residual as specified.
 - 3. Prior to flushing of the highly chlorinated water from the potable water system and a minimum of 24-hours after the initial injection of the chlorine. Sample shall have a minimum chlorine residual as specified.

3.10 BACTERIOLOGICAL TESTING

- A. Required location for obtaining water samples:
 - 1. Every 2,000 lf
 - 2. End of each main.
 - 3. A minimum of one from each branch.
 - 4. Mains at cut-in locations: Each side of work area. Time between samples to be determined by Engineer in field.
- B. A laboratory, certified for the required testing by the State of North Carolina, shall collect the sample and perform the testing. The laboratory shall be the same for both sampling and testing.

- C. Obtain two water samples at each specified location for the bacteriological testing. Take the first sample immediately after flushing of the chlorinated water and again in 24-hours.
- D. Recommended additional samples. During the required sampling of water from the new system, it is recommended that samples be taken from the existing potable water source to determine if coliforms are present.
- E. Care in sampling. No hose or fire hydrant shall be used for the collection of samples. Take samples from an approved sample tap consisting of a corporation stop installed in the main with a copper tube gooseneck assembly. Operation shall be such as to ensure that the sample collected is actually from water that has been in the new system. Copper tube gooseneck assembly shall be removed and sample tap corporation stop shut off upon completion of testing bacteriological testing is requirements.
- F. Test samples for the presence of coliform organisms in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater. Testing method used shall be the multiple-tube fermentation technique, the membrane-filter technique, or presence/absence.
- G. Test for odor. The water in the new system should also be tested to assure that no offensive odor exists due to chlorine reactions or excess chlorine residual.
- H. If samples show the presence of coliform, procedure 1 or 2 described below shall be followed, with the approval of the Owner, before placing the unit or facility in service.
 - 1. Take repeat samples at least 24 hours apart until consecutive samples do not show the presence of coliform.
 - 2. Again subject the system to chlorination and sampling as described in this section.
- I. If samples are free of coliform, and with the approval of the Owner, the potable water system may be placed in service.
- J. Contamination: If, in the opinion of the Engineer, possible contaminants have entered the existing water system, or water samples show the water in the existing system to be unsafe on completion of the work, the existing water system shall be disinfected as specified herein and shall include all contaminated components. Disinfection of the existing system shall be coordinated with the Owner.

3.11 VALVE OPERATION

- A. Prior to final acceptance provide competent personnel to operate each valve in presence of Engineer. Verify that valves are left in the open position.

END OF SECTION

SECTION 02530

SANITARY SEWER SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work under this section includes, but is not limited to, piping, valves, and appurtenances for a complete sanitary sewer collection system.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
1. Section 02315 Trenching for Utilities
 2. Section 02445 Bore & Jack of Conduits.

1.03 REFERENCES

- A. Publications are referred to in the text by basic designation only.
1. American Society for Testing and Materials (ASTM)
 - a. A126 Gray iron Castings and Valves, Flanges and Pipe Fittings.
 - b. C361 Reinforced Concrete Low-Head Pressure Pipe.
 - c. C443 Flexible Watertight Joints for Precast Manhole Sections
 - d. C478 Precast Reinforced Concrete Manhole Sections
 - e. C828 Low-Pressure Air Test of Vitrified Clay Pipe Lines (4 to 12 inch)
 - f. C890 Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
 - g. C923 Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
 - h. C1244 Test Method for Concrete Sewer Manholes by the Negative Air Pressure
 - i. D1248 Polyethylene Plastics Molding and Extrusion Materials
 - j. D1784 Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - k. D2241 Poly(Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series)
 - l. D 2321 Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
 - m. D2680 Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Pipe
 - n. D3034 Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - o. D3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
 - p. D3350 Polyethylene Plastics Pipe and Fittings Materials
 - q. F477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - r. F794 Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
 - s. F949 Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
 - t. F894 Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
 - u. F1483 Specification for Oriented Poly(Vinyl Chloride) PVCO, Pressure Pipe

2. American Water Works Association (AWWA)
 - a. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - b. C105 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
 - c. C110 Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids
 - d. C115 Flanged Ductile-Iron Pipe with Threaded Flanges
 - e. C151 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
 - f. C153 Ductile-Iron Compact Fittings, 3 inch through 16 inch, for Water and Other Liquids
 - g. C504 Rubber-Seated Butterfly Valves
 - h. C507 Ball Valves, 6 inch through 48 inch
 - i. C508 Swing-Check Valves for Waterworks Service, 2 inch Through 24 inch NPS
 - j. C509 Resilient-Seated Gate Valves for Water Supply Service
 - k. C512 Air-Release, Air / Vacuum, and Combination Air Valves for Waterworks Service
 - l. C550 Protective Epoxy Interior Coatings for Valves and Hydrants
 - m. C600 Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
 - n. C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
 - o. C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch, for Water Distribution
 - p. C906 Polyethylene (PE) Pressure Pipe and Fittings 4 inch through 63 inch for Water Distribution
 - q. M23 PVC Pipe - Design Installation
3. National Sanitation Foundation (NSF) Standards
 - a. 14 Plastic Piping Components and Related Materials
4. UNI-BELL Plastic Pipe Association (UNI)
 - a. B-5 Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Sewer Pipe
 - b. B-6 Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that tests set forth in each applicable referenced publication have been performed and that test requirements have been met. Submit for each of the following materials:
 - a. Pipe
 - 1) Ductile iron
 - 2) Polyvinyl Chloride (PVC) pressure pipe
 - i) AWWA C900
 - b. Pre-cast concrete manholes
 - c. Valves
 - 1) Plug
 - 2) Air Release

2. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. Pipe
 - 1) Ductile iron
 - 2) Ductile Iron with restrained joints
 - 3) Polyvinyl Chloride (PVC) pressure pipe
 - i) AWWA C900
 - ii) Pressure Rated
 - b. Pre-cast Concrete Manholes and the following appurtenances:
 - 1) Manhole steps
 - 2) Pipe connectors
 - 3) Joint material
 - 4) Castings
 - c. Valves
 - 1) Plug
 - 2) Air Release
3. Reports:
 - a. Field test report for each section of pipe for the following:
 - 1) Pressure test for force mains.
4. Operation and Maintenance Instructions: Submit complete operation and maintenance manual for the following:
 - a. Valves.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Provide a suitable pipe hook or rope sling when handling the pipe with a crane. Lifting of the pipe shall be done in a vertical plane. Under no conditions shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to both tongue and groove ends.
- B. Deliver pipe in the field as near as practicable to the place where it is to be installed. Distribute pipe along the side of the trench opposite to the spoil bank. Where necessary to move the pipe longitudinally along the trench, it shall be done in such a manner as not to injure the pipe or coating.
- C. Shield PVC pipe and fittings stored on site from the sun's ultraviolet rays by suitable cover, or indoor storage.

PART 2 PRODUCTS

2.01 DUCTILE-IRON PIPE

- A. Pipe and fittings shall conform to the following requirements:
 1. Size shall be as indicated on the Drawings.
 2. Suitable for a system working pressure of 150 psi.
 3. Interior of pipes and fitting shall be Protecto 401 lined.
- B. Ductile-iron pipe for below ground service shall have push-on or mechanical joints, unless noted otherwise on the Drawings, conform to AWWA C151, and to the following requirements:
 1. Pipe thickness class shall be suitable for a laying condition as specified in Section, Trenching for Utilities, at the depth indicated on the Drawings, and at the system working pressure specified above.

2. Provide mechanical joint fittings, unless noted otherwise on the Drawings.
 3. Encase pipe in polyethylene conforming to AWWA C105.
- C. Ductile-iron pipe for above ground service shall have flanged joints, unless noted otherwise on the Drawings, and conform to AWWA C115.
1. Pipes to be painted shall have only a shop primer on the outside by the manufacturer. Verify that proposed manufacturer's primer is compatible with the proposed paint system.
- D. Fittings for ductile-iron pipe shall conform to AWWA C110, or C153 and to the following requirements:
1. Joint type shall be as specified above for the supplied ductile-iron pipe.
 2. Fittings shall be made of gray-iron or ductile-iron.
- E. Special Pipe Joints
1. Restrained
 - a. Provide restrained joint pipe at fittings and valves where indicated on the Drawings. Length of restrained pipe shall be as shown. Restrained joints shall be Snap-Lok (Griffin Pipe), Flex Ring and Lok-Ring (American), TR Flex (U.S. Pipe) or approved equal.
 - b. Restrained joint pipe and fittings shall meet all AWWA standards and other requirements as specified above for standard ductile iron pipe and fittings unless addressed herein.
 - c. Field made joints are allowable but should be avoided where possible. Careful planning to locate field cuts in standard pipe sections is preferred. For field made joints in restrained piping, use field weldments or an insert equal to TR Flex Gripper Rings or approved equal. Gasket type field made joints will not be allowed.
 - d. Restrained joint fittings shall be provided by the restrained joint pipe supplier where located within restrained joint pipe sections. Fittings shall be of the same model / type as the pipe supplied from the pipe manufacturer.
 - e. Restrained joint fittings may be push-on joint type.
 - f. Megalugs, Series 1100, as manufactured by EBAA Iron Sales or approved equal shall be allowable for restraint where fittings or valves are not available with restrained joints from the pipe manufacturer.
 - g. Where additional fittings/valves are required and not shown on Drawings, consult with Engineer for length of restrained joint pipe necessary each side of fittings/valve prior to installation of pipe/fitting.
 - h. Contractor shall develop a field layout schedule and drawing for restrained joint pipe installations.

2.02 MANHOLES

- A. Provide manholes made of precast concrete sections in conformance with ASTM C478, NC Department of Transportation, and the following requirements:
1. General
 - a. Provide manholes to the depth as indicated on the Drawings. Manhole inside diameter shall be 4 feet unless noted otherwise on the Drawings.
 - b. Precast concrete manholes shall be as manufactured by Adams Concrete, Carolina Precast Concrete, Inc., D & M Concrete Specialties, Inc., N. C. Products Corp., Stay Right Tank, Tindall Concrete Products, Inc. or approved substitute.

2. Precast Concrete Sections
 - a. Minimum wall thickness shall be 5-inches.
 - b. Base: Cast monolithically without construction joints or with an approved PVC waterstop in the cold joint between the base slab and the walls. The width of the base extensions on Extended Base Manholes shall be no less than the base slab thickness.
 - c. Riser: Minimum lay length of 16 inches.
 - d. Eccentric Cone: Top inside diameter shall be 24 inches. Width of the top ledge shall be no less than the wall thickness required for the cone section.
 - e. Transition Cone: Provide an eccentric transition from 60-inch and larger manholes to 48-inch diameter risers, cones, and flat slab top sections. Minimum slope angle for the cone wall shall be 45 degrees.
 - f. Transition Top: Provide an eccentric transition from 60-inch and larger manholes to 48-inch diameter risers, cones, and flat slab top sections. Transition Top sections shall be furnished with vents as shown on the manhole details. Tops shall not be used in areas subject to vehicle traffic.
 - g. Flat Slab Top: Designed for HS-20 traffic loadings as defined in ASTM C890. Items to be cast into Special Flat Slab Tops shall be sized to fit within the manhole ID and the top and bottom surfaces. Provide a float finish for exterior slab surface.
 - h. Precast or core holes for pipe connections. Diameter of hole shall not exceed outside diameter of pipe by more than 3-inches.
 - i. Grade Rings: May be used to adjust frame and cover to finished grade. Grade Rings shall be no less than 4 inches in height.
 - j. Lifting Devices: Devices for handling precast components shall be provided by the precast manufacturer and comply with OSHA Standard 1926.704.
3. Joints
 - a. Manufacturer in accordance with tolerance requirements of ASTM C 990 for butyl type joints.
 - b. Minimize number of joints. Do not use riser section for manholes up to 6 feet tall and no more than one riser for each additional 4 feet in height.
 - c. Flexible Joint Sealants: Preformed butyl rubber based sealant material conforming to Federal Specification SS-S-210A, Type B and ASTM C990.
 - d. External Seal: Polyethylene backed flat butyl rubber sheet no less than 1/16-inch thick and 6-inches wide.
4. Inverts
 - a. Brick and mortar or precast concrete invert.
 - b. Form and finish invert channel to provide a consistent slope from inlet(s) to outlet up to 4-inches.
 - c. Channel walls shall be formed to 3/4 of the height of the outlet pipe diameter.
 - d. Finish benches with a minimum uniform 1.5:12 slope. Provide a 1/4-inch radius at the edge of bench and trough.
5. Flexible Pipe Connectors: Provide flexible connectors for pipe to manhole that conform to ASTM C923. Location of connectors shall vary from Project Drawings no more than 1/2-inch vertically and 5 degrees horizontally. Provide stainless steel pipe clamp type band around flexible connection to sewer pipe.
6. Manhole Steps:
 - a. Steps shall be in accordance with ASTM C478 and made of 1/2-inch grade 60 steel encapsulated by co-polymer polypropylene and have serrated tread and tall end lugs.

- b. Secure steps to the wall with compression fit in tapered holes or cast-in-place. Align steps along a vertical wall and shall not be located over a pipe opening. First step shall be a maximum of 26 inches from the bottom.
- c. Steps shall be by American Step Co., Inc., Bowco Industries, Inc., M. A. Industries, Inc. or approved substitute.

2.03 CASTINGS

A. General

1. Made of gray iron, ASTM A-48 - class 30, or ductile iron, ASTM A536, grade 65-45-12.
2. Castings shall be free from imperfections not true to pattern. Casting tolerances shall be plus or minus 1/16-inch per foot of dimension. Top shall set neatly in frame, with edges machined for even bearing and proper fit to prevent rattling and flush with the edge of frame.
3. Castings shall be as manufactured by Neenah Foundry Co., U.S. Foundry & Manufacturing Corp., or Vulcan Foundry

B. Manhole Frame and Cover:

1. Minimum clear opening shall be 22 inches.
2. Minimum weight for frame and cover shall be 300 pounds and suitable for Heavy Duty Highway Traffic Loads of H-20.
3. Frame shall have four 3/8-inch anchor bolt holes equally spaced.
4. Cast "Sanitary Sewer" on the cover. Casting shall bear the name of the manufacturer and the part number.
5. Provide solid cover.
6. Provide cover with two 1-inch perforated holes unless noted as watertight on the Drawings.
7. Provide the following where indicated on the Drawings:
 - a. Ring and cover shall be watertight.
 - b. Bolt down cover. Bolt down covers shall be provided with four (4) 3/8-inch stainless steel hex head bolts at 90 degrees.

2.04 VALVES

A. General: Valves shall meet the following requirements:

1. Size shall be as required for the pipe size and material as indicated on the Drawings and specified.
2. Open by counterclockwise rotation.
3. Standard system working pressure is 150 psi.
4. Equip valves with a suitable means of operation.
5. For buried valves over 5 feet deep, provide extension stems of cold rolled steel to bring the operating nut to within 2 feet of the ground surface.
6. Provide valve accessories as required for proper valve operation for valve locations as indicated on the Drawings and as recommended by valve manufacturer.
7. Valve accessories shall be compatible to proper valve operation.
8. Similar valve types shall be of one manufacturer.

B. Plug Valves: Plug valves shall conform to the following requirements:

1. Plug valves shall be of the non-lubricated, eccentric type designed for a working pressure of 175 psi for valves 12 inch and smaller, 150 psi for valves 14 inch and larger.
2. Valves shall provide tight shut-off at rated pressure.

3. The plug valve body shall be cast iron ASTM A126 Class B with a welded-in overlay of not less than 90% nickel alloy content on all the surfaces contacting the face of the plug.
4. The valve plug shall be constructed of cast iron conforming to ASTM A126 Class B, with Buna N resilient seating surface to mate with the body seat.
5. Valve flanges shall be in accordance with ANSI B16.1 Class 125.
6. Shaft bearings shall be sleeve-type, sintered, oil impregnated, and permanently lubricated stainless steel.
7. Plug valve shaft seals shall be of the multiple V-ring type and shall be adjustable. Sealing system shall conform to AWWA C504 and C507 standards. All packing shall be replaceable without removing the bonnet or actuator and while valve is in service.
8. Valves 6" and larger shall be provided with gear actuators.
9. Provide levers or hand wheels to operate the valve as recommended by the manufacturer.
10. Valves shall be designed and suitable for direct bury installation.
11. Actuator location shall be such that when installed, required cover depths are still maintained.
12. Full ported (i.e., 100% flow area) and piggable.

2.05 AIR VALVES

- A. Provide air valves in conformance with AWWA C512 and the following:
 1. Valve type shall be a combination valve.
 - a. Inlet size: 2 inch
 - b. Large orifice minimum: 1 inch
 - c. Small orifice minimum: 1/8 inch
 2. Valve shall be designed for the following automatic operation:
 - a. Release of large quantities of air during the filling of the main.
 - b. Permit air to enter the main when it is being emptied.
 - c. Release accumulated air while the main is in operation and under pressure.
 3. Valve shall be designed for a system pressure 150 psi. Valve shall also operate at a minimum system pressure of 20 psi.
 4. Provide threaded inlet.
 5. Provide stainless steel ball float and wetted internal parts.
 6. Provide isolating bronze ball valve for connection to main line.
 7. For sewage force mains provide tall body to minimize possibility of sewage plugging orifice or linkage.
 8. Sewage force main valve shall include backwash accessories. They shall include bronze flushing ball valves and 5 feet of rubber hose with quick-connect coupling on each end.

2.06 VALVE BOX

- A. Valve Box, Below Ground: Boxes shall be high strength cast iron of the screw or telescopic type. Box shall consist of a base section, center extension as required, and a top section with cover marked "SEWER."

2.07 THRUST BLOCKING

- A. Provide concrete thrust blocking for pressure lines in accordance with the detail on the Drawings.

- B. Thrust blocking is not required where restrained joint fittings and equivalent length of restrained joint pipe are used unless shown otherwise on the Drawings.

PART 3 EXECUTION

3.01 GENERAL

- A. Pipe installation shall meet the following general guidelines:
 - 1. Lay pipe in the presence of Engineer, unless specifically approved otherwise.
 - 2. Handle pipe and accessories in accordance with manufacturer's recommendations. Take particular care not to damage pipe coatings.
 - 3. Carefully inspect pipe immediately prior to laying. Do not use defective pipe. Replace pipe damaged during construction.
 - 4. Lay pipe to grade and alignment indicated on the Drawings.
 - 5. Provide proper equipment for lowering pipe into trench.
 - 6. Provide tight closure pipe ends when work is not in progress.
 - 7. Keep pipe interior free of foreign materials.
 - 8. Do not lay pipe in water or when the trench or weather conditions are unsuitable for the work.
 - 9. Clean bell and spigots before joining. Make joints and lubricate gasket in accordance with pipe manufacturer recommendation.
 - 10. Block fittings with concrete, or restrained as indicated on the Drawings or as required to prevent movement.

3.02 RELATION OF WATER MAINS TO SEWERS

- A. Lateral Separation: Lay water mains at least 10 feet laterally from existing and proposed sewers. Where existing conditions prevent a 10-foot lateral separation, the following shall be followed with approval of the Engineer:
 - 1. Lay water main in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
 - 2. Lay water main in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
- B. Crossing Separation: Lay bottom of water main at least 18 inches above the top of the sewer. Where existing conditions prevent an 18-inch vertical separation, construct both the water main and sewer of ferrous materials and with joints that are equivalent to water main standards for a distance of 10 feet on each side of the point of crossing.
- C. Crossing a Water Main Under a Sewer: When it is necessary for a water main to cross under a sewer, construct both the water main and the sewer of ferrous materials and with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

3.03 SEWER PIPE

- A. Lay sewer pipe to true lines and grades by use of laser beam equipment or other acceptable means.
- B. Minimum Separation Distances:
 - 1. 100-foot horizontal separation from wells or other water supplies.
 - 2. 24-inch vertical separation from storm sewers or ferrous pipe shall be used.

3. For separation from water mains see paragraph 3.02 above.

3.04 DUCTILE IRON PIPE

- A. Install pipe in conformance with AWWA C600 and the following:
1. For laying pipe in a vertical or horizontal curve, each full length pipe may be deflected by the following offset distance:
 - a. Push-on joint
 - 1) 3 to 12-inch pipe: 14-inch offset
 - 2) 14 to 36-inch pipe: 8-inch offset
 - b. Mechanical joint
 - 1) 3 to 6-inch pipe: 20-inch offset
 - 2) 8 to 12-inch pipe: 15-inch offset
 - 3) 14 to 20-inch pipe: 8-inch offset
 - 4) 24 to 36-inch pipe: 6-inch offset
 2. For laying restrained joint pipe in a vertical or horizontal curve, except for horizontal directional drills (HDD), each full length pipe may be deflected by the following offset distance:
 - a. 6 to 12-inch pipe: 11-inch offset
 - b. 16 to 20-inch pipe: 7-inch offset
 - c. 24 to 30-inch pipe: 5-inch offset
 - d. 36-inch pipe: 4-inch offset
 - e. 42 to 48-inch pipe: 1 ¼ -inch offset

3.05 PVC PRESSURE PIPE

- A. Install PVC C900 pipe in conformance with AWWA C605.
- B. Solvent Weld: Where indicated in these specifications or on the plans, solvent weld type joints shall be used. Field cut ends shall be sanded to roughing the surface. Joints shall be cleaned of foreign material. Solvent shall be applied to the joint and joint made as recommended by the manufacturer. Excess solvent shall be wiped off. The joint should not be moved until sufficiently set up.
- C. Bell and Spigot Joints: Clean bell and spigot ends prior to jointing. Ends of field cut pipe shall be beveled with file. Gasket shall be clean and lightly lubricated. Joint shall be made as recommended by the manufacturer.

3.06 VALVES AND FITTINGS

- A. Install buried valves on top of an 18-inch square, 3-inch thick, solid concrete pad (minimum dimensions). The concrete pad may be provided by a pre-cast manufacturer or cast-in-place in the field above grade. Concrete used for the pads shall be a minimum 3,000 psi mix. The pads may not be cast-in-place in the pipe trench. Connection to pipe shall be such that there shall be no stress at the joint caused by misalignment or inadequate support of pipe or valve.
- B. Install fittings as recommended by the manufacturer. Fittings shall be blocked or otherwise restrained from movement.
- C. Valve Boxes: Set valve boxes flush with finished grade. Box shall be supported so that no stress shall be transmitted to the valve. Operating nut shall be centered in box.
- D. Install valves, gates, and accessories indicated on the Drawings and in complete accordance with the manufacturer's recommendations.

- E. Valve boxes shall be set straight with the operating nut centered and supported on (2) 4" concrete blocks, to prevent load transfer onto valve body or pipe line. Set top of box at finished grade. Provide a minimum of a 24-inch x 24-inch wide by 6-inch thick concrete pad at top of valve boxes outside paved areas, and per the valve manufacturer's recommended size.

3.07 AIR VALVES

- A. Main shall be drilled for a two inch connection.
- B. Valve shall be installed on the main line with a service saddle.
- C. Install air valve in a precast 5 foot diameter flat top manhole.

3.08 MANHOLES

- A. Set base plumb and level. Align manhole invert with pipe invert.
- B. Secure pipe connectors to pipe in accordance with manufacturer's recommendation.
- C. Clean bells and spigots of foreign material that may prevent sealing. Unroll the butyl sealant rope directly against base of spigot. Do not stretch. Follow manufacturer's instructions when using O-ring seals.
- D. Set precast components so that steps align.
- E. Plug lift holes using a non-shrink grout. Cover with a butyl sealant sheet on the outside and seal on the inside with an application of an epoxy gel 1/8-inch thick extending 2 inches beyond the opening.
- F. Set manhole frames to grade with grade rings. Seal joints between cone, adjusting rings, and manhole frame with butyl sealant rope and sheet.
- G. Apply external seal to the outside of joint.
- H. Finish the interior by filling fractures greater than 1/2-inch in length, width or depth with a sand cement mortar.
- I. Clean the interior of the manhole of foreign matter.

3.09 PAINTING

- A. Equipment shall receive the manufacturer's standard coating for the intended application. Coatings shall be suitable for the intended application.
- B. Repaint damaged paint services.
- C. Above ground piping and piping within vaults shall be painted in accordance with Section, Painting.

3.10 TESTING

- A. General
 1. Clean and flush pipe system of foreign matter prior to testing.
 2. Notify Owner and Engineer a minimum of 48 hours prior to testing.
 3. Perform tests in the presence of Engineer.
 4. Length of line to be tested at one time shall be subject to approval of Engineer.
 5. Pipe sections shall not be accepted and placed into service until specified test limits have been met.
 6. Repair defects in the pipe system. Make repairs to the same standard as specified for the pipe system.

7. Retest repaired sections until acceptance.
8. Repair visible leaks regardless of the test results.

B. Pressure Mains

1. The Engineer shall approve the source, quality, and method of disposal of water to be used in test procedures.
2. Obtain Owner's permission 48 hours prior to filling or flushing of pipe system with water from Owner's water system. Owner shall operate valves connected to the existing water system. Keep pipe interior clean during construction to minimize the amount of water required for flushing. Where large quantities of water may be required for flushing, Engineer reserves the right to require that flushing be done at periods of low demand.
3. Pressure test in accordance with AWWA C600 for ductile iron pipe and AWWA C605 and M23 for PVC pipe and the following.
4. Make pressure tests between valves. Furnish suitable test plugs where line ends in "free flow."
5. Provide air vents at the high points in the line section to be tested for releasing of air during filling. Service corporation stops may be used for air vent when located at a high point. Include cost of air vents in price of testing. Leave corporation stops in place after testing and note locations on As-Built Drawings.
6. Allow concrete blocking to reach design strength prior to pressure testing.
7. Force main shall be completely filled with water, all air expelled from the pipe, and the discharge end of the pipeline shall be plugged and adequately blocked before hydrostatic test begins.
8. Upon completing a section of pipe between valves, test pipe by maintaining for a two hour period the following hydrostatic pressure for each main:
 - a. Force main: 150 psig
9. Test pressure shall not vary by more than +/- 5 psi for the duration of the test.
10. No length of line shall be accepted if the leakage is greater than that determined by the following formula based on the appropriate test pressure:
L = Allowable leakage per 1,000 feet of pipe in gallons per hour.
D = Nominal diameter of the pipe in inches.
100 psi: $L = D \times 0.07$
150 psi: $L = D \times 0.08$
200 psi: $L = D \times 0.09$
250 psi: $L = D \times 0.10$

END OF SECTION

SECTION 02610

PAVEMENT PATCHING

PART 1 GENERAL

1.01 SCOPE

- A. Provide pavement patching where marked in the field by the Owner and specified herein.

1.02 REFERENCED STANDARDS

- A. N.C. State Dept. of Transportation - Standard Specifications for Roads and Structures (NC DOT), 1990.

1.03 SUBMITTALS

- A. Shop Drawings: Submit four (4) copies of Certificate of Compliance that the materials used in the bituminous concrete mixer, and aggregate base course meet the requirements of this section for materials, mixing, and handling.

1.04 PROTECTION OF EXISTING PAVEMENT, AND CURB AND GUTTER

- A. The existing paved area not to be patched, curb and gutter, and concrete pavement shall be protected by the Contractor. The Contractor and Owner shall inspect the entire site and mark all failed areas that are not designated for repair, and damaged curb and gutter, and concrete pavement. The Contractor shall remove any areas of pavement or concrete damage or failure that occurs during construction and provide a new patch at his own cost. The patch shall be the same as specified herein.

1.05 MEASUREMENT AND PAYMENT

- A. All measurements shall be made by the Contractor in the presence of the Owner's representative. All quantities shall be agreed to as the work progresses and maintained in a daily log format signed by the Owner and Contractor.
- B. Existing pavement removal and new patching: Payment for pavement removal and new patching shall be in accordance with the Contract unit price per square yard. Payment shall be for all the labor, material and accessories required for a complete pavement repair including, but not limited to, the following:
 1. Pavement saw cutting.
 2. Existing pavement structure removal.
 3. Excavation to a depth of 10-inches below existing pavement surface for non-DOT roads or 12-Inches below existing pavement surface for DOT road.
 4. Compaction of existing subgrade.
 5. Placement of engineering fabric.
 6. Placement and compaction of 8-inches of ABC stone base for non-DOT roads or 6-inches of ABC stone base for DOT roads.
 7. Placement and compaction of 2-inches of S9.5B asphalt pavement.
 8. Placement and compaction of 4-inches of B25.0B asphalt for NCDOT roads
 9. Tack coat.
 10. Removal from site of all excess material.
- C. Additional undercutting and backfilling: Payment for additional undercutting and backfilling shall be in accordance with the Contract unit price per cubic yard.

Payment shall be for all the labor, material and accessories required for undercutting including, but not limited to, the following:

1. Undercut excavation to the depth as directed by the Soils Engineer.
2. Backfilling with approved material and compacting.
3. Removal from site of all excess material.

PART 2 PRODUCTS

2.01 MATERIALS AND MIXES

- A. Engineering Fabric: Fabric shall comply with the requirements of NC DOT Section 1056 for Type 1 material.
- B. Base Course: Aggregate base course shall comply with requirements of NC DOT Section 520.
- C. Tack Coat: Conforming to materials and compositions required in Section 605 of the NC DOT specifications.
- D. Bituminous Concrete Surface Course - Type S9.5B: Conforming to materials and composition required in Section 645 of the NC DOT specifications.

PART 3 EXECUTION

3.01 PREPARATION FOR PAVEMENT PATCHING

- A. Verify areas outlined for pavement patching with Owner. Areas outlined should extend 5 feet into sound pavement.
- B. Saw cut outlined areas designated for removal.
- C. Remove the distressed pavement, and the underlying base course. The existing subgrade shall be removed to a minimum depth of 10-inches below the existing pavement surface for non-DOT roads or 12-inches below the existing pavement surface for NCDOT roads.
- D. Prior to placement of the aggregate, allow testing of the existing subgrade by a soil technician provided by the Owner.
- E. Provide additional undercutting as required by the soils engineer and approved by the Owner. Additional undercutting shall be measured and approved by the Owner as the work progresses. Only undercutting that has been measured and approved prior to backfilling will be paid by the Owner.
- F. The existing subgrade shall be compacted as directed by the soil technician using a plate tamp on a Ramex type compactor prior to backfilling or placement of new base course.
- G. Compaction shall be to at least 95% maximum density Modified Proctor Method.
- H. Maintain subgrade in satisfactory condition and properly drain until surface courses are placed.
- I. Preparation, shaping, and compaction shall be in accordance with Section 500 of the NC DOT specifications.

3.02 ENGINEERING FABRIC

- A. Install specified fabric over the subgrade as recommended by the material manufacturer.

3.03 AGGREGATE BASE COURSE

- A. The stone base shall be constructed in accordance with the applicable paragraphs of Section 520 of the NC DOT specifications.
- B. A minimum of 8-inches (for non-DOT roads or 6-inches for NCDOT roads) of ABC stone base should be placed and compacted to at least 100 percent of the dry density as defined by ASTM 1557 Modified Proctor Density.

3.04 TACK COAT

- A. Application rates, method of application, and curing shall be in accordance with the requirements of NC DOT specification Section 605.

3.05 BITUMINOUS CONCRETE SURFACE COURSE

- A. Spreading, compaction, and finishing shall comply with the requirements of Sections 610 and 645 of the NC DOT specifications.
- B. Compacted thickness shall be no less than the 2-inches of Type S9.5B.

END OF SECTION

SECTION 02700

PAVEMENT AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE

- A. Provide pavement, curb and gutter, and sidewalk sections as indicated on the Drawings and specified herein. Construction shall conform with the lines, grades, thickness, and typical cross-section indicated on the Drawings.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02300 Earthwork

1.03 REFERENCED STANDARDS

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. N.C. Department of Transportation - Specifications for Roads and Structures (NCDOT).
- B. Paragraphs in the NCDOT standard regarding measurement and payment do not apply to this Project.

1.04 SUBMITTALS

- A. Submit the following in accordance with Section, Submittal Procedures:
 - 1. Certificates of Compliance: Certificates shall attest that supplied products conform to the referenced standard and this specification, that all tests set forth in each applicable referenced publication have been performed, and that all test requirements have been met. Submit for each of the following materials:
 - a. Asphalt Concrete
 - b. Aggregate Base Course
 - c. Pavement Marking Material

1.05 PROTECTION OF EXISTING PAVEMENT, CURB AND GUTTER, AND SIDEWALK

- A. Existing pavement, curb and gutter, and sidewalks at the site are in good condition. Contractor, Owner, and Engineer shall inspect the entire site prior to the start of construction and mark existing damaged areas and note areas on Contractor's plan set to be used for the Record Drawings.
- B. Protect existing pavement, curb and gutter, and sidewalks during construction.
- C. Remove areas of existing curb and gutter, and sidewalks damaged during construction. Removal shall include to the nearest existing joint. Replace damaged areas with new curb and gutter, and sidewalks to match the existing section.
- D. Remove areas of existing pavement damaged during construction. New pavement patch shall consist of re-stabilizing the subgrade, and providing 8 inches of ABC and 2 inches of S9.5B asphalt to match existing pavement surface.

- E. Repair damage to existing pavement, curb and gutter, and sidewalks.

PART 2 PRODUCTS

2.01 MATERIALS AND MIXES

- A. Asphalt Concrete Base Course - Type B-25.0B: Conforming to materials and compositions required in NCDOT Section 610, Asphalt Concrete Plant Mix Pavements.
- B. Tack Coat: Conforming to materials and compositions required in NCDOT Section 605, Asphalt Tack Coat.
- C. Asphalt Concrete Surface Course - Type S9.5B: Conforming to materials and composition required in NCDOT Section 610, Asphalt Concrete Plant Mix Pavements.
- D. Concrete for Curb and Gutter, and Sidewalks: Conforming to materials and composition required in NCDOT Section 846, Concrete Curb, Curb and Gutter, Concrete Gutter, Shoulder Berm Gutter, Concrete Expressway Gutter, Concrete Valley Gutter and Concrete Flumes, and Section 848, Concrete Sidewalks and Driveways and Wheelchair Ramps.
- E. Base Course: Aggregate base course shall comply with requirements of NCDOT Section 520, Aggregate Base Course.
- F. Pavement Markings and Symbols: Conforming to materials and composition required in NCDOT Section 1205, Pavement Marking General Requirements.

PART 3 EXECUTION

3.01 PREPARATION OF SUBGRADE

- A. Refer to applicable portions of Section, Earthwork.
- B. Compaction shall be to at least 95 percent maximum density Standard Proctor Method.
- C. Remove unsuitable material to a depth of one foot and replace with an approved material. Loosen exceptionally hard spots and re-compact. Finish subgrade to provide uniform bearing surface.
- D. Maintain subgrade in satisfactory condition and properly drain until surface courses are placed.
- E. Preparation, shaping, and compaction shall be in accordance with NCDOT Section 500, Fine Grading Subgrade, Shoulders, and Ditches.

3.02 MILLING ASPHALT PAVEMENT

- A. Milling of existing asphalt pavement shall be in accordance with applicable paragraphs of NC DOT Section 612.
- B. Milled asphalt shall be properly disposed by the Contractor.
- C. Minimize heavy construction equipment traffic within areas of reduced pavement sections .

3.03 AGGREGATE BASE COURSE

- A. This applies to both the aggregate base course as indicated on the Drawings for paved and unpaved roads.
- B. The stone base shall be constructed in accordance with the applicable paragraphs of NCDOT Section 520.
- C. Compacted base shall be of the thickness indicated on the Drawings.

3.04 ASPHALT CONCRETE BASE COURSE

- A. Spreading, compaction, and finishing shall comply with the requirements of NCDOT Section 610, Asphalt Concrete Plant Mix Pavements.
- B. Compacted thickness shall be no less than the thickness indicated on the Drawings.

3.05 ASPHALT CONCRETE SURFACE COURSE

- A. Spreading, compaction, and finishing shall comply with the requirements of NCDOT Section 610 Asphalt Concrete Plant Mix Pavements.
- B. Compacted thickness shall be as indicated on the drawings.

3.06 TACK COAT

- A. Application rates, method of application, and curing shall be in accordance with the requirements of NCDOT Section 605.

3.07 CONCRETE CURB & GUTTER

- A. Provide concrete curb and gutter where indicated on the Drawings. Curb and Gutter shall conform to the section indicated on the Drawings.
- B. Construct Curb and Gutter in accordance with NCDOT Section 846.

3.08 CONCRETE SIDEWALKS

- A. Provide concrete sidewalks where indicated on the Drawings or replace sidewalk removed during construction. Construction shall be in conformity with the materials, lines, grades, thickness, and typical section as indicated in the Drawings.
- B. Construct sidewalks in accordance with NCDOT, Section 848, and the following Specifications.
- C. Space contraction joints equal to the width.
- D. Place a ½ inch wide expansion joint at all intersections and wherever walks abut structures and other walks.
- E. Place an additional expansion joint at each fifth contraction joint.
- F. Walks shall receive a light broom finish.

3.09 PAVEMENT MARKINGS AND SYMBOLS

- A. Mark parking spaces in paved areas with 4 inch white paint stripe the length of the parking space.
- B. Stripe roads maintained by the NCDOT or the local municipality in accordance with the agency requirements.
- C. Provide painted pavement symbols as indicated on the Drawings.

END OF SECTION

SECTION 02920

LAWNS AND GRASSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work shall include, but not be limited to, the following:
 - 1. Surface preparation of subsoil.
 - 2. Placing topsoil.
 - 3. Addition of lime and fertilizer.
 - 4. Seeding.
 - 5. Maintenance to produce a permanent stand of grass.

1.02 PAYMENT PROCEDURES

- A. Base bid for the work on the specified quantities of lime, fertilizer, and seed. After the specified soil tests have been made, Engineer may vary specified quantities. Should the actual quantities applied in the field vary appreciably from those specified, an adjustment in the contract price may be made.

1.03 REFERENCES

- A. N.C. Department of Agriculture - NCDA
- B. U.S. Department of Agriculture - USDA

1.04 PERFORMANCE REQUIREMENT

- A. Grassed area shall be considered established when it presents a green appearance from eye level 50 feet away and the grass is vigorous and growing well in each square foot of seeded area. It is not required that the seeded area be thick and heavy as an old established lawn.
- B. Should the permanent seed not germinate and produce a strand of grass, reseed affected areas until a permanent stand is established.

1.05 SUBMITTALS

- A. Not less than 6 weeks prior to seeding, obtain representative soil samples from areas to be seeded and deliver the properly packaged samples with an information sheet for each sample properly filled out to the Soils Division of the NC Department of Agriculture or a private laboratory. Based on the test results, submit to the Engineer a recommendation as to the quantity and type of lime, fertilizer and seed for the area covered by the test.

1.06 QUALITY ASSURANCE

- A. Quality of fertilizer, lime, and seed, and operations in connection with the furnishing of this material, shall comply with the requirements of the N.C. Fertilizer, Lime and Seed Law; and with the requirements of the rules and, regulations adopted by the NC Department of Agriculture in accordance with the provisions of the said law.
- B. Seed containers shall bear an official "Certified Seed" label as inspected by the N.C. Crop Improvement Association.
- C. Packages for soil conditioners and fertilizer shall bear manufacturer's guaranteed analysis.

- D. Do not apply lime, fertilizer or seed in strong wind, when the soil is extremely wet, or otherwise unworkable. No rolling shall be done if precipitation after seeding would make the operation detrimental to the seed bed.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver grass seed mixture in sealed containers showing percentage of seed mix, year of production, net production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.08 MAINTENANCE SERVICE

- A. Maintain seeded areas until grass is well established and exhibits a vigorous growing condition for a minimum of two cuttings. Mow grass at regular intervals to a maximum height of 3 inches. Hand clip where necessary.
- B. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- C. Water areas seeded between May 1 and July 15 at such intervals as to maintain the seeded area in a moist condition until the grass is established and accepted by the Engineer. Provide equipment to transport and distribute the water to the seeded areas. Areas seeded between September 1 and November 1 need not be irrigated beyond the initial watering specified above except that the Contractor may apply water at his own discretion.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds, and roots; pH value of minimum 5.4 and maximum of 7.0.
- B. Lime: Ground Dolomitic agricultural limestone, not less than 85 percent total carbonates, ground so that 50 percent passes 100 mesh sieve and 90 percent passes 30 mesh sieve. Coarser material will be acceptable, provided the specified rates of application are increased proportionately on the basis of quantities passing No. 100 mesh sieve.
- C. Fertilizer: Mixed, commercial, fertilizer containing 10-10-10 percentages of available nitrogen, phosphoric acid, and potash respectively, plus superphosphate with 20 percent P₂O₅ content. Fertilizer shall be dry, in granular (pellet) form, shall be delivered to the site in the manufacturer's original bag or container which shall be plainly marked as to formula.
- D. Seed: Fresh seed guaranteed 95 percent pure with a minimum germination rate of 85 percent within one year of tests. Provide the following seed mixtures with lime and fertilizer in disturbed areas including NCDOT Rights-of-Way:

1. Temporary Seeding

<u>Planting Dates</u>	<u>Grass Type</u>	<u>Pounds/Acre</u>	
Dec. 1 - Apr. 15	Rye (Grain)	120	
	Kobe Lespedeza	50	
Apr. 15 - Aug. 15	German Millet	40	
Aug. 15 - Dec. 1	Rye (Grain)	120	
	Lime	3,000	
	Fertilizer	10-10-10	800
	Mulch	Straw	4,000

2. Permanent Seeding

<u>Planting Dates</u>	<u>Grass Type</u>	<u>Pounds/Acre</u>	
Feb. 15 - Apr. 30	Tall Fescue	80	
	& Pensacola Bahiagrass	50	
Sept. 1 - Oct. 30	Sericea Lespedeza	30	
	Kobe Lespedeza	10	
	Lime	4,000	
	Fertilizer	10-10-10	1,000
	Mulch	Straw	4,000

On poorly drained sites omit sericea and increase kobe to 30 lb / acre.

- E. Matting / Erosion Control Fabric (ECF): Matting and ECF shall be heavy jute mesh over mulch held in place by staples. Commercially available ECFs may be used upon approval of the engineer. Approval of fabrics will require manufacturer's design data regarding velocity, ditch slopes, method of installation, decay cycle, repair techniques, and grass growth enhancement characteristics.
- F. Wire Staples: 16 gauge steel wire, with minimum of 3" top and 4" long legs.
- G. Mulch: Threshed straw of oats, wheat, or rye; free from seed of obnoxious weeds; or clean salt hay. Straw which is fresh and excessively brittle or straw which is in such an advanced stage of decomposition as to smother or retard growth of grass will not be acceptable.
- H. Water: Water shall be free from substances harmful to growth of grass.

PART 3 EXECUTION

3.01 PREPARATION OF SUBSOIL

- A. Complete operations in the area to be seeded and prepare subsoil to eliminate uneven areas and low spots. Bring surface to the approximate design contours.
- B. Scarify subsoil to a depth of 3 inches. Remove weeds, roots, stones and foreign materials 1-1/2 inches in diameter and larger.

3.02 APPLICATION OF LIME

- A. Liming shall be done immediately after grading has reached the fine grading stage, even though actual seeding may not be done until several months later.
- B. Spread lime evenly by means of a mechanical distributor.
- C. When lime is distributed by commercial liming dealers, sales slips showing the tonnage delivered shall be filed with the Engineer and shall show the full tonnage required for the acres treated.
- D. Incorporate lime in the top 2 to 3 inches of soil by harrowing, disking, or other approved means.

3.03 APPLICATION OF FERTILIZER

- A. Spread fertilizer not more than 2 weeks in advance of seeding.
- B. To verify application rate, determine acreage to be fertilized and provide Engineer with total weight of fertilizer applied to the area.
- C. Provide mechanical spreader for even distribution and spread half of the rate in one direction, and the other half at right angles to the first. Mix thoroughly into upper 2 to 3 inches of soil by disking, harrowing or other approved methods.

3.04 SEEDING

- A. Accomplish seeding by means of an approved power-drawn seed drill, combination corrugated roller-seeder, approved hand operated mechanical seeder, or other approved methods to provide even distribution of seed.
- B. Do not seed when ground is excessively wet or excessively dry. After seeding, roll area with a roller, not less than 18 inches in diameter and weighing not more than 210 pounds per foot of width. Upon completion of rolling, water area with a fine spray.
- C. Immediately following seeding apply mulch or matting. Do not seed areas in excess of that which can be mulched on same day.
- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil depth

3.05 MULCHING AND MATTING

- A. Apply mulch or matting as required to retain soil and grass, but no less than the following:
 - 1. Slopes from 0 to 20 percent by spreading a light cover of mulch over seeded area at the rate of not less than 85 lbs. per 1000 sq. ft.
 - 2. Slopes greater than 20 percent mulch with matting. Pin matting to the ground with wire staples at 5 foot intervals, immediately after seeding.
 - 3. Use tack to prevent disruption of mulch.
- B. For tack use an asphalt tie-down of emulsified asphalt grade AE-3 or cut-back asphalt grade RC-2 or other approved equal. The application rate shall be 0.10 gal/sy (11 gal / 1000 sq ft). An approved jute mesh or net may be used in lieu of tacking straw mulch.
- C. Other types of mulch and anchoring methods may be used upon approval by the Engineer.

3.06 PROTECTION

- A. Protect seeded areas from damage by barricades, signs, and other appropriate means. Maintain and protect slopes from weather damage.

END OF SECTION

Firm Name and Address	Circle One	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address	MBE WBE				
Name Address	MBE WBE				
Name Address	MBE WBE				
Name Address	MBE WBE				
Name Address	MBE WBE				
Name Address	MBE WBE				

* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE/WBE subcontractor, and these prices will be used to determine the percentage of the MBE/WBE participation in the contract.

**** Dollar Volume of MBE Subcontractor** \$ _____

MBE Percentage of Total Contract Bid Price _____%

**** Dollar Volume of WBE Subcontractor** \$ _____

WBE Percentage of Total Contract Bid Price _____%

** Dollar Volume of MBE/WBE Subcontractor Percentage of Total Contract Bid Price:

If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.

If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.

EXECUTION OF BID

**NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
CERTIFICATION**

CORPORATION

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____ Full name of Corporation

_____ Address as Prequalified

Attest _____
Secretary/Assistant Secretary
Select appropriate title

By _____
President/Vice President/Assistant Vice President
Select appropriate title

_____ Print or type Signer's name

_____ Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

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

NOTARY SEAL

_____ Signature of Notary Public

of _____ County

State of _____

My Commission Expires: _____

**EXECUTION OF BID
 NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
 CERTIFICATION
 PARTNERSHIP**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____	By	_____
Signature of Witness		Signature of Partner
_____		_____
Print or type Signer's name		Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

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

NOTARY SEAL

 Signature of Notary Public

of _____ County

State of _____

My Commission Expires: _____

**EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
CERTIFICATION**

LIMITED LIABILITY COMPANY

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____ Full Name of Firm

_____ Address as Prequalified

_____ Signature of Witness

_____ Signature of Member/Manager/Authorized Agent
Select appropriate title

_____ Print or type Signer's name

_____ Print or type Signer's Name

AFFIDAVIT MUST BE NOTARIZED

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

NOTARY SEAL

_____ Signature of Notary Public

of _____ County

State of _____

My Commission Expires: _____

**EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
CERTIFICATION**

JOINT VENTURE (2) or (3)

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

_____ Signature of Witness or Attest	By	_____ Signature of Contractor
_____ Print or type Signer's name		_____ Print or type Signer's name
<i>If Corporation, affix Corporate Seal</i>	and	
_____ Signature of Witness or Attest	By	_____ Signature of Contractor
_____ Print or type Signer's name		_____ Print or type Signer's name
<i>If Corporation, affix Corporate Seal</i>	and	
_____ Signature of Witness or Attest	By	_____ Signature of Contractor
_____ Print or type Signer's name		_____ Print or type Signer's name
<i>If Corporation, affix Corporate Seal</i>		

NOTARY SEAL
Affidavit must be notarized for Line (2)
Subscribed and sworn to before me this _____ day of _____ 20____

Signature of Notary Public
of _____ County
State of _____
My Commission Expires: _____

NOTARY SEAL
Affidavit must be notarized for Line (3)
Subscribed and sworn to before me this _____ day of _____ 20____

Signature of Notary Public
of _____ County
State of _____
My Commission Expires: _____

NOTARY SEAL
Affidavit must be notarized for Line (4)
Subscribed and sworn to before me this _____ day of _____ 20____

Signature of Notary Public
of _____ County
State of _____
My Commission Expires: _____

**EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
CERTIFICATION**

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor

_____ Individual name

Trading and doing business as

_____ Full name of Firm

Signature of Witness

Signature of Contractor, Individually

Print or type Signer's name

Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

NOTARY SEAL

_____ day of _____ 20__.

Signature of Notary Public

of _____ County

State of _____

My Commission Expires: _____

**EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN
CERTIFICATION**

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____
Print or type Individual name

Address as Prequalified

Signature of Contractor, Individually

Print or type Signer's Name

Signature of Witness

Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

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

NOTARY SEAL

Signature of Notary Public

of _____ County

State of _____

My Commission Expires: _____

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction*, *debarred*, *suspended*, *ineligible*, *lower tier covered transaction*, *participant*, *person*, *primary covered transaction*, *principal*, *proposal*, and *voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

Check here if an explanation is attached to this certification.

Execution of Contract

Contract No: DA00226

County: Chowan

ACCEPTED BY THE DEPARTMENT

Contract Officer

Date

County : Chowan

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (12+29.50)	Lump Sum	L.S.	
0003	0050000000-E	226	SUPPLEMENTARY CLEARING & GRUB- BING	1 ACR		
0004	0134000000-E	240	DRAINAGE DITCH EXCAVATION	10 CY		
0005	0248000000-N	SP	GENERIC GRADING ITEM (EXCAVATION & EMBANKMENT)	Lump Sum	L.S.	
0006	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	20 TON		
0007	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	50 SY		
0008	0335000000-E	305	*** DRAINAGE PIPE (18")	48 LF		
0009	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	100 LF		
0010	0995000000-E	340	PIPE REMOVAL	70 LF		
0011	1308000000-E	607	MILLING ASPHALT PAVEMENT, **** TO ***** (0"-3")	140 SY		
0012	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	150 TON		
0013	1525000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	200 TON		
0014	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	20 TON		
0015	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	50 TON		
0016	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	8 EA		
0017	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (4-TYPE "E", 2-TYPE "F", 2-TYPE "G")	8 EA		

County : Chowan

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0018	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	498		LF
0019	2591000000-E	848	4" CONCRETE SIDEWALK	130		SY
0020	2612000000-E	848	6" CONCRETE DRIVEWAY	19		SY
0021	3215000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE III	3		EA
0022	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	3		EA
0023	3649000000-E	876	RIP RAP, CLASS B	4		TON
0024	3656000000-E	876	GEOTEXTILE FOR DRAINAGE (DRAINAGE)	40		SY
0025	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	Lump Sum	L.S.	
0026	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	1,000		LF
0027	5325600000-E	1510	6" WATER LINE	100		LF
0028	5326200000-E	1510	12" WATER LINE	80		LF
0029	5534000000-E	1515	*** VALVE (18")	4		EA
0030	5540000000-E	1515	6" VALVE	2		EA
0031	5558000000-E	1515	12" VALVE	2		EA
0032	5571600000-E	1515	6" TAPPING VALVE	2		EA
0033	5666000000-E	1515	FIRE HYDRANT	3		EA
0034	5709000000-E	1520	*** FORCE MAIN SEWER (18")	60		LF
0035	5804000000-E	1530	ABANDON 12" UTILITY PIPE	275		LF
0036	5811000000-E	1530	ABANDON 18" UTILITY PIPE	330		LF

County : Chowan

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0037	5871000000-E	1550	TRENCHLESS INSTALLATION OF *** IN SOIL (1" WATER SERVICE)	80 LF		
0038	5871700000-E	1550	TRENCHLESS INSTALLATION OF 12" IN SOIL	250 LF		
0039	5872000000-E	1550	TRENCHLESS INSTALLATION OF 18" IN SOIL	290 LF		
0040	6000000000-E	1605	TEMPORARY SILT FENCE	1,000 LF		
0041	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	75 TON		
0042	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	15 TON		
0043	6012000000-E	1610	SEDIMENT CONTROL STONE	70 TON		
0044	6015000000-E	1615	TEMPORARY MULCHING	0.5 ACR		
0045	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	100 LB		
0046	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	0.5 TON		
0047	6024000000-E	1622	TEMPORARY SLOPE DRAINS	200 LF		
0048	6029000000-E	SP	SAFETY FENCE	100 LF		
0049	6030000000-E	1630	SILT EXCAVATION	20 CY		
0050	6036000000-E	1631	MATTING FOR EROSION CONTROL	1,500 SY		
0051	6037000000-E	SP	COIR FIBER MAT	100 SY		
0052	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	20 SY		
0053	6042000000-E	1632	1/4" HARDWARE CLOTH	315 LF		
0054	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	50 SY		
0055	6071012000-E	SP	COIR FIBER WATTLE	165 LF		

County : Chowan

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0056	6084000000-E	1660	SEEDING & MULCHING	0.5	ACR	
0057	6087000000-E	1660	MOWING	0.5	ACR	
0058	6090000000-E	1661	SEED FOR REPAIR SEEDING	50	LB	
0059	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.25	TON	
0060	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	50	LB	
0061	6108000000-E	1665	FERTILIZER TOPDRESSING	0.25	TON	
0062	6114500000-N	1667	SPECIALIZED HAND MOWING	10	MHR	
0063	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25	EA	

STRUCTURE ITEMS

0064	8021000000-N	SP	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (12+29.50)	Lump Sum	L.S.	
0065	8112730000-N	450	PDA TESTING	1	EA	
0066	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION ***** (12+29.50)	Lump Sum	L.S.	
0067	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (12+29.50)	Lump Sum	L.S.	
0068	8364000000-E	450	HP12X53 STEEL PILES	770	LF	
0069	8365000000-E	450	HP12X53 GALVANIZED STEEL PILES	280	LF	
0070	8384000000-E	450	HP14X73 STEEL PILES	480	LF	
0071	8384200000-E	450	HP14X73 GALVANIZED STEEL PILES	200	LF	
0072	8393000000-N	450	PILE REDRIVES	9	EA	

County : Chowan

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0073	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	195 TON		
0074	8622000000-E	876	GEOTEXTILE FOR DRAINAGE (SLOPE PROTECTION)	450 SY		
0075	8765000000-N	SP	CONSTRUCTION OF SUBSTRUCTURE (12+29.50)	Lump Sum	L.S.	
0076	8766000000-N	SP	CONSTRUCTION OF SUPERSTRUCTURE (12+29.50)	Lump Sum	L.S.	

0932/Jan28/Q10311.5/D373555942000/E76

Total Amount Of Bid For Entire Project :

ADDENDUM(S)

ADDENDUM #1

I, _____
(SIGNATURE)

representing _____

Acknowledge receipt of Addendum #1.

ADDENDUM #2

I, _____
(SIGNATURE)

representing _____

Acknowledge receipt of Addendum #2.

ADDENDUM #3

I, _____
(SIGNATURE)

representing _____

Acknowledge receipt of Addendum #3.

UTILITY CONTACTS (ATTACHMENT A)

UTILITY CONTACTS

Town of Edenton Public Works

John Norris
(252) 482-4111

Mickey Watson
(252) 333-7315

Century Link – Telephone

Heath Bryant
(252) 333-1222

Town of Edenton Electric Department

Glenn Anderson
(252) 482-4414