STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

PROPOSAL

INCLUDES ADDENDUM No.1 DATED 11-02-2026

DATE AND TIME OF BID OPENING: **Nov 17, 2026 AT 02:00 PM**

CONTRACT ID	C204481
WBS	45810.3.1, 47897, 48392.3.2

FEDERAL-AID NO.	STATE FUNDED
COUNTY	GASTON
T.I.P NO.	B-5857, U-6146
MILES	1.277
ROUTE NO.	
LOCATION	US 29/US-74 (WILKINSON BLVD) FROM SR-2209 TO SR-2016/SR-2017.
TYPE OF WORK	GRADING, DRAINAGE, PAVING, SIGNALS, AND STRUCTURES.

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 $40,000 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.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT No. C204481 IN GASTON COUNTY, NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204481** 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 Board 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 *2024 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 Contract No. **C204481** in **Gaston 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 2024* 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.

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.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.



State Contract Officer

Signed by:
Jonathan H. Weathersbee
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11/02/2026

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GENERAL

AWARD OF CONTRACT:
(1-16-18)(Rev. 5-28-24) 103 SP1 G01

Revise the *Standard Specifications* as follows:

Page 1-24, Subarticle 103-4(A) General, first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the lowest responsible bidder the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such bidder. In the absence of such agreement, the lowest responsible bidder may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

HAUL ROADS:
(7-16-24) 105 SP1 G04

Revise the *Standard Specifications* as follows:

Page 1-45, Article 105-15 RESTRICTION OF LOAD LIMITS, line 31, add the following after second sentence of the second paragraph:

At least 30 days prior to use, the Contractor shall notify the Engineer of any public road proposed for use as a haul road for the project.

CONTRACT TIME AND LIQUIDATED DAMAGES:
(8-15-00) (Rev. 5-16-23) 108 SP1 G08 A

The date of availability for this contract is **April 12, 2027**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **April 13, 2031**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars ($ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:
(7-1-95) (Rev. 2-21-12) 108 SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, 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 **April 12, 2027**.

The completion date for this intermediate contract time is **October 15, 2030**.

The liquidated damages for this intermediate contract time are **Three Thousand Seven Hundred Dollars ($ 3,700.00)** 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 *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **US 29/US 74 (-L-)** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday through Friday, 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM

In addition, the Contractor shall not close or narrow a lane of traffic on **US 29/US 74 (-L-),** detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.

2. For **New Year's Day**, between the hours of **7:00 AM** December 31st and **6:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 PM** the following Tuesday.

3. For **Easter**, between the hours of **7:00** AM Thursday and **6:00 PM** Monday.

4. For **Memorial Day**, between the hours of **7:00** AM Friday and **6:00** PM Tuesday.

5. For **Independence Day**, between the hours of **7:00 AM** the day before Independence Day and **6:00 PM** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 AM** the Thursday before Independence Day and **6:00 PM** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.

7. For **Thanksgiving Day**, between the hours of **7:00 AM** Tuesday and **6:00 PM** Monday.

8. For **Christmas**, between the hours of **7:00 AM** the Friday before the week of Christmas Day and **6:00 PM** the following Tuesday after the week of Christmas Day.

9. For the **McAddenville Christmas Light Celebration**, between the hours of **6:00 PM and 12:01 AM** beginning the day before Thanksgiving Day and ending the following January 2nd.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

The liquidated damages are **Five Hundred Dollars ($ 500.00)** per fifteen **(15)** minute time period.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **Wesleyan Drive / Market Street (-Y-), Peach Orchard Road (-Y1-), or Cramerton Village Drive (-Y2-)** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday through Friday, 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM

In addition, the Contractor shall not close or narrow a lane of traffic on **Wesleyan Drive / Market Street, Peach Orchard Road, or Cramerton Village Drive**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.

2. For **New Year's Day**, between the hours of **7:00 AM** December 31st and **6:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 PM** the following Tuesday.

3. For **Easter**, between the hours of **7:00 AM** Thursday and **6:00 PM** Monday.

4. For **Memorial Day**, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.

5. For **Independence Day**, between the hours of **7:00 AM** the day before Independence Day and **6:00 PM** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 AM** the Thursday before Independence Day and **6:00 PM** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.

7. For **Thanksgiving Day**, between the hours of **7:00 AM** Tuesday and **6:00 PM** Monday.

8. For **Christmas**, between the hours of **7:00 AM** the Friday before the week of Christmas Day and **6:00 PM** the following Tuesday after the week of Christmas Day.

9. For the **McAddenville Christmas Light Celebration**, between the hours of **6:00 PM and 12:01 AM** beginning the day before Thanksgiving Day and ending the following January 2nd.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

The liquidated damages are **Two Hundred Fifty Dollars ($ 250.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase I, Step #3 thru Step #6** as shown on Sheet **TMP- 3** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is the date the Contractor elects to begin the work.

The completion date for this intermediate contract time is the date which is **One Hundred Twenty (120)** consecutive calendar days after and including the date the Contractor begins this work.

The liquidated damages are **Three Thousand Dollars ($ 3,000.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 5 AND LIQUIDATED DAMAGES FOR FAILURE TO RESTORE COMMUNICATION TO ITS DEVICE AFTER AN UNPLANNED DISRUPTION

The Contractor shall maintain communications with all permanent and temporary ITS devices integrated with the "Statewide ITS Network" that have not been turned over to the OMC Contractor for maintenance. If communication is lost, the Contractor shall restore communication within 24 hours or provide a replacement device at no cost to the Department. If a replacement device is provided, it shall be integrated with the "Statewide ITS Network" within 24 hours.

Liquidated Damages for failure to restore communication to an ITS devices or provide a Replacement Device within twenty-four (24) hours are Five Hundred Dollars ($ 500.00) per hour, or any portion thereof.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12)(Rev. 1-16-24) 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 *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 *Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

MAJOR CONTRACT ITEMS:

(2-19-02)(Rev. 1-16-24) 104 SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *Standard Specifications*):

Line #	Description
269	Reinforced Concrete Deck Slab
275	54" Prestressed Concrete Girders

SPECIALTY ITEMS:
(7-1-95)(Rev. 1-16-24) 108-6 SP1 G37

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

Line #	**Description**
84-96	Guardrail
97-103	Fencing
109-116	Signing
134-138, 149	Long-Life Pavement Markings
139	Removable Tape
150	Permanent Pavement Markers
151-185	Utility Construction
186-220	Erosion Control
221-255	Signals/ITS System
263-267	Drilled Piers

FUEL PRICE ADJUSTMENT:
(11-15-05)(Rev. 1-16-24) 109-8 SP1 G43

Page 1-82, Article 109-8, FUEL PRICE ADJUSTMENTS, add the following:

The base index price for DIESEL #2 FUEL is **$ 5.0299** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

Description	**Units**	**Fuel Usage Factor Diesel**
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Erosion Control Stone	Gal/Ton	0.55
Rip Rap, Class _____	Gal/Ton	0.55
Asphalt Concrete Base Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Open-Graded Asphalt Friction Course	Gal/Ton	0.90 or 2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	0.90 or 2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Ultra-thin Bonded Wearing Course	Gal/Ton	0.90 or 2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
> 11" Portland Cement Concrete Pavement	Gal/SY	0.327
Concrete Shoulders Adjacent to > 11” Pavement	Gal/SY	0.327
9” to 11" Portland Cement Concrete Pavement	Gal/SY	0.272
Concrete Shoulders Adjacent to 9” to 11” Pavement	Gal/SY	0.272
< 9” Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to < 9” Pavement	Gal/SY	0.245

For the asphalt items noted in the chart as eligible for fuel adjustments, the bidder may include the *Fuel Usage Factor Adjustment Form* with their bid submission if they elect to use the fuel usage factor. The *Fuel Usage Factor Adjustment Form* is found at the following link:

https://connect.ncdot.gov/letting/LetCentral/Fuel%20Usage%20Factor%20Adjustment%20Form%20-%20%20Starting%20Nov%202022%20Lettings.pdf

Select either 2.90 Gal/Ton fuel factor or 0.90 Gal/Ton fuel factor for each asphalt line item on the *Fuel Usage Factor Adjustment Form*. The selected fuel factor for each asphalt item will remain in effect for the duration of the contract.

Failure to complete the *Fuel Usage Factor Adjustment Form* will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items noted above. The contractor will not be permitted to change the Fuel Usage Factor after the bids are submitted.

STEEL PRICE ADJUSTMENT:
(4-19-22)(Rev. 12-20-22) SP1 G47

Description and Purpose

Steel price adjustments will be made to the payments due the Contractor for items as defined herein that are permanently incorporated into the work, when the price of raw steel mill products utilized on the contract have fluctuated. The Department will adjust monthly progress payments up or down as appropriate for cost changes in steel according to this provision.

Eligible Items

The list of eligible bid items for steel price adjustment can be found on the Departments website at the following address:

https://connect.ncdot.gov/letting/LetCentral/Eligible%20Bid%20Items%20for%20Steel%20Price%20Adjustment.xlsx

Nuts, bolts, anchor bolts, rebar chairs, connecting bands and other miscellaneous hardware associated with these items shall not be included in the price adjustment.

Adjustments will only be made for fluctuations in the material cost of the steel used in the above products as specified in the Product Relationship Table below. The producing mill is defined as the source of steel product before any fabrication has occurred (e.g., coil, plate, rebar, hot rolled shapes, etc.). No adjustment will be made for changes in the cost of fabrication, coating, shipping, storage, etc.

No steel price adjustments will be made for any products manufactured from steel having an adjustment date, as defined by the Product Relationship Table below, prior to the letting date.

Bid Submittal Requirements

The successful bidder, within 14 calendar days after the notice of award is received by him, shall provide the completed Form SPA-1 to the Department (State Contract Officer or Division Contract Engineer) along with the payment bonds, performance bonds and contract execution signature sheets in a single submittal. If Form SPA-1 is not included in the same submittal as the payment bonds, performance bonds and contract execution signature sheets, the Contractor will not be eligible for any steel price adjustment for any item in the contract for the life of the contract. Form SPA-1 can be found on the Department's website at the following address:

https://connect.ncdot.gov/letting/LetCentral/Form%20SPA-1.xlsm

The Contractor shall provide Form SPA-1 listing the Contract Line Number, (with corresponding Item Number, Item Description, and Category) for the steel products they wish to have an adjustment calculated. Only the contract items corresponding to the list of eligible item numbers for steel price adjustment may be entered on Form SPA-1. The Contractor may choose to have steel price adjustment applied to any, all, or none of the eligible items. However, the Contractor's selection of items for steel price adjustment or non-selection (non-participation) may not be changed once Form SPA-1 has been received by the Department. Items the Bidder

chooses for steel price adjustment must be designated by writing the word "Yes" in the column titled "Option" by each Pay Item chosen for adjustment. Should the bidder elect an eligible steel price item, the entire quantity of the line item will be subject to the price adjustment for the duration of the Contract. The Bidder's designations on Form SPA-1 must be written in ink or typed and signed by the Bidder (Prime Contractor) to be considered complete. Items not properly designated, designated with "No", or left blank on the Bidder's Form SPA-1 will automatically be removed from consideration for adjustment. No steel items will be eligible for steel price adjustment on this Project if the Bidder fails to return Form SPA-1 in accordance with this provision.

Establishing the Base Price

The Department will use a blend of monthly average prices as reported from the Fastmarkets platform to calculate the monthly adjustment indices (BI and MI). This data is typically available on the first day of the month for the preceding month. The indices will be calculated by the Department for the different categories found on the Product Relationship Table below. For item numbers that include multiple types of steel products, the category listed for that item number will be used for adjusting each steel component.

The bidding index for Category 1 Steel items is **$ 47.50** per hundredweight.
The bidding index for Category 2 Steel items is **$ 73.00** per hundredweight.
The bidding index for Category 3 Steel items is **$ 81.25** per hundredweight.
The bidding index for Category 4 Steel items is **$ 62.39** per hundredweight.
The bidding index for Category 5 Steel items is **$ 64.31** per hundredweight.
The bidding index for Category 6 Steel items is **$ 86.32** per hundredweight.
The bidding index for Category 7 Steel items is **$ 50.35** per hundredweight.

The bidding index represents a selling price of steel based on Fastmarkets data for the month of **September 2026**.

MI = Monthly Index. – in Dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

Product Relationship Table

Steel Product (Title)	BI, MI*	Adjustment Date for MI	Category
Reinforcing Steel, Bridge Deck, and SIP Forms	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	1
Structural Steel and Encasement Pipe	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	2
Steel H-Piles, Soldier Pile Walls	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	3
Guardrail Items and Pipe Piles	Based on one or more Fastmarkets indices	Material Received Date**	4
Fence Items	Based on one or more Fastmarkets indices	Material Received Date**	5
Overhead Sign Assembly, Signal Poles, High Mount Standards	Based on one or more Fastmarkets indices	Material Received Date**	6
Prestressed Concrete Members	Based on one or more Fastmarkets indices	Cast Date of Member	7

* BI and MI are in converted units of Dollars per Hundredweight ($/CWT)
** Material Received Date is defined as the date the materials are received on the project site. If a material prepayment is made for a Category 4-6 item, the Adjustment Date to be used will be the date of the prepayment request instead of the Materials Received Date.

Submit documentation to the Engineer for all items listed in the Contract for which the Contractor is requesting a steel price adjustment.

Submittal Requirements

The items in categories 1,2, and 3, shall be specifically stored, labeled, or tagged, recognizable by color marking, and identifiable by Project for inspection and audit verification immediately upon arrival at the fabricator.

Furnish the following documentation for all steel products to be incorporated into the work and documented on Form SPA-2, found on the Departments website at the following address:

https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-2.xlsx

Submit all documentation to the Engineer prior to incorporation of the steel into the completed work. The Department will withhold progress payments for the affected contract line item if the documentation is not provided and at the discretion of the Engineer the work is allowed to proceed. Progress payments will be made upon receipt of the delinquent documentation.

Step 1 (Form SPA -2)

Utilizing Form SPA-2, submit separate documentation packages for each line item from Form SPA-1 for which the Contractor opted for a steel price adjustment. For line items with multiple components of steel, each component should be listed separately. Label each SPA-2 documentation package with a unique number as described below.

a. Documentation package number: (Insert the contract line-item) - (Insert sequential package number beginning with "1").
   Example: 412 - 1,
   412 - 2,
   424 – 1,
   424 – 2,
   424 – 3, etc.
b. The steel product quantity in pounds
   i. The following sources should be used, in declining order of precedence, to determine the weight of steel/iron, based on the Engineers decision:
      1. Department established weights of steel/iron by contract pay item per pay unit;
      2. Approved Shop Drawings;
      3. Verified Shipping Documents;
      4. Contract Plans;
      5. Standard Drawing Sheets;
      6. Industry Standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and
      7. Manufacture's data.
   ii. Any item requiring approved shop drawings shall have the weights of steel calculated and shown on the shop drawings or submitted and certified separately by the fabricator.
c. The date the steel product, subject to adjustment, was shipped from the producing mill (Categories 1-3), received on the project (Categories 4-6), or casting date (Category 7).

Step 2 (Monthly Calculator Spreadsheet)

For each month, upon the incorporation of the steel product into the work, provide the Engineer the following:

1) Completed NCDOT Steel Price Adjustment Calculator Spreadsheet, summarizing all the steel submittal packages (Form SPA-2) actually incorporated into the completed work in the given month.
   a. Contract Number
   b. Bidding Index Reference Month
   c. Contract Completion Date or Revised Completion Date
   d. County, Route, and Project TIP information
   e. Item Number
   f. Line-Item Description
   g. Submittal Number from Form SPA-2
   h. Adjustment date
   i. Pounds of Steel

2) An affidavit signed by the Contractor stating the documentation provided in the NCDOT Steel Price Adjustment Calculator Spreadsheet is true and accurate.

Price Adjustment Conditions

Download the Monthly Steel Adjustment Spreadsheet with the most current reference data from the Department's website each month at the following address:

https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-3%20NCDOT%20Steel%20Price%20Adjustment%20Calculator.xlsx

If the monthly Fastmarkets data is not available, the data for the most recent immediately preceding month will be used as the basis for adjustment.

Price Adjustment Calculations

The price adjustment will be determined by comparing the percentage of change in index value listed in the proposal (BI) to the monthly index value (MI). (See included sample examples). Weights and date of shipment must be documented as required herein. The final price adjustment dollar value will be determined by multiplying this percentage increase or decrease in the index by the represented quantity of steel incorporated into the work, and the established bidding index (BI) subject to the limitations herein.

Price increase/decrease will be computed as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where;

SPA = Steel price adjustment in dollars

MI = Monthly Shipping Index. – in Dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

Q = Quantity of steel, product, pounds actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

Calculations for price adjustment shall be shown separate from the monthly progress estimate and will not be included in the total cost of work for determination of progress or for extension of Contract time in accordance with Subarticle 108-10(B)(1).

Any apparent attempt to unbalance bids in favor of items subject to price adjustment may result in rejection of the bid proposal.

Adjustments will be paid or charged to the Contractor only. Any Contractor receiving an adjustment under this provision shall distribute the proper proportional part of such adjustments to the subcontractor who performed the applicable work.

Delays to the work caused by steel shortages may be justification for a Contract time extension but will not constitute grounds for claims for standby equipment, extended office overhead, or other costs associated with such delays.

If an increase in the steel material price is anticipated to exceed 50% of the original quoted price, the contractor must notify the Department within 7 days prior to purchasing the material. Upon receipt of such notification, the Department will direct the Contractor to either (1) proceed with the work or (2) suspend the work and explore the use of alternate options.

If the decrease in the steel material exceeds 50% of the original quoted price, the contractor may submit to the Department additional market index information specific to the item in question to dispute the decrease. The Department will review this information and determine if the decrease is warranted.

When the steel product adjustment date, as defined in the Product Relationship Table, is after the approved contract completion date, the steel price adjustments will be based on the lesser value of either the MI for the month of the approved contract completion date or the MI for the actual adjustment date.

If the price adjustment is based on estimated material quantities for that time, and a revision to the total material quantity is made in a subsequent or final estimate, an appropriate adjustment will be made to the price adjustment previously calculated. The adjustment will be based on the same indices used to calculate the price adjustment which is being revised. If the adjustment date of the revised material quantity cannot be determined, the adjustment for the quantity in question, will be based on the indices utilized to calculate the steel price adjustment for the last initial documentation package submission, for the steel product subject to adjustment, that was incorporated into the particular item of work, for which quantities are being finalized. Example: Structural steel for a particular bridge was provided for in three different shipments with each having a different mill shipping date. The quantity of structural steel actually used for the bridge was calculated and a steel price adjustment was made in a progress payment. At the conclusion of the work an error was found in the plans of the final quantity of structural steel used for the bridge. The quantity to be adjusted cannot be directly related to any one of the three mill shipping dates. The steel price adjustment for the quantity in question would be calculated using the indices that were utilized to calculate the steel price adjustment for the quantity of structural steel represented by the last initial structural steel documentation package submission. The package used will be the one with the greatest sequential number.

Extra Work/Force Account:

When steel products, as specified herein, are added to the contract as extra work, in accordance with the provisions of Article 104-7 or 104-3, the Engineer will determine and specify in the supplemental agreement, the need for application of steel price adjustments on a case-by-case basis. No steel price adjustments will be made for any products manufactured from steel having an adjustment date prior to the supplemental agreement execution date. Price adjustments will be made as provided herein, except the Bidding Index will be based on the month in which the supplemental agreement pricing was executed.

For work performed on force account basis, reimbursement of actual material costs, along with the specified overhead and profit markup, will be considered to include full compensation for the current cost of steel and no steel price adjustments will be made.

Examples **Form SPA-2**

Steel Price Adjustment Submission Form

Contract Number __C203394_____ Bid Reference Month __January 2019__

Submittal Date ___8/31/2019_____

Contract Line Item _____237_____

Line Item Description __APPROX….LBS Structural Steel_____

Sequential Submittal Number _____2_____

Supplier	**Description of material**	**Location information**	**Quantity in lbs.**	**Adjustment Date**
XYZ mill	Structural Steel	Structure 3, Spans A-C	1,200,000	May 4, 2020
ABC distributing	Various channel & angle shapes	Structure 3 Spans A-C	35,000	July 14, 2020
		Total Pounds of Steel	1,235,000	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name _____ Signature _____

Examples **Form SPA-2**

Steel Price Adjustment Submission Form

Contract Number C203394 Bid Reference Month January 2019

Submittal Date August 31, 2019

Contract Line Item 237

Line Item Description SUPPORT, OVRHD SIGN STR -DFEB – STA 36+00

Sequential Submittal Number 2

Supplier	Description of material	Location information	Quantity in lbs.	Adjustment Date
XYZ mill	Tubular Steel (Vertical legs)	-DFEB – STA 36+00	12000	December 11, 2021
PDQ Mill	4" Tubular steel (Horizontal legs)	-DFEB – STA 36+00	5900	December 11, 2021
ABC distributing	Various channel & angle shapes (see quote)	-DFEB – STA 36+00	1300	December 11, 2021
	Catwalk assembly	-DFEB – STA 36+00	2000	December 11, 2021
Nucor	Flat plate	-DFEB – STA 36+00	650	December 11, 2021
		Total Pounds of Steel	21,850	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name _____ Signature _____

Price Adjustment Sample Calculation (increase)

Project bid on September 17, 2019

Line Item 635 “Structural Steel” has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was $36.12/CWT = BI

450,000 lbs. of Structural Steel for Structure 2 at Station 44+08.60 were shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Structural Steel (Category 2) for May 2021 was $64.89/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where;

SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $36.12/ CWT

MI = $64.89 / CWT

% change = ((MI/ BI)-1) = ($64.89 / $36.12 – 1) = (1.79651 – 1) = 0.79651162791

Q = 450,000 lbs.

SPA = 0.79651162791x $36.12 x (450,000/100)

SPA = 0.79651162791* $36.12 *4,500

SPA = $129,465 pay adjustment to Contractor for Structural Steel (Structure 2 at Station 44+08.60)

Price Adjustment Sample Calculation (decrease)

Project bid on December 18, 2018

Line Item 635 Structural Steel has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was $46.72/CWT = BI

600,000 lbs. of Structural Steel for Structure 1 at Station 22+57.68 were shipped to fabricator from the producing mill in same month, August 2020.

Monthly Index for Structural Steel (Category 2) for August 2020 was $27.03/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $46.72/ CWT

MI = $27.03 / CWT

% change = ((MI/ BI)-1) = ($27.03/ $46.72–1) = (0.57855–1) = -0.421446917808

Q = 600,000 lbs.

SPA = -0.421446917808 * $46.72 * (600,000/100)

SPA = -0.421446917808 * $46.72 *6,000

SPA = $ 118,140.00 Credit to the Department for Structural Steel (Structure 1 at Station 22+57.68)

Price Adjustment Sample Calculation (increase)

Project bid on July 16, 2020

Line Item 614 Reinforced Concrete Deck Slab has a plan quantity of 241974 lbs.

Bidding Index Reference Month was May 2020. Bidding Index for Reinforced Concrete Deck Slab (Category 1) in the proposal was $29.21/CWT = BI

51,621 lbs. of reinforcing steel and 52,311 lbs. of epoxy coated reinforcing steel for Structure 2 at Station 107+45.55 -L- was shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Reinforced Concrete Deck Slab (Category 1) for May 2021 was $43.13/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $29.21/ CWT

MI = $43.13 / CWT

% change = ((MI/ BI)-1) = ($43.13 / $29.21 – 1) = (1.47655 – 1) = 0.47654912701

Q = 103932 lbs.

SPA = 0. 47654912701 * $29.21 * (103,932/100)

SPA = 0. 47654912701 * $29.21 *1,039.32

SPA = $14,467.33 Pay Adjustment to Contractor for Reinforced Concrete Deck Slab (Category 1) at Station 107+45.55 -L-

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:
(7-15-08)(Rev. 6-16-26) 108-2 SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

Fiscal Year	Progress (% of Dollar Value)
2027 (7/01/26 - 6/30/27)	**11**% of Total Amount Bid
2028 (7/01/27 - 6/30/28)	**32**% of Total Amount Bid
2029 (7/01/28 - 6/30/29)	**31**% of Total Amount Bid
2030 (7/01/29 - 6/30/30)	**22**% of Total Amount Bid
2031 (7/01/30 – 6/30/31)	**4**% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:
(10-16-07)(Rev. 10-21-25) 102-15(J) SP1 G66

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 the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE /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 Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

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

Manufacturer - A firm that owns (or leases) and operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor. A firm that makes minor modifications to the materials, supplies, articles, or equipment is not a manufacturer.

MBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated 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 (or leases), and operates a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in sufficient quantities, 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, concrete or concrete products, gravel, stone, asphalt and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Any supplement of regular dealers' own distribution equipment shall be by a long-term operating lease and not on an ad hoc or contract-by-contract basis.

Distributor – A firm that engages in the regular sale or lease of the items specified by the contract. A distributor assumes responsibility for the items it purchases once they leave the point of origin (e.g., a manufacturer's facility), making it liable for any loss or damage not covered by the carrier's insurance.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

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 Participation (Anticipated) - A portion of the total contract, expressed as a percentage, that is anticipated 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. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Form%20and%20Instructions.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. https://connect.ncdot.gov/projects/construction/Construction%20Forms/SAF%20Form%20-%20Subcontract%20Approval%20Form%20Revised%2004-19.xlsm

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 estimated amount (based on quantities and unit prices) 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 the Combined MBE/WBE goal. This form is for paper bids only. http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

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

DBE Regular Dealer/Distributor Affirmation Form – Form is used to make a preliminary counting determination for each DBE listed as a regular dealer or distributor to assess its eligibility for 60 or 40 percent credit, respectively of the cost of materials or supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in section 49 CFR 26.55 under the contract at issue. A Contractor will submit the completed form with the Letter of Intent. https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20Regular%20Dealer-Distributor%20Affirmation%20Form%20-%20USDOT%202024.pdf

Combined MBE/WBE Goal

There is NO MBE/WBE Goal for this project.

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 Combined MBE/WBE Goal. The Directory can be found at the following link.

https://www.ebs.nc.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 Combined MBE/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 above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's 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) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

(1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.

(2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.

(3) The bidder shall be responsible for ensuring that the MBE and WBE are 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 Combined MBE/WBE goal.

(B) Paper Bids

(1) *If the Combined MBE/WBE Goal is more than zero,*

(a) 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.

(b) 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.

(c) 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 Combined MBE/WBE Goal.

(2) *If the Combined MBE/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 a Combined MBE/WBE goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE Goal 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 goal.

MBE/WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE/WBE Subcontractor* 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 Combined MBE/WBE Goal 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 State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. 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 Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE Goal, the Contractor shall submit evidence of good faith efforts for the goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds $500,000 and if the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE /WBE Goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE Goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

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

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the Contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

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 a Combined MBE/WBE Goal 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 that are also prequalified subcontractors. 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 Combined MBE/WBE Goal 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 advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors 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 the advertised goal 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 goal, 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 the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov 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 advertised 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 Combined MBE/WBE Goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, 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 Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The State Prequalification 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 State Prequalification 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 the Combined MBE/WBE Goal

(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 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 anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does <u>not</u> count toward the contract goal requirement. 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 MBE or WBE participation breakdown. 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 firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. 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.

(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) Manufacturer, Regular Dealer, Distributor

A Contractor may count toward its MBE/WBE requirement 40 percent of its expenditures for materials or supplies (including transportation costs) from a MBE/WBE distributor, 60 percent of its expenditures for materials or supplies (including transportation costs) from a MBE/WBE regular dealer and 100 percent of such expenditures obtained from a MBE/WBE manufacturer.

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

(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, regular dealer, nor a distributor count the entire amount of fees or commissions charged that the Department deems to be reasonable, including transportation charges for the delivery of materials or supplies. Do not count any portion of the cost of the materials and supplies themselves.

A Contractor will submit a completed *DBE Regular Dealer/Distributor Affirmation Form* with the Letter of Intent to the State Contractor Utilization Engineer or DBE@ncdot.gov. The State Contractor Utilization Engineer will make a preliminary assessment as to whether a MBE/WBE supplier has the demonstrated capacity to perform a commercially useful function (CUF) on a contract-by-contract basis *prior* to its participation.

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 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 performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(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 Combined MBE/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 participation breakdown. 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 responsible for meeting the individual MBE or WBE participation breakdown.

(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 subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor or any portion of its work 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.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate a MBE/WBE subcontractor or any portion of its work, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated or any portion of its work after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. Good cause does not exist if the Contractor seeks to terminate a MBE/WBE or any portion of its work that it relied upon to obtain the contract so that the Contractor can self-perform the work for which the MBE/WBE was engaged, or so that the Contractor can substitute another MBE/WBE or non- MBE/WBE contractor after contract award. For purposes of this section, good cause shall include the following circumstances:

(a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR parts 180, 215 and 1200 or applicable State law;
(f) The listed MBE/WBE subcontractor is not a responsible contractor;
(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract; and
(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor.

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

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/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 MBE/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 MBE/WBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
(b) A description of the information provided to MBE/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 MBE/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 but not the overall goal.

(i) If the MBE/WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract. The Department may continue to count participation equal to the remaining work performed by the decertified firm which will count toward the contract goal requirement and overall goal.

(ii) If the MBE/WBE's ineligibility is caused solely by its acquisition by or merger with a non- MBE/WBE during the performance of the contract. The Department may not continue to count the portion of the decertified firm's performance on the contract remaining toward either the contract goal or the overall goal, even if the Contractor has executed a subcontract with the firm or the Department has executed a prime contract with the MBE/WBE that was later decertified.

(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 MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined 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).

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(DBE 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.

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/ 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 work on future DOT 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 through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

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

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:
(11-17-20) SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):
(8-20-19)(Rev. 3-17-26) SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107, NC GS 15A-300*,* American Security Drone Act of 2023 (ASDA), Office of Management and Budget (OMB) Memorandum M-26-02, all FAA rules, regulations and policies and all NCDOT UAS Policies. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, as well as operating a UAS registered with the FAA.

All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

EQUIPMENT IDLING GUIDELINES:
(1-19-21) 107 SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.

8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

SUBSURFACE INFORMATION:
(7-1-95) 450 SP1 G112 C

Subsurface information is available on the roadway and structure portions of this project.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):
(7-1-95)(Rev. 1-16-24) 1170-4 SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *Standard Specifications* will apply to the portable concrete barrier.

REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):
(7-1-95)(Rev. 1-16-24) 1205-10 SP1 G124

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of pavement marking tape, provided that these materials have been delivered on or in the vicinity of the project, stored in an acceptable manner, not to exceed the shelf life recommended by the manufacturer, and further provided the documents listed in Subarticle 109-5(C) of the *Standard Specifications* have been furnished to the Engineer.

The Contractor shall be responsible for the material and the satisfactory performance of the material when used in the work.

The provisions of Article 109-6 of the *Standard Specifications* will not apply to removable pavement marking materials.

MAINTENANCE OF THE PROJECT:
(11-20-07)(Rev. 1-16-24) 104-10 SP1 G125

Revise the *Standard Specifications* as follows:

Page 1-35, Article 104-10 Maintenance of the Project, line 3, 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 8, 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 20-22, 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.

COOPERATION BETWEEN CONTRACTORS:
(7-1-95)(Rev. 1-16-24) 105-7 SP1 G133

The Contractor's attention is directed to Article 105-7 of the *Standard Specifications*.

I-5719B / U-5800 (C205001) project limits are a part of off-site detour of this project. C205001 is currently under construction and not anticipated to be completed prior to the letting of this project.

Map #7 of the 2026CPT.12.16.10361, etc. (DL00358) resurfacing package is adjacent to this project. DL00358 is currently under construction and not anticipated to be completed prior to the letting of this project.

Map #3 of the 2026CPT.12.04.20361 (DL00370) resurfacing package is adjacent to this project. DL00370 is currently under construction and not anticipated to be completed prior to the letting of this project.

The Contractor on this project shall cooperate with the Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned.

ELECTRONIC BIDDING:

(8-18-26) 101, 102, 103 SP1 G140

Revise the *Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) ***Electronic Bid,*** **line 3,** replace "electronic bidding software" with "electronic bidding website".

Page 1-16, Subarticle 102-8(B), Electronic Bids, lines 13-14, replace "electronic bidding software" with "electronic bidding website".

Page 1-18, Article 102-10, BID BOND OR BID DEPOSIT, line 43, replace "electronic bidding software" with "electronic bidding website".

Page 1-18, Article 102-11, DELIVERY OF BIDS, line 47, replace "electronic bidding software" with "electronic bidding website".

Page 1-25, Subarticle 103-4(B)(2), Electronic Bids, line 20, replace the first paragraph with the following:

This form is located on the electronic submittal website. The bidder shall click on yes or no to indicate whether or not the bidder desires to limit the award, provide the award limit if desiring to limit the award, and provide the project number and county of the projects associated with the award limit.

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.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev. 10-15-24) 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 and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(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 Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III 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 C*ease 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

All work described within this provision and the role of 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. 1-16-24) 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 *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 https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/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.

NOTES TO CONTRACTOR (Temporary River Traffic Warning Signs):

The Contractors attention is directed to pages TC-3 to TC-4 of the Traffic Control Provisions: "Temporary River Traffic Warning Signs". The Contractor shall implement and adhere to the "Temporary River Traffic Warning Signs" provision. Two weeks prior to starting construction the contractor shall provide and install temporary signage in accordance with the River Warning Sign plan sheets TMP-2C and TMP-2D, Standard Specifications and as directed by the Engineer. The Contractor shall contact local stakeholders listed in the plan, confirm dates and contact information for stakeholders for inclusion on the contractor furnished signs.

In the event of a boating incident involving construction equipment, the contractor shall immediately notify the Engineer and communicate with local stakeholders.

PROJECT SPECIAL PROVISIONS

ROADWAY

CLEARING AND GRUBBING - METHOD III:

(4-6-06)(Rev. 3-19-24) 200 SP2 R02B

Perform clearing on this project to the limits established by Method - III shown on Standard Drawing No. 200.03 of the *Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

BURNING RESTRICTIONS:

(7-1-95) 200, 210, 215 SP2 R05

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

BOATER SAFETY PLAN:

Description

The Contractor shall install items for and implement the Boater Safety Plan as detailed in the project permits and as directed by the Engineer.

Measurement and Payment

Payment shall be made at the contract lump sum bid price for *Boater Safety Plan* found on pages P-34 to P-44 of the permit and is titled "U-6146 / B-5857 Lake Facility Navigational Safety Plan (Boater Safety Plan): Proposed Widening of US 29 / US 74 (Wilkinson Blvd) and Replacement of Bridge #350082 over South Fork Catawba River". The lump sum payment shall be full compensation for all work covered by this provision including, but not limited to, furnishing, installing, maintaining, and removing all items related to the Boater Safety Plan, as detailed in the project permits, other contract documents, *Standard Specifications* and as directed by the Engineer. Such work also includes, but is not limited to, providing barriers that are signed, marked and illuminated consistent with Uniform Waterway Marking System and in accordance with NCDOT guidelines and standards. Additional work may include, floating barricade and lighted buoy system, danger markers, Hazard Analysis Forms, safety forms, training employees, "Slow No Wake", "Keep Out" buoys, as needed, Boat Detour signs as needed, agency contact, public notification and as directed by the Engineer.

TEMPORARY PAVEMENT:
(8-15-00) (Rev. 4-21-15) 1101 SP2 R30A(Rev)

Construct the temporary pavement required on this project in accordance with the plans or as directed by the Engineer.

After the temporary pavement has served its purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Salvage and stockpile the aggregate base course removed from the temporary pavement at locations within the right of way, as directed by the Engineer, for removal by State Forces. Place pavement and earth material removed from the temporary pavement locations in embankments or dispose of in waste areas furnished by the Contractor.

Pipe culverts removed from the temporary pavement locations remain the property of the Contractor. Pipe culverts that are removed will be measured and will be paid at the contract unit price per linear foot for *Pipe Removal*. Payment for the construction of the temporary pavement will be made at the contract unit prices for the various items involved.

No direct payment will be made for removing the aggregate base course, earth material and pavement, as the cost of same shall be included in the lump sum price bid for *Grading*. Such prices and payments will be full compensation for the work of removing, salvaging, and stockpiling aggregate base course; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SHOULDER AND FILL SLOPE MATERIAL:
(5-21-02)(Rev. 1-16-24) 235, 560 SP2 R45 A

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *Standard Specifications*.

Measurement and Payment

Where the material has been obtained from an authorized stockpile or from a borrow source and *Borrow Excavation* is not included in the contract, no direct payment will be made for this work, as the cost of this work will be part of the work being paid at the contract lump sum price for *Grading.* If *Borrow Excavation* is included in this contract and the material has been obtained from an authorized stockpile or from a borrow source, measurement and payment will be as provided in Section 230 of the *Standard Specifications* for *Borrow Excavation*.

ROADWAY EXCAVATION:
(10-20-26) 225 SP2 R50

Revise the *Standard Specifications* as follows:

Page 2-12, Article 225-1, DESCRIPTION, add the following after line 42:

When excavation operations encounter graves, temporarily discontinue operations in the vicinity of the graves and do not resume until directed by the Engineer.

When excavation operations encounter contaminated soils, temporarily discontinue operations in the vicinity of the contamination and do not resume until directed by the Engineer.

When excavation operations encounter artifacts or remains of historical, cultural, or archeological significance, temporarily discontinue operations in the vicinity of the artifacts or remains and do not resume until directed by the Engineer. Disposition of the artifacts shall be in accordance with the requirements of the Division of Archives and History.

Discontinuing operations shall include promptly ceasing all work in the vicinity, immediately notifying the Engineer as to the discovery for legally required authority notification, taking all precautions to protect the discovery from further disturbance to include securing the area and preventing access to it, and preserving all materials as found as directed by the Engineer.

Page 2-15, Article 225-3, UNCLASSIFIED EXCAVATION, lines 23-30, delete the last three paragraphs.

MANUFACTURED QUARRY FINES IN EMBANKMENTS:
(01-17-17)(Rev. 4-16-24) 235 SP02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for subgrade stabilization in accordance with the contract. Geotextile for subgrade stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Materials

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:
(A) Frozen material,
(B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T 99 Method A or C.
(C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications.*

Preconstruction Requirements

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

(A) Description, purpose and location of project.
(B) Estimated start and completion dates of project.
(C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.
(D) The names, address, and contact information for the generator of the MQFs.
(E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

Construction Methods

Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T 99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T 99, Method A or C.

In embankments where MQFs are incorporated, geotextile for subgrade stabilization shall be used. Refer to Article 505-2 of the *Standard Specifications* for geotextile type and Article 505-3 of the *Standard Specifications* for the geotextile construction methods.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight. Where the pay item for *Borrow Excavation* is not included in the original contract then no separate payment will be made for this item and payment will be included in the lump sum price bid for *Grading*.

Geotextile for Subgrade Stabilization will be measured and paid in accordance with Article 505-4 of the *Standard Specifications*. When the pay item for *Geotextile for Subgrade Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.

FLOWABLE FILL:

(9-17-02) (Rev. 1-16-24) 300, 340, 1000, 1530, 1540, 1550 SP3 R30

Description

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Flowable Fill	1000-7

Construction Methods

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

Measurement and Payment

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

Pay Item	Pay Unit
Flowable Fill	Cubic Yard

BRIDGE APPROACH FILLS:

(10-19-10)(Rev. 1-16-24) 422 SP4 R02

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or part of bridge approach slabs. Install outlets and grade bridge approach fills to drain water through and away from approach fills. Install geotextiles to allow for possible future slab jacking and separate approach fills from embankment fills, natural ground and pavement sections as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps as required. Construct bridge approach fills in accordance with the contract, accepted submittals and bridge approach fill *Roadway Standard Drawings*.

Define bridge approach fill types as follows:

Type 1 Approach Fill – Approach fill for bridge abutment in accordance with *Roadway Standard Drawing* No. 423.01;

Type 1A Approach Fill – Alternate approach fill for integral bridge abutment in accordance with *Roadway Standard Drawing* No. 423.02;

Type 2 Approach Fill – Approach fill for bridge abutment with MSE wall in accordance with *Roadway Standard Drawing* No. 423.03 and

Type 2A Approach Fill – Alternate approach fill for integral bridge abutment with MSE wall in accordance with *Roadway Standard Drawing* No. 423.04.

At the Contractors option, use Type 1A or 2A approach fills instead of Type 1 or 2 approach fills, respectively, for integral bridge abutments. Type 1A and 2A approach fills consists of constructing an approach fill with a temporary geotextile wall before placing all or a portion of the concrete for the backwall and wing walls of the integral end bent cap. The temporary geotextile wall is designed for a construction surcharge, remains in place and is aligned so the wall face functions as a form for the integral end bent cap backwall and wing walls.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	**Section**
Geotextiles	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044
Welded Wire Reinforcement	1070-3

Provide Type 1 geotextile for separation geotextiles, Type 4a geotextile for under bridge approach slabs and Class B concrete for outlet pads. Use Class V or Class VI select material for

Type 1 and 1A approach fills and the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal for Type 2 and 2A approach fills. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide outlet pipes and fittings for subsurface drainage materials. Provide 1/4" hardware cloth with 1/4 inch openings constructed from 24 gauge wire.

For temporary geotextile walls, use welded wire reinforcement for welded wire facing and Type 5a geotextile for reinforcement geotextiles. Use Type 5a geotextile with lengths as shown in *Roadway Standard Drawing* No. 423.02 or 423.04.

Construction Methods

Excavate as necessary for approach fills and, if applicable, temporary geotextile walls in accordance with the contract. Ensure limits of approach fills are graded to drain as shown in the bridge approach fill *Roadway Standard Drawings*. For Type 1 and 1A approach fills in embankment fills, place and compact a temporary 1.5:1 (H:V) fill slope in accordance with *Roadway Standard Drawing* No. 423.01 or 423.02 and in accordance with Subarticle 235-3(B) and 235-3(C) of the *Standard Specifications*. Density testing is required within the temporary fill slope and additional more frequent density testing is also required for bridge approach embankments. Wait 3 days before cutting the slope back to complete the approach fill excavation. Use excavated material elsewhere on the project to form embankments, subgrades, or shoulders. If a slope for an approach fill is excavated to flatter than what is required for access or any other reason, that same slope is required for the entire approach fill excavation. Do not backfill overexcavations that extend outside the approach fill limits shown on the *Roadway Standard Drawings* with embankment soils. Instead, expand approach fill limits to include overexcavations.

Notify the Engineer when embankment fill placement and approach fill excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and embankment materials below and outside approach fills are approved.

For Type 2 approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within 3 inches of locations shown in the accepted MSE wall submittals. Install MSE wall reinforcement with the orientation, dimensions and number of layers shown in the accepted MSE wall submittals. If a Type 2 approach fill is designed with geogrid reinforcement embedded in an end bent cap, cut geogrids to the required lengths and after securing ends of geogrids in place, reroll and rewrap portions of geogrids not embedded in the cap to protect geogrids from damage. Before placing aggregate over any MSE wall geosynthetic reinforcement, pull reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

For Type 1 and 1A approach fills, place pipe sleeves in wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads. Insert outlet pipes into pipe sleeves to direct water towards outlets. Attach hardware cloth in front of the outlet pipe at the wing. Connect outlet pipes and fittings with solvent cement in accordance with Article 815-3 of the *Standard Specifications* and place outlet pads in accordance with Roadway Standard Drawing No. 815.03.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent geotextiles of the same type at least 18 inches. Cover select material or aggregate with Type 4a geotextile at an elevation 6 inches below the bridge approach slab. 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 geotextiles or MSE wall reinforcement.

For Type 1A and 2A approach fills, install temporary geotextile walls as shown in *Roadway Standard Drawing* No. 423.02 or 423.04. At the Contractor's option, construct the bottom portion of integral end bents before temporary geotextile walls as shown in the plans. Erect and set welded wire facing for temporary geotextile walls so facing functions as a form for the integral end bent cap backwall. Place welded wire facing adjacent to each other in the horizontal and vertical directions to completely cover the temporary geotextile wall face. Stagger welded wire facing to create a running bond by centering facing over joints in the row below. Wrap reinforcement geotextiles at the wall face in accordance with *Roadway Standard Drawing* No. 423.02 or 423.04 and cover geotextiles with at least 3 inches of select material or aggregate. Place layers of reinforcement geotextiles within 3 inches of locations shown in *Roadway Standard Drawing* No. 423.02 or 423.04. Install reinforcement geotextiles with the direction shown in *Roadway Standard Drawing* No. 423.02 or 423.04. Orient overlapping seams in reinforcement geotextiles perpendicular to the integral end bent cap backwall. Do not overlap reinforcement geotextiles so seams are parallel to the wall face. Before placing select material or aggregate over reinforcement geotextiles, pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Temporary geotextile walls are designed for a surcharge pressure in accordance with *Roadway Standard Drawing* No. 423.02 or 423.04. If loads from construction equipment will be more than what the wall is designed for, contact the Engineer before positioning equipment on top of temporary geotextile walls.

Place select material or aggregate in 6 inch to 8 inch thick lifts. Compact fine aggregate for Type 2 and 2A approach fills in accordance with Subarticle 235-3(C) of the *Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for Type 1 and 1A approach fills and coarse aggregate for Type 2 and 2A approach fills with at least 4 passes of a trench roller in a direction parallel to the end bent cap backwall. Do not displace or damage geosynthetics or MSE wall reinforcement when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics until they are covered with at least 8 inches of select material or aggregate. Replace any damaged geosynthetics to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap Type 4a geotextiles over select material or aggregate and back under approach slabs as shown in *Roadway Standard Drawing* No. 423.03 or 423.04.

Measurement and Payment

Type 1 and 1A approach fills will be paid for at the contract lump sum price for *Type 1 Bridge Approach Fill, Station* _____ and Type 2 and 2A approach fills will be paid for at the contract lump sum price for *Type 2 Bridge Approach Fill, Station* _____. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing wall facing, geotextiles and outlets, compacting backfill and supplying select material, aggregate, geotextiles, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

Compensation for the material placed within the temporary 1.5:1 (H:V) fill slopes will be made in accordance with Section 225, 226, or 230 of the *Standard Specifications*. The cost of removal, including excavating, hauling, placement, and compaction of the material elsewhere on or off the project will be included in the contract lump sum price for *Type 1 Bridge Approach Fill, Station* _____.

The contract lump sum price for *Type 2 Bridge Approach Fill, Station* _____ will also be full compensation for supplying and connecting MSE wall reinforcement to end bent caps but not designing MSE wall reinforcement and connectors. The cost of designing reinforcement and connectors for Type 2 approach fills behind bridge end bents with MSE abutment walls will be incidental to the contract unit price for *MSE Retaining Wall No.* _____.

Payment will be made under:

Pay Item	**Pay Unit**
Type 1 Bridge Approach Fill, Station _____	Lump Sum
Type 2 Bridge Approach Fill, Station _____	Lump Sum

GEOTEXTILE FOR SUBGRADE STABILIZATION:

(5-15-18)(Rev. 4-16-24) 505, 1056 SP5 R9

Description

Provide geotextile for subgrade stabilization in accordance with the contract. Geotextile for subgrade stabilization is required for subgrades to prevent pavement cracking at locations shown in the plans and as directed by the Engineer.

Materials

Refer to Article 505-2 of the *Standard Specifications*.

Construction Methods

Refer to Article 505-3 of the *Standard Specifications*.

Measurement and Payment

Geotextile for Subgrade Stabilization will be measured and paid in accordance with Article 505-4 of the *Standard Specifications*.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:
(11-21-00)(Rev. 1-16-24) 620 SP6 R25

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

The base price index for asphalt binder for plant mix is **$ 752.50** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **October 1, 2026**.

DELETION OF FINAL SURFACE TESTING REQUIREMENTS:
(1-20-25) 610 SP6 R045A

Revise the *Standard Specifications* as follows:

Pages 6-24 to 6-30, Article 610-13 FINAL SURFACE TESTING AND ACCEPTANCE, delete Article 610-13 in its entirety.

4" CONCRETE MULTI-USE PATH

Description

The Contractor shall construct 4" Concrete Multi-Use Path as shown in the plans, in accordance with the applicable requirements of Section 848 of the *Standard Specifications*, and as directed by the Engineer.

Materials

Concrete shall be Class AA Concrete meeting the requirements of Section 1000 of the *Standard Specifications*.

Wire mesh reinforcement shall be 4x4-W3.5xW3.5 welded wire fabric meeting the requirements of Section 1070 of the *Standard Specifications*. Macro-fibers for concrete reinforcement may be used in lieu of wire mesh reinforcement. See NCDOT Approved Products List for list of macro-fibers.

Construction Methods

Construct concrete apron in accordance with Section 848 of the *Standard Specifications***.**

Measurement and Payment

4" Concrete Multi-Use Path will be measured and paid for in square yards measured along the surface of the completed and accepted work. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	Pay Unit
4" Concrete Multi-Use Path	Square Yard

FRAME WITH GRATES (DRIVEWAY DROP INLET):

(3-21-00) (Rev.7-18-06) SPI 8-35

Description

Provide grates for driveway drop inlets that are fabricated steel or cast iron. Provide grates that are of a design and weight that is recommended by the manufacturer as being adequate for HS-20 loadings. Furnish a manufacturer's certification stating that the grates and frame furnished on the project have been designed and manufactured to be adequate for an HS-20 loading. Provide grates with a minimum clear waterway opening of 50 in^2 per 1'-0" length of grate.

If the frame and grate is made from fabricated steel, the requirements of Article 1074-9 of the *2024 Standard Specifications* will be applicable. If the grate and frame is made from iron castings, the requirements of Article 1074-7 of the *Standard Specifications* will be applicable.

Measurement and Payment

Frame with Grates, Driveway Drop Inlet will be measured and paid for as the actual number of linear feet that have been incorporated into the completed and accepted work. Such price and payment will be full compensation for furnishing the grates and frame, and all labor and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Frame with Grates, Driveway Drop Inlet	Linear Foot

DETECTABLE WARNING SURFACE AT CURB RAMPS:

(8-19-25) 848 SP8 R52A

Description

Install detectable warning surface at curb ramps as shown in the plans or as directed by the Engineer, in accordance with Section 848 of the *Standard Specifications* and this special provision.

Materials

Detectable warning surface materials shall consist of raised truncated domes found on the NCDOT APL, meet the requirements of Article 848-2 of the *Standard Specifications* and be capable of being affixed to or anchored in the concrete sidewalk, including green concrete defined as concrete that has set but not appreciably hardened, cured concrete, or asphalt pavement. Surface applied such as glued or stick down applications are prohibited for permanent installations unless approved by the Engineer.

The detectable warning surface shall be uniform in color and texture, be free of cracks or other defects. The color shall be an approximate visual match to the color specified in the contract or as approved by the Engineer.

Construction Methods

Install all detectable warning surface in accordance with the manufacturer's recommendations, Article 848-3 of the *Standard Specifications* and as approved by the Engineer. Ensure the surface is free of debris and irregularities prior to placing the detectable warning on the surface. Place in fresh concrete, before the concrete has reached initial set, or on a hardened cement concrete surface or asphalt pavement surface. Secure permanent installations with mechanical fasteners. No cutting of the coated colored truncated domes is allowed. Embossing or stamping the wet concrete to achieve the truncated dome pattern or using a mold into which a catalyst-hardened material is applied is not allowed. Detectable warning surfaces shall be 24 inches in the direction of travel and extend the full width of the flush surface. The detectable warning surface shall show no appreciable fading, lifting or shrinkage and fit contours, breaks and faults of concrete and asphalt surfaces and show no significant tearing, rollback, lifting or other signs of poor adhesion.

Remove and replace any damaged or misaligned detectable warning surfaces and repair any damage to adjacent facilities prior to final acceptance at no cost to the Department. The finished installation shall meet all applicable ADA and Public Right-of-Way Accessibility Guidelines (PROWAG) requirements for placement, orientation, surface condition, and visual contrast.

Measurement and Payment

The detectable warning surface at curb ramps are incidental to *Concrete Curb Ramps*, *Retrofit Existing Curb Ramps*, and/or *Remove and Replace Curb Ramps* in accordance with Article 848-4 of the *Standard Specifications*.

TEMPORARY GUARDRAIL:

(11-17-26) 862 SP8 R60

Revise the *Standard Specifications* as follows:

Page 8-40, Article 862-5 TEMPORARY GUARDRAIL, lines 39-40, replace the first and second sentence of the first paragraph with the following:

Install temporary guardrail in accordance with this section and the plans. Temporary guardrail may be reused if it is in satisfactory condition and meets the requirements of Article 862-2.

WOOD RUB RAIL:

Construct wood rub rail at areas indicated in the plans and as directed by the Engineer.

Construction

Construct wood rub rail in accordance with the details in the plans.

Measurement and Payment

Wood Rub Rail will be measured and paid in linear feet of wood rub rail that has been satisfactorily completed and accepted by the Engineer. Measurement will be made from center to center of the outermost post in the length of wood rub rail being measured.

Payment will be made under:

Pay Item	Pay Unit
Wood Rub Rail	Linear Feet

HANDRAIL ON RETAINING WALL (BLACK):

Description

Furnish and install a steel pipe handrail (painted black in color) mounted on a retaining wall at areas indicated in the plans and as directed by the Engineer.

Construction

Construct handrail on retaining wall (black) in accordance with the details in the plans.

Measurement and Payment

Handrail on Retaining Wall (Black) will be measured and paid as the actual number of linear feet of steel pipe handrail (painted black in color) measured along the top of the handrail to the nearest 0.1 of a foot. Such price and payment shall be full compensation for fabricating, furnishing, installing, attaching to retaining wall, painting and all incidentals necessary to satisfactorily install the handrail in accordance with the details in the plans or as directed by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Handrail on Retaining Wall (Black)	Linear Foot

PEDESTRIAN SAFETY RAIL (BLACK):

Furnish and install a steel pipe handrail (painted black in color) at areas indicated in the plans and as directed by the Engineer.

Construction

Construct pedestrian safety rail (black) in accordance with the details in the plans.

Measurement and Payment

Pedestrian Safety Rail (Black) will be measured and paid as the actual number of linear feet of steel pipe handrail (painted black in color) measured along the top of the handrail to the nearest 0.1 of a foot. Such price and payment shall be full compensation for fabricating, furnishing, installing, painting and all incidentals necessary to satisfactorily install the handrail in accordance with the details in the plans or as directed by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Pedestrian Safety Rail (Black)	Linear Foot

WOOD SAFETY RAIL:

Description

Construct wood safety rail at areas indicated in the plans and as directed by the Engineer.

Construction

Construct wood safety rail in accordance with the details in the plans.

Measurement and Payment

Wood Safety Rail will be measured and paid in linear feet of wood safety rail, measured in place from center of each post to center of end post, that has been satisfactorily completed and accepted by the Engineer.

Such price and payment shall be full compensation for all work covered by this provision including all materials, labor, construction, tools, equipment, and any other incidentals necessary

to satisfactorily place the wood safety rail in accordance with the details in the plans or as directed by the Engineer.

No additional payment will be made for the Class "B" concrete foundation as it is considered incidental to this pay item.

Payment will be made under:

Pay Item	**Pay Unit**
Wood Safety Rail	Linear Feet

VINYL COATED CHAIN LINK FENCE:

(1-1-02)(Rev. 6-17-25) 866 SP8 R101

Revise the *Standard Specifications* as follows:

Page 8-48, Article 866-4, MEASUREMENT AND PAYMENT, add the following paragraphs after line 35:

____ *Vinyl Coated Chain Link Fence, ___" Fabric* will be measured and paid in linear feet of fence measured in place from center of each post or gate post to center of end post or gate post exclusive of gate sections, that has been completed and accepted.

____ *Vinyl Coated Metal Line Posts for ___" Chain Link Fence* will be measured and paid in units of each for the several sizes and kinds of posts actually installed on the project. For extra length metal posts, the actual length of post in place in excess of the standard pay length for each post shall be measured in linear feet, and half of such length shall be converted to an equivalent number of standard length posts of the same size for which a pay item has been established. In converting to equivalent numbers of standard length posts, any fractional portion of a post remaining from the division of a total number of linear feet by a standard post length shall be considered as equal to one post.

____ *Vinyl Coated Metal Terminal Posts for ___" Chain Link Fence* will be measured and paid in units of each for all end, corner and brace posts installed on the project.

____ *Vinyl Coated Metal Gate Posts for ___" Chain Link Fence, Double Gate* will be measured and paid in units of each for gateposts installed on the project.

____ *Vinyl Coated Metal Gate Posts for ___" Chain Link Fence, Single Gate* will be measured and paid in units of each for gate posts installed on the project.

____ *Vinyl Coated Double Gates, ___" High, ___' Wide, ___' Opening* will be measured and paid in units of each for the number of gates actually erected on the project. Double gates will be measured as one gate.

____ *Vinyl Coated Single Gates, ___" High, ___' Wide, ___' Opening* will be measured and paid in units of each for the number of gates actually erected on the project.

Page 8-49, Article 866-4, MEASUREMENT AND PAYMENT, add the following after line 1:

Pay Item	Pay Unit
____ Vinyl Coated Chain Link Fence, __" Fabric	Linear Foot
____ Vinyl Coated Metal Line Posts for __" Chain Link Fence	Each
____ Vinyl Coated Metal Terminal Posts for __" Chain Link Fence	Each
____ Vinyl Coated Metal Gate Posts for __" Chain Link Fence, Double Gate	Each
____ Vinyl Coated Metal Gate Posts for __" Chain Link Fence, Single Gate	Each
____ Vinyl Coated Double Gates, ___" High, ___' Wide, ___' Opening	Each
____ Vinyl Coated Single Gates, ___" High, ___' Wide, ___' Opening	Each

TIMBER BOLLARD:

Description

Furnish and install timber bollards at areas indicated in the plans and as directed by the Engineer.

Construction

Furnish and install timber bollards in accordance with the details in the plans.

Measurement and Payment

Timber Bollard will be measured and paid for as the actual number of timber bollards installed and accepted. Such price and payment shall be full compensation for furnishing, installing and all incidentals necessary to satisfactorily place each timber bollard in accordance with the details in the plans or as directed by the Engineer.

No additional payment will be made for the Class “B” concrete foundation as it is considered incidental to this pay item.

Payment will be made under:

Pay Item	Pay Unit
Timber Bollard	Each

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12)(Rev. 1-16-24) 9, 14, 17 SP9 R05

Description

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and light standards supported by metal poles or upright trusses. Foundations consist of footings with pedestals and drilled piers with or without grade beams or wings. Anchor rod assemblies consist of anchor rods (also called anchor bolts) with nuts and washers on the exposed ends of rods and nuts and a plate or washers on the other ends of rods embedded in the foundation.

Construct concrete foundations with the required resistances and dimensions and install anchor rod assemblies in accordance with the contract and accepted submittals. Construct drilled piers consisting of cast-in-place reinforced concrete cylindrical sections in excavated holes. Provide temporary casings or polymer slurry as needed to stabilize drilled pier excavations. Use a prequalified Drilled Pier Contractor to construct drilled piers for metal poles. Define "excavation" and "hole" as a drilled pier excavation and "pier" as a drilled pier.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *Standard Specifications* and Roadway Standard Drawing No. 1743.01.

Materials

Refer to the *Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Type 2	1003
Polymer Slurry	411-2(B)(2)
Portland Cement Concrete	1000
Reinforcing Steel	1070
Rollers and Chairs	411-2(C)
Temporary Casings	411-2(A)

Provide Type 3 material certifications in accordance with Article 106-3 of the *Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:
https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide anchor rod assemblies in accordance with the contract consisting of the following:

(A) Straight anchor rods,

(B) Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and

(C) Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the *Standard Specifications*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

Construction Methods

Install the required size and number of conduits in foundations in accordance with the plans and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *Standard Specifications* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

Before starting drilled pier construction, hold a predrill meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor has mobilized to the site. The Resident or Division Traffic Engineer, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 ft of completed piers until 16 hours after Drilled Pier concrete reaches initial set.

Check for correct drilled pier alignment and location before beginning drilling. Check plumbness of holes frequently during drilling.

Construct drilled piers with the minimum required diameters shown in the plans. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

Excavate holes with equipment of the sizes required to construct drilled piers. Depending on the subsurface conditions encountered, drilling through rock and boulders may be required. Do not use blasting for drilled pier excavations.

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all materials and fluids removed from excavations.

If unstable, caving or sloughing materials are anticipated or encountered, stabilize holes with temporary casings and/or polymer slurry. Do not use telescoping temporary casings. If it becomes necessary to replace a temporary casing during drilling, backfill the excavation, insert a larger casing around the casing to be replaced or stabilize the excavation with polymer slurry before removing the temporary casing.

If temporary casings become stuck or the Contractor proposes leaving casings in place, temporary casings should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Contractor proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain the required slurry properties at all times except for sand content.

Define a "sample set" as slurry samples collected from mid-height and within 2 ft of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required polymer slurry properties.

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the *Standard Specifications* except for the following:

(1) Inspections for tip resistance and bottom cleanliness are not required,
(2) Temporary casings may remain in place if approved, and
(3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or
(4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes

are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

Use collars to extend drilled piers above finished grade. Remove collars after Drilled Pier concrete sets and round top edges of piers.

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the *Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *Standard Specifications*.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation is required in accordance with Article 411-6 of the *Standard Specifications*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

Permanently embed a plate in or mark top of piers with the pier diameter and depth, size and number of vertical reinforcing bars and the minimum compressive strength of the concrete mix at 28 days.

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Place concrete against undisturbed soil or backfill and fill in accordance with Article 410-8 of the *Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

(C) Anchor Rod Assemblies

Size anchor rods for design and the required projection above top of foundations. Determine required anchor rod projections from nut, washer and base plate thicknesses, the protrusion of 3 to 5 anchor rod threads above top nuts after tightening and the distance of one nut thickness between top of foundations and bottom of leveling nuts.

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

Arrange anchor rods symmetrically about center of base plate locations as shown in the plans. Set anchor rod elevations based on required projections above top of foundations. Securely brace and hold rods in the correct position, orientation and alignment with a steel template. Do not weld to reinforcing steel, temporary casings or anchor rods.

Install top and leveling (bottom) nuts, washers and the base plate for each anchor rod assembly in accordance with the following procedure:

(1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
(2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
(3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
(4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.
(5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.
(6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
(7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.
(8) Repeat (7) for leveling nuts.
(9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm

contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).

(10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

NUT ROTATION REQUIREMENTS
(Turn-of-Nut Pretensioning Method)

Anchor Rod Diameter, inch	Requirement
≤ 1 1/2	1/3 turn (2 flats)
> 1 1/2	1/6 turn (1 flat)

Follow a star pattern cycling through each top nut at least twice.

(11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.

(12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

TORQUE REQUIREMENTS

Anchor Rod Diameter, inch	Requirement, ft-lb
7/8	180
1	270
1 1/8	380
1 1/4	420
≥ 1 1/2	600

If necessary, retighten top nuts in the presence of the Engineer with a calibrated torque wrench to within ± 10 ft-lb of the required torque. Do not overtighten top nuts.

(13) Do not grout under base plate.

Measurement and Payment

Foundations and anchor rod assemblies for metal poles and upright trusses will be measured and paid for elsewhere in the contract.

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

ELECTRONIC TICKETING SYSTEM:

(7-16-24)(Rev. 12-17-24) 1020 SP10 R20

Description

At the contractor's option, the use of an electronic ticketing system for reporting individual and cumulative asphalt material deliveries may be utilized on this project. At the preconstruction conference, the contractor shall notify the Engineer if they intend to utilize an electronic ticketing system for reporting individual and cumulative asphalt material deliveries to the project.

Electronic Ticketing Requirements

a. The electronic ticketing system must be fully integrated with the load read-out system at the plant. The system shall be designed so data inputs from scales cannot be altered by either the Contractor or the Department.

b. Material supplier must test to confirm that ticketing data can be shared from the originating system no less than 30 days prior to project start.

c. After each truck is loaded, ticket data must be electronically captured, and ticket information uploaded via Application Programming Interface (API) to the Department.

d. Obtain security token from NCDOT for access to E-Ticketing portal (to send tickets). To request a Security Key, fill out the below E-Ticketing Security Request Form: https://forms.office.com/g/XnT7QeRtgt

e. Obtain API from NCDOT containing the required e-ticketing data fields and format. Download the API from the NCDOT E-ticketing Webpage: https://connect.ncdot.gov/projects/construction/E-Ticketing/Pages/default.aspx

f. Provide all ticket information in real time and daily summaries to the Department's designated web portal. If the project contains locations with limited cellular service, an alternative course of action must be agreed upon.

g. Electronic ticketing submissions must be sent between the Material Supplier and the Department.

h. The electronic ticket shall contain the following information:

Date
Contract Number
Supplier Name
Contractor Name
Material
JMF
Gross Weight

Tare Weight
Net Weight
Load Number
Cumulative Weight
Truck Number
Weighmaster Certification
Weighmaster Expiration
Weighmaster Name
Facility Name
Plant Certification Number
Ticket Number
Hauling Firm (optional)
Voided Ticket Number (if necessary)
Original Ticket Number (if necessary)
Supplier Revision (If necessary)

The Contractor/supplier can use the electronic ticketing system of their choice to meet the requirements of this provision.

Measurement and Payment

No measurement or payment will be made for utilizing an electronic ticketing system as the cost of such shall be included in the contract price bid for the material being provided.

TIMBER AND LUMBER:

(4-21-26) 235, 866, 1046, 1050, 1082, 1084, 1089, 1540 SP10 R82

Revise the *Standard Specifications* as follows:

Page 2-23, Article 235-2 MATERIALS, line 26, add the following as the third sentence of the fourth paragraph.

Use pressure treated wood bases meeting the requirements of Section 1082.

Page 8-45, Article 866-2 MATERIALS, line 26, replace "1076-7" with "1050-8".

Page 10-73, Subarticle 1046-3(C) Treated Timber Posts, line 8, replace "treated southern pine" with "pressure treated southern pine".

Page 10-76, Subarticle 1050-2(A) General, line 3, replace "Use treated southern pine meeting Articles 1082-2 and 1082-3" with "Use pressure treated southern pine meeting Articles 1082-2 and 1082-3".

Page 10-76, Subarticle 1050-2(A) General, lines 15-16, replace "All round posts" with "All round wood posts and braces".

Page 10-76, Subarticle 1050-2(A) General, lines 19-20, delete the last sentence of the third paragraph and replace with the following:

The pieces shall show at least 3 annual rings per inch and shall be at least 30% summerwood. All timber and lumber shall conform to the material characteristics detailed in the Southern Pine Inspection Bureau (SPIB) grading rules for the designated grade and may bear the mark of an American Lumber Standards Committee (ALSC) accredited agency.

Page 10-177, Article 1082-1 GENERAL, lines 32-33, delete the first sentence of the first paragraph and replace with the following:

Use southern pine timber and lumber graded in accordance with the current grading rules of the SPIB and manufactured by a Department pre-approved producer/supplier. All timber and lumber shall conform to the material characteristics detailed in the SPIB grading rules for No. 1 Dense or Select Structural (Sel Str.) and bear the mark of an ALSC-accredited agency.

Page 10-177 and 10-178, Article 1082-1 GENERAL, lines 38-42 and line 1, delete the second through fourth sentence of the second paragraph and replace with the following:

Use approved inspection companies listed on the Department's pre-approved producer/suppliers list. The inspection agency must perform inspections of preservative treated materials in accordance with AWPA Standard M2. Each item shall bear the brand, hammer mark, ink stamp or tag of the inspection agency to indicate it has been inspected. In lieu of commercial inspection, materials in Section 1082 manufactured by a facility that is audited by an ALSC-accredited agency and bearing the quality mark of that agency shall be acceptable for use. In addition, the Supplier must furnish Type 4 – Certified Test Reports and Type 6 – Supplier's Certifications in accordance with Article 106-3. Type 6 – Supplier's Certifications are required for each producer/supplier to include any chain of custody changes from the mill to the Department.

Page 10-178, Article 1082-2 UNTREATED TIMBER AND LUMBER, line 7, replace "Dense" with "Grade No. 1 Dense MC19".

Page 10-178, Subarticle 1082-3(A) General, line 13, replace "lumber" with "timber and lumber" and replace "will not" with "with".

Page 10-178, Subarticle 1082-3(B) Bridges, Fender Systems and Piles, lines 22 and 24, replace "Grade No. 1 Dense" with "Grade No. 1 Dense or Select Structural (Sel Str.)".

Page 10-178, Subarticle 1082-3(B) Bridges, Fender Systems and Piles, lines 24-27, delete the third and fourth sentence of the first paragraph and replace with the following:

Timbers for bridges or fender systems that are 5 inches and thicker along the least dimension shall conform to Grade No. 1 Dense or Select Structural (Sel Str.).

Page 10-178, Subarticle 1082-3(B) Bridges, Fender Systems and Piles, line 28, delete and replace the second paragraph with the following:

Timber for piles shall be southern pine and meet the requirements of ASTM D25.

Page 10-178, Subarticle 1082-3(C) Guardrail Posts, Blockouts and related components, lines 33-34, replace "Southern Pine, conforming to Grade No. 1. Rough lumber will be acceptable." with "southern pine, conforming to Grade No. 1 Dense.".

Page 10-178, Subarticle 1082-3(D) Fence Posts and Braces, lines 37-39, delete the first paragraph and replace with the following:

Sawn fence posts and braces shall be southern pine, S4S, and conform to Grade No. 1 Dense.

Page 10-178, Subarticle 1082-3(E) Sign Posts and Battens, lines 42-44, delete the first and second sentence of the first paragraph and replace with the following:

Lumber or timbers for sign posts shall conform to Structural Light Framing, Grade No. 1 Dense.

Page 10-178, Subarticle 1082-3(E) Sign Posts and Battens, line 46, delete the first sentence of the second paragraph.

Page 10-179, Subarticle 1082-3(F) Poles, lines 2-3, delete the first sentence of the first paragraph and replace with the following:

Timber for poles shall be either treated southern pine or coastal douglas-fir and meet the requirements of ANSI O5.1.

Page 10-179, Subarticle 1082-4(A) General, line 8, replace "AASHTO M 133 or AWPA Standards" with "AASHTO M 133 and AWPA Standards".

Page 10-179, Subarticle 1082-4(A) General, lines 14-15, delete the third paragraph.

Page 10-179, Subarticle 1082-4(A) General, line 19, replace ""areas include" with "areas including, but not limited to,".

Page 10-179, Subarticle 1082-4(B) Timber Preservatives, line 24, replace "AASHTO M 133 or AWPA Standards U1" with "AASHTO M 133 and AWPA Standards U1".

Page 10-179, Subarticle 1082-4(C) Bridges, Fender Systems and Piles, lines 27-28, replace "AASHTO M-133 or AWPA Standard U1" with "AASHTO M 133 and AWPA Standard U1".

Page 10-179, Subarticle 1082-4(D) Guardrail Posts, Blockouts and Related Components, lines 32-33, replace "AASHTO M-133 or AWPA Standard U1" with "AASHTO M 133 and AWPA Standard U1".

Page 10-179, Subarticle 1082-4(E) Fence Posts and Braces, lines 36 and 38, replace "AASHTO M-133 or AWPA Standard U1" with "AASHTO M 133 and AWPA Standard U1".

Page 10-179, Subarticle 1082-4(E) Fence Posts and Braces, line 39, replace "except require retention of preservative as below" with "Commodity Specification B. Posts, UC4A".

Page 10-180, Subarticle 1082-4(F) Sign Posts and Battens, line 2, replace "AASHTO M-133 or AWPA Standard U1" with "AASHTO M 133 and AWPA Standard U1".

Page 10-180, Subarticle 1082-4(G) Poles, line 9, replace "AASHTO M-133 or AWPA Standard U1" with "AASHTO M 133 and AWPA Standard U1".

Page 10-180, Subarticle 1084-1(A) Treated Timber Pile, line 16-17, delete and replace the first paragraph with the following:

Treated timber piles shall meet the requirements of Section 1082.

Page 10-195, Subarticle 1089-2(A)(1) Work Zone Signs (Stationary), line 44, add the following sentence to the second paragraph:

Pressure treat wood posts in accordance with Section 1082.

Page 15-18, Article 1540-2 MATERIALS, line 8, replace "1082-3" with "1082".

GROUND MOUNTED SIGN SUPPORTS:

(9-15-26) 1094 SP10 R94

Revise the *Standard Specifications* as follows:

Page 10-214, Subarticle 1094-1(B) 3 lb Steel U-Channel Supports, line 12 and 15, replace "3/8" with "7/16".

Page 10-214, Subarticle 1094-1(B) 3 lb Steel U-Channel Supports, line 16, replace "5/16" with "3/8".

Page 10-214, Subarticle 1094-1(B) 3 lb Steel U-Channel Supports, lines 14-15, delete the fifth sentence of the first paragraph and replace with the following:

These supports shall be galvanized in accordance with ASTM A653 or ASTM A123 depending on the manufacturing process.

Page 10-214, Subarticle 1094-1(C) 2 lb Steel U-Channel Supports, lines 26-29, delete the third and fourth sentence of the second paragraph with the following:

Punch or drill 7/16 inch diameter holes on 1 inch centers, beginning 1 inch from the top of the post, for a minimum distance equal to the vertical dimension of the respective sign or mile marker. These supports shall be galvanized in accordance with ASTM A653 or ASTM A123 depending on the manufacturing process.

Page 10-214, Subarticle 1094-1(C) 2 lb Steel U-Channel Supports, line 30, replace "3/8" with "7/16".

Page 10-214, Subarticle 1094-1(C) 2 lb Steel U-Channel Supports, line 31, replace "5/16" with "3/8".

Page 10-214, Subarticle 1094-1(D) Steel Square Tube Supports, lines 36-43, delete and replace the first two paragraphs with the following:

Use steel square tube supports of variable length galvanized steel. The support cross section and gauge shall be in accordance with the plans. These supports shall be manufactured using domestic steel conforming to ASTM 1011, Grade 50. Minimum yield strength after cold forming shall be 60,000 psi. These supports shall be galvanized in accordance with ASTM A653 or ASTM A123 depending on the manufacturing process and meet G90 galvanizing requirements. Both the interior and exterior of the post shall be galvanized and all coating applications shall occur in the United States.

The posts shall be corner welded and scarfed as necessary to allow sections to telescope within each other. The finished posts shall be machine straightened and have a smooth uniform finish free from cracks, flaws, injurious seams, laps, blisters, and edges which are ragged, sharp, and imperfect, or other defects affecting their strength, durability, or appearance. The maximum variation in straightness shall be no more than 1/4 inch in any 5 foot of length. For perforated square tubes, cut holes or knockout holes of 7/16 inch diameter shall be spaced on 1 inch centers, on the centerlines of all four sides in true alignment, and opposite to each other for back to back applications. All holes and sheared ends shall be free from burrs. The steel shall also be coated with a conversion coating and a clear organic polymer topcoat.

The zinc coating nor manufacturing process shall interfere with the telescoping properties of steel square supports. The zinc coating inside of the 7/16 inch diameter holes of perforated supports shall not exceed specification requirements enough to prevent a 3/8 inch diameter bolt from freely passing through. These supports should contain a manufacturer's mark for traceability after installation. Provide a Type 2 material certification in accordance with Article 106-3 upon Engineer request.

WORK ZONE INSTALLER:

(7-20-21)(Rev. 4-21-26) 1101 SP11 R04

Revise the *Standard Specifications* as follows:

Page 11-4, Article 1101-14 WORK ZONE INSTALLER, lines 25-26, delete the first sentence of the first paragraph and replace with the following:

When temporary traffic control consists of more than flagging operations, the Contractor shall provide the service of at least one qualified work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way.

TEMPORARY CRASH CUSHIONS:

(4-21-26) 1089, 1160 SP11 R06

Revise the *Standard Specifications* as follows:

Page 10-204, Subarticle 1089-8(A) General, lines 26-29, delete the third and fourth paragraph.

Page 10-204, Subarticle 1089-8(A) General, line 34, delete the last sentence of the fifth paragraph.

Page 11-14, Article 1160-2 MATERIALS, lines 32-35, delete the second and third sentence of the first paragraph.

Page 11-15, Article 1160-3 CONSTRUCTION METHODS, add the following after line 1:

Use a redirective, non-gating temporary crash cushion when adequate space for the lateral displacement of the crash cushion is not available or as required in the TMP.

Page 11-15, Article 1160-3 CONSTRUCTION METHODS, line 7, add the following to the second paragraph:

Temporary crash cushion shall not be placed on an unpaved surface.

FLAGGERS:

(12-17-24)(Rev. 12-23-25) 1150 SP11 R50

Revise Section 1150 of the *Standard Specification* as follows:

Page 11-13, Article 1150-1, DESCRIPTION, add the following after line 31:

Alternatively, at the discretion of the Contractor, the Contractor may furnish, install, place in operation, repair, maintain, relocate, and remove remotely controlled Automated Flagging Assistance Devices (AFAD) or Temporary Portable Traffic Signal units (PTS units) to assist, supplement, or replace human flaggers for one-lane, two-way traffic maintenance during construction in accordance with this provision and the *Standard Specifications*.

For the purpose of this provision, an "approach" refers to a single lane of traffic moving in one direction toward a point of control or work zone. Flaggers, AFAD and PTS units are only used to control one lane of approaching traffic in a specific direction.

Page 11-13, Article 1150-2, MATERIALS, add the following after line 34:

Provide documentation to the Engineer that the AFAD or PTS units meets or exceeds the requirements of this special provision and is on the NCDOT APL or ITS and Signals QPL.

(A) Automated Flagging Assistance Devices (AFAD)

(1) AFAD General

Cover the automated gate arm with Department approved Type VII, VIII or IX retroreflective sheeting of vertical alternating red and white stripes at 16 inch intervals measured horizontally. When the gate arm is in the down position the minimum vertical aspect of the arm and sheeting shall be 4 inches. The retroreflectorized sheeting shall be on both sides of the gate arm. With the AFAD parked or positioned 2 feet outside or in a location deemed acceptable for the lane being controlled, the gate arm shall reach at least to the center of the lane but shall not exceed the width of the lane being controlled.

Design the system to be fail-safe. Provide a conflict monitor, malfunction monitoring unit, or similar device that monitors for malfunctions and prevents the display of conflicting indications. This system shall be electronic and operated by remote control.

(2) AFAD Type I System: RED/YELLOW

Provide a Red/Yellow AFAD with at least one set of CIRCULAR RED and CIRCULAR YELLOW lenses in a vertical configuration that are 12 inches in diameter. The bottom of the housing (including brackets) shall be at least 7 feet (2.1 meters) above the pavement.

This system is required to have yellow 12 inch aluminum or polycarbonate vehicle signal heads with 10 inch tunnel visors, backplates, and Light Emitting Diode (LED) modules. Provide signal heads, backplates, and LED modules listed on the ITS and Signals QPL available on the Department's website.

Provide an automated gate arm on the AFAD that descends to a down position across the approaching lane of traffic when the **s**teady CIRCULAR RED lens is illuminated and then ascends to an upright position when the flashing CIRCULAR YELLOW lens is illuminated. The automated gate arm is to be designed such that if a motorist pulls underneath the gate arm while lowering, no damage to the vehicle occurs.

A STOP HERE ON RED (R10-6 or R10-6a) sign shall be installed on the right-hand side of the approach at the point at which drivers are expected to stop when the steady CIRCULAR RED lens is illuminated.

To stop traffic, the AFAD shall transition from the flashing CIRCULAR YELLOW lens by initiating a <u>minimum 5 second steadily illuminated</u> CIRCULAR YELLOW lens followed by the CIRCULAR RED lens.

Once the CIRCULAR RED lens is displayed, the system is to have <u>a minimum 2 second delay</u> between the time the steady CIRCULAR RED is displayed and the time the gate arm begins to lower. The maximum delay between CIRCULAR RED and the time the gate arm lowers is 4 seconds. To permit stopped road users to proceed, the AFAD shall display the flashing CIRCULAR YELLOW lens and the gate arm shall be placed in the upright position.

Ensure the system monitors for a lack of yellow or red signal voltage, total loss of indication in any direction, presence of multiple indications on any approach and low power conditions.

Additional sets of CIRCULAR RED and CIRCULAR YELLOW lenses located over the roadway or on the left side of the approach and operated in unison with the primary set, may be used to improve visibility of the AFAD. If the set of lenses is located over any portion of the roadway that can be used by motor vehicles, the bottom of the housing (including brackets) shall be at least 15 feet (4.6 meters) above the pavement.

(3) AFAD Type II System: STOP/SLOW

Provide STOP/SLOW signs that are octagonal in shape, made of rigid material, and at least 36 inch x 36 inch in size. Letters shall be a minimum of 8 inches high. The STOP face shall have a red background with white letters and border.

The SLOW face shall be diamond shaped, orange, or yellow background with black letters and border. Cover both faces in a Department approved Type VII, VIII or IX retroreflective sheeting. The minimum mounting height for the sign faces shall be 7 feet above the pavement to the bottom of the sign.

The AFAD's STOP/SLOW signs shall be supplemented with active conspicuity devices by incorporating a stop beacon (red lens) and a warning beacon (yellow lens). The stop beacon shall be no more than 24 inches above the STOP face. Mount the warning beacon no more than 24 inches above or beside of the SLOW face. Except for the mounting locations, the beacons shall conform to the provisions of Chapter 4L of the MUTCD and have 12 inch signal lenses.

Strobe/flashing lights are an acceptable alternative to flashing beacons. If utilized, they shall be either white or red flashing lights located within the STOP face and white or yellow flashing lights within the SLOW face and conform to the provisions of Chapter 6D of the MUTCD. If used, the lens diameter shall be a minimum of 5 inches with a minimum height of 6 inches. Equip strobes/flashing lights for both dual and quad flash patterns.

Type B warning lights shall not be used in lieu of the beacons or the strobe lights.

The faces of the AFADs STOP/SLOW sign may include louvers. If louvers are used, design the louvers such that the aspect of the sign face to approaching traffic is a full sign face at a distance of 50 feet or greater.

A WAIT ON STOP (R1-7) sign and a GO ON SLOW (R1-8) sign shall be displayed to traffic approaching the AFAD. Position signs on the same support structure as the AFAD. Both signs shall have black legends and borders on white Type III sheeting backgrounds. Each of these signs shall be rectangular in shape and be at least 24 inch x 30 inch size with letters at least 6 inches high.

Provide an automated gate arm on the AFAD that descends to a down position across the approaching lane of traffic when the STOP face is displayed and then ascends to an upright position when the SLOW face is displayed.

The automated gate arm is to be designed such that if a motorist pulls underneath the gate arm while lowering, no damage to the vehicle occurs.

A STOP HERE ON RED (R10-6 or R10-6a) sign shall be installed on the right-hand side of the approach at the point at which drivers are expected to stop when the STOP face is displayed.

When approaching motorists are to proceed, display the SLOW face and the warning beacon or strobes are to flash on the AFAD. When approaching motorists are will be stopped, display the STOP face and the stop beacon or strobes are to flash on the AFAD.

To stop traffic, the AFAD will transition from the SLOW face to the STOP face by initiating a minimum 5 second change cycle. First, the warning beacon is to be steadily illuminated for the change cycle. If strobes are used in lieu of a warning beacon, they are to be placed in the quad flash pattern. At the end of the change cycle, the STOP face is to be displayed with the stop beacon flashing and the warning beacon or strobes are to stop flashing. Once the STOP face is displayed, the system is to have a minimum 2 second delay between the time the STOP face is displayed and the time the gate arm begins to lower. The maximum delay between the time the STOP face is displayed and the time the gate arm lowers is 4 seconds.

To permit stopped road users to proceed, the gate arm shall be placed in the upright position and the AFAD shall display the SLOW face and the warning beacon or strobes are to flash in the dual flash pattern.

Do not flash the stop beacon when the SLOW face is displayed, and do not flash the warning beacon when the STOP face is displayed.

(B) Portable Traffic Signals (PTS) Units

Provide PTS units with at least one set of CIRCULAR RED, CIRCULAR YELLOW, and CIRCULAR GREEN lenses in a vertical configuration that are 12 inch diameter aluminum or polycarbonate vehicle signal heads with 10 inch tunnel visors, backplates, and Light Emitting Diode (LED) modules. All signal heads, tunnel visors, and backplates shall be yellow in color.

The bottom of the housing (including brackets) shall be at least 7 feet above the pavement for single set units. Additional signal heads on units with more than one signal head shall be capable of extending over the travel lane.

Communication Requirements

All PTS units within the signal set up systems shall maintain communication at all times by either hardwire cable or wireless radio link communication. If the hardwire cable communication is utilized the communication cable shall be deployed in a manner that will not intrude in the direct work area of the project or obstruct vehicular and pedestrian traffic. Utilize radio communication with 900MHz frequency band and frequency

hopping capability. The radio link communication system shall have a minimum range of 1 mile.

Fault Mode Requirements

Revert PTS units to a flashing red mode upon system default unless otherwise specified by the Engineer. Equip the PTS units with a remote monitoring system. Where cell communication availability exists, the remote monitoring system shall adhere to the remote monitoring system section of this provision.

Remote Monitoring System

The remote monitoring system (RMS) shall be capable of reporting signal location, battery voltage / battery history and system default. Provide a password protected website viewable from any computer with internet capability for the RMS. In the event of a system default, the RMS shall provide specific information concerning the cause of the system default (i.e. red lamp on signal number 1). Equip the RMS with a mechanism capable of immediately contacting a minimum of three previously designated individuals via text messaging and/or email upon a default.

The running program operating the PTS units shall be always available and viewable through the RMS website. Maintain a history of the RMS operating system in each signal including operating hours and events and the location of the PTS units.

Trailer / Cart

The AFAD and PTS units may be mounted on either a trailer or a moveable cart system.

Finish all exterior metal surfaces with Federal orange enamel per AMS-STD-595, color chip ID# 13538 or 12473 respectively with a minimum paint thickness of 2.5 mils (64 microns).

Design and test the AFAD or PTS units trailer / cart to withstand an 80 MPH wind load while in the operational position. Provide independent certification that the assembly meets the design wind load.

Equip the AFAD or PTS units with leveling jacks capable of stabilizing the unit in a horizontal position when located on slopes 6:1 or flatter.

Equip trailers in compliance with North Carolina Law governing motor vehicles and include a 12-volt trailer lighting system complying *with Federal Motor Carrier Safety Regulations 393*, safety chains and a minimum 2 inch ball hitch.

Provide a minimum 4 inch wide strip of fluorescent conspicuity sheeting retroreflective sheeting to the frame of the trailer. Apply the sheeting to all sides of the trailer. The sheeting shall meet the ASTM requirements of Type VII, VIII or IX.

Power System

Design the systems to operate both with and without an external power source. Furnish transmitters, generators, batteries, controls and all other components necessary to operate the device.

Provide equipment that is solar powered and supplemented with a battery backup system that includes a minimum 110/120 VAC powered on-board charging system capable of powering the unit for 7 continuous days with no solar power. Each unit shall also be capable of being powered by standard 110/120 VAC power sources, if applicable.

Locate batteries and electronic controls in a locked, weather and vandal resistant housings.

Page 11-14, Article 1150-3, CONSTRUCTION METHODS, add the following after line 11:

Flaggers shall have a path to escape an errant approaching vehicle at all times, unimpeded by barrier, guardrail, guiderail, parked vehicles, construction materials, slopes steeper than 2:1, or any other obstruction at all times. If an unimpeded path cannot be maintained, the Contractor shall use AFAD or PTS units in lieu of a flagger.

Provide documentation to the Engineer prior to deploying the device that the AFAD or PTS units operator(s) are qualified flagger(s) that have been properly trained through an NCDOT approved training agency or other NCDOT approved training provider and that the qualified flagger(s) have received manufacturer training to operate that specific device. This training shall include proper installation, remote control operation, central control systems and maintenance of the AFAD or PTS units. The training shall take place off the project site where training conditions are removed from live traffic. The documentation shall include the names of the authorized trainer, the trainees, the device on which they have been trained and the date of the training. Provide updated documentation to the Engineer prior to deploying any additional operators.

Install advance warning signs and operate AFADs in accordance with the attached detail drawings in this provision.

Install advance warning signs and operate PTS units in accordance with *NCDOT Roadway Standard Drawings* No. 1101.02, Sheet 17.

AFAD and PTS units shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled. **At no time shall an AFAD unit controlling traffic through the work area be placed in an autonomous mode and/or left unattended.**

Signal timing and operation of PTS units shall be field verified and accepted by the Engineer before use.

Do not use AFAD or PTS units in locations where queueing from the AFAD or PTS units will extend to within 150 feet of a signalized intersection or railroad crossing. Do not use AFAD and PTS units as a substitute for or a replacement for a continuously operating temporary traffic control signal as described in Section 6F.84 of the MUTCD.

If used at night, illuminate each AFAD or PTS units as described in Section 6D of the MUTCD.

Provide a complete AFAD or PTS units that is capable of being relocated as traffic conditions demand.

If AFADs or PTS units become inoperative, be prepared at all times to replace the unit with the same type and model of AFAD or PTS units, revert to human flagging operations or terminate all construction activities requiring the use of the AFAD or PTS units until the AFAD or PTS units become operative or qualified human flaggers are available.

When the work requiring the AFAD or PTS units is not pursued for 30 minutes or longer, power off each AFAD or PTS units. Removed the AFAD or PTS units from the travel lane and relocated to a minimum of 5 feet from the edge line. AFAD gate arms shall be in the upright position. Remove all traffic control devices from the road, place two cones by each AFAD or PTS units and all signs associated with the lane closure operation shall be removed or laid down. At the end of each workday, remove all AFADs or PTS units from the roadway and shoulder areas.

Ensure the system's wireless communication links continuously monitor and verify proper transmission and reception of data used to monitor and control each AFAD or PTS units. Ensure ambient mobile or other radio transmissions or adverse weather conditions do not affect the system.

In the event of a loss of communications, immediately display the flashing RED or STOP indication on all AFAD or PTS units.

AFAD Specific Construction Methods

The flagger/operator controlling the AFAD units shall be on the project site at all times. If multiple AFAD units are used, one AFAD unit shall be the Main AFAD unit and all other units shall be remote AFAD units. Ensure that each device meets the physical display and operational characteristics as specified in the MUTCD.

Multiple AFAD units may be controlled with **one** flagger/operator when the AFAD units meet each of the following requirements:

(1) AFAD units are spaced no greater than the manufacturer's recommendations.

(2) Both AFAD units can be seen at the same time from the flagger/operator's position, or the AFAD is operating on its own secure network with malfunction detection and notification to the flagger/operator.

(3) The flagger/operator has an unobstructed view of approaching traffic in both directions from the flagger/operator position or the AFAD is operating on its own secure network, with cameras that provide the flagger/operator an unobstructed view of approaching traffic from both directions. The flagger/operator may control the AFAD units from a pilot vehicle.

If any of the above requirements are not met, flagger/operator control each AFAD unit.

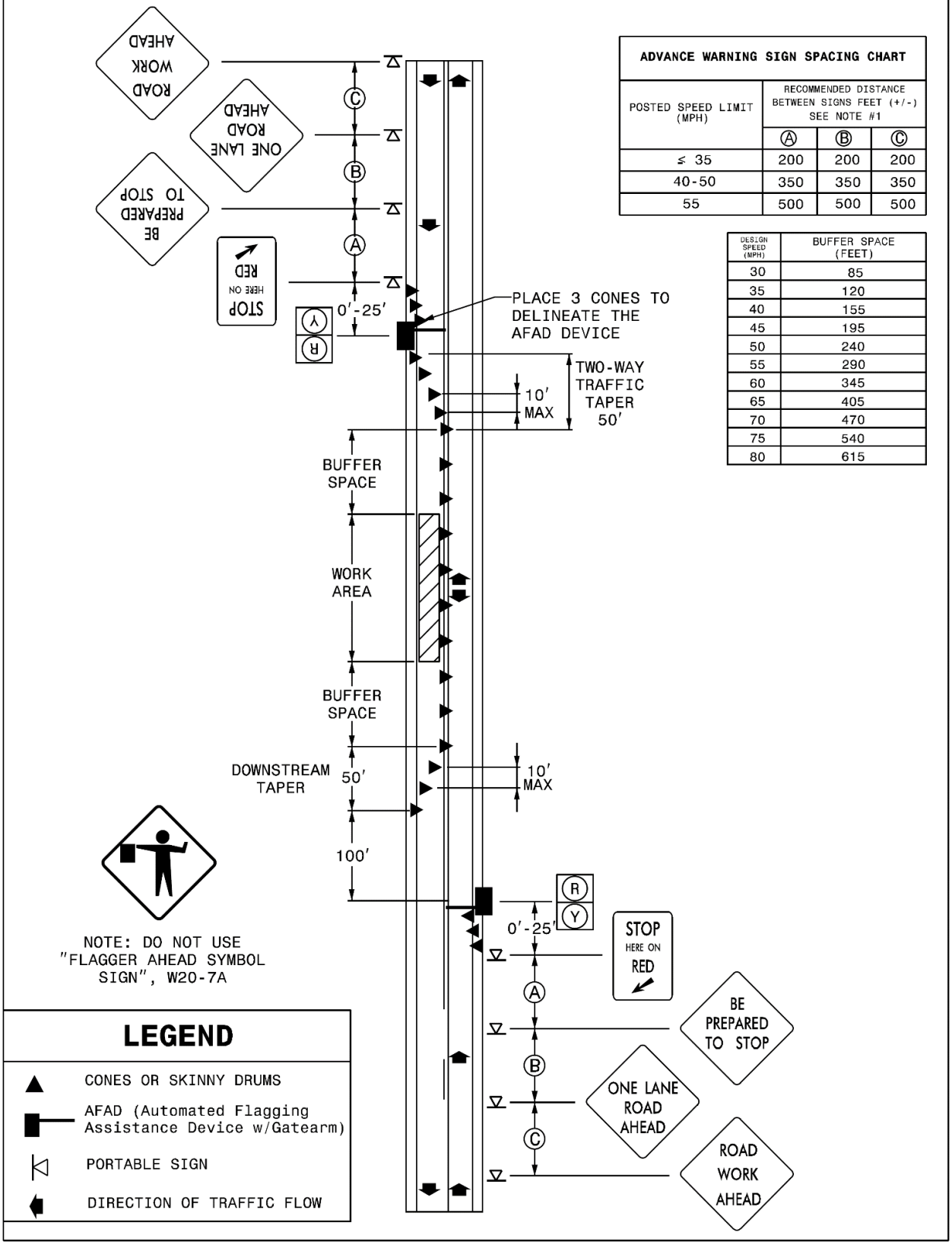
AFAD operators may either control traffic at side streets or driveways between the AFAD units or operate the pilot car while operating the AFAD system if approved by the Engineer. AFAD units must continue to be within clear sight of the operator during these work activities.

Page 11-14, Article 1150-4, MEASUREMENT AND PAYMENT, add the following after line 24:

Each AFAD or PTS unit will be measured and paid for as *Flaggers* paid by day in accordance with Article 1150-4 of the *Standard Specifications*. Where the pay item for *Flaggers* is not included in the original contract then no separate payment will be made for this item and payment will be included in the lump sum price bid for *Temporary Traffic Control* found elsewhere in this contract. Each approach controlled by AFAD or PTS units will be measured and paid as one flagger, irrespective of the number of devices used. If multiple PTS units are required to control a single approach, these units will collectively be considered as replacing one flagger.

No separate measurement or payment will be made for AFAD or PTS unit operators, as the cost of such including their training and operational costs shall be included in the unit or lump sum price for *Flaggers* or *Temporary Traffic Control*. Such price and payment also includes the relocation, maintenance, and removal during repair periods of AFAD or PTS units as well as the signal controller, communication, vehicle detection system, traffic signal software of PTS units and any other incidentals necessary to complete the work.

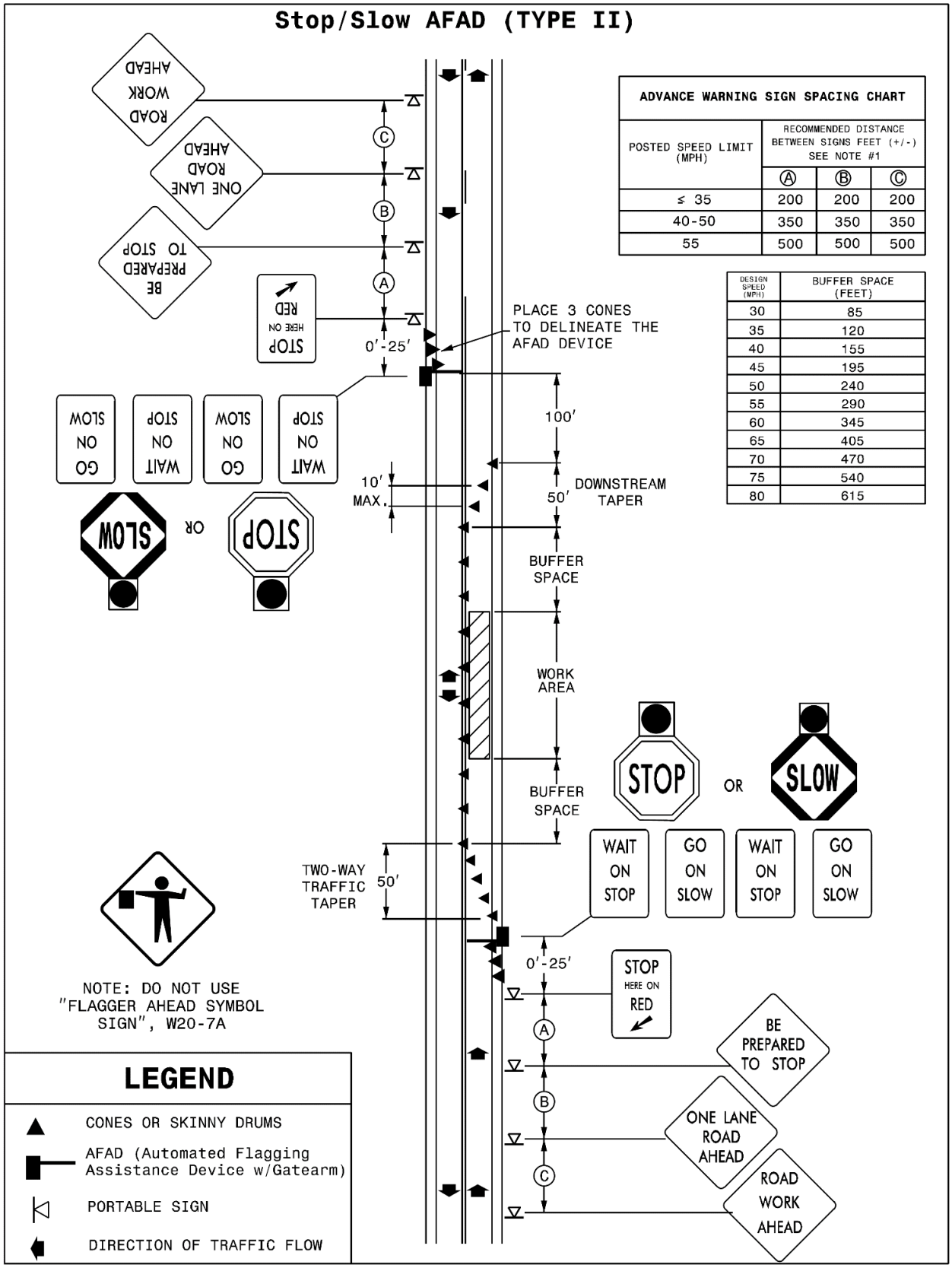
Red/Yellow Lens AFAD (TYPE I)



ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS FEET (+/-) SEE NOTE #1		
	Ⓐ	Ⓑ	Ⓒ
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500

DESIGN SPEED (MPH)	BUFFER SPACE (FEET)
30	85
35	120
40	155
45	195
50	240
55	290
60	345
65	405
70	470
75	540
80	615

Stop/Slow AFAD (TYPE II)



ADVANCE WARNING SIGN SPACING CHART

POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS FEET (+/-) SEE NOTE #1		
	Ⓐ	Ⓑ	Ⓒ
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500

DESIGN SPEED (MPH)	BUFFER SPACE (FEET)
30	85
35	120
40	155
45	195
50	240
55	290
60	345
65	405
70	470
75	540
80	615

PORTABLE CONCRETE BARRIER:
(12-17-24) 1170 SP11 R70

Revise the *Standard Specifications* as follows:

Page 11-17, Subarticle 1170-3(A)(1) Portable Concrete Barrier, after line 25, add the following:

For MASH approved F-Shape K-Wall, install anchorage transitions between unanchored portable concrete barrier and temporary crash cushions, and between unanchored portable concrete barrier and portable concrete barrier (anchored) as shown in the *Roadway Standard Drawings*, No. 1170.01.

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 16, after the second sentence of the first paragraph add the following:

Crash cushion to unanchored concrete requires a transition

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 13, delete and replace "*Portable Concrete Barrier (____)*" with "*Portable Concrete Barrier*".

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 16, after the second sentence of the first paragraph add the following:

As shown in the *Roadway Standard Drawings*, No. 1170.01, anchorage transition sections between *Portable Concrete Barrier* and *Temporary Crash Cushions* as found in Section 1160 will be measured and paid as *Portable Concrete Barrier*. No additional payment will be made for equipment, materials or labor to meet the anchorage transition requirements.

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 16, after the first paragraph add the following:

Portable Concrete Barrier (Anchored) will be measured and paid as the maximum number of linear feet furnished, satisfactorily installed, accepted by the Engineer, maintained and removed, at any one time during the life of the project, including anchorage transition sections between portable concrete barrier and portable concrete barrier (anchored) as shown in the Roadway Standard Drawings, No. 1170.01. Measurement will be made by counting the number of barrier units used and multiplying by the length of a unit.

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 21, delete and replace "*Remove and Reset Portable Concrete Barrier (____)*" with "*Remove and Reset Portable Concrete Barrier*".

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 24, after the second sentence of the third paragraph add the following:

As shown in the *Roadway Standard Drawings*, No. 1170.01, anchorage transition sections between *Portable Concrete Barrier* and *Temporary Crash Cushions* as found in Section 1160 will be measured and paid as *Remove and Reset Portable Concrete Barrier*. No additional

payment will be made for equipment, materials or labor to meet the anchorage transition requirements.

Page 11-19, Article 1170-4 MEASUREMENT AND PAYMENT, line 28, after the third paragraph add the following:

Remove and Reset Portable Concrete Barrier (Anchored) will be measured and paid as the number of linear feet of barrier moved from one location on the project to another location on the project, including anchorage transition sections between portable concrete barrier and portable concrete barrier (anchored) as shown in the Roadway Standard Drawings, No. 1170.01. Measurement will be made by counting the number of barrier units moved during any one move and multiplying by the length of a unit. Where barrier units are moved more than once, each move will be measured separately. Whenever the Engineer directs the Contractor to move barrier units from an installed location to a stockpile either on or off the project and then back to another installed location, the complete move from the first installed location to the next installed location will be measured as 2 moves.

PAVEMENT MARKINGS:

(5-19-26)(Rev. 11-17-26) 1087, 1205 SP12 R04

Revise the *Standard Specifications* as follows:

Page 10-185, Subarticle 1087-2(A) Paint Composition, line 15, replace "TT--P-1952" with "TT--P-1952, Type III".

Page 10-185, Subarticle 1087-2(C) Thermoplastic Composition, lines 28-33, replace the first through third paragraph and the table with the following:

(C) Thermoplastic and Integrated Multipolymer (IMP) Composition

Use thermoplastic alkyd/maleic pavement markings composed of the materials in Table 1087-1A and integrated multipolymer markings composed of the materials in Table 1087-1B.

TABLE 1087-1A
PHYSICAL PROPERTIES
OF THERMOPLASTIC PAVEMENT MARKINGS

Component	By Weight
Alkyd/Maleic Binder	18.0% Min
Premixed Glass Beads (AASHTO M 247 – 50% Type 3 and 50% Type 1)	40.0% Min
Titanium Dioxide Pigment (ASTM D476 Type 2)	10.0% Min. (white) 1.5% Min. (yellow)

TABLE 1087-1B
PHYSICAL PROPERTIES
OF INTEGRATED MULTIPOLYMER (IMP) PAVEMENT MARKINGS

Component	By Weight
Binder	21.0% Min
Premixed Glass Beads (AASHTO M 247 – 50% Type 3 and 50% Type 1)	40.0% Min
Titanium Dioxide Pigment (ASTM D476 Type 2)	10.0% Min. (white only)
Inert Filler	15% Max white / 24% Max Yellow

Use white material that does not contain anatase titanium dioxide pigment. Use yellow material that does not contain any intentionally added lead chromate.

Calcium carbonate and inert fillers may be used by the manufacturer, providing all other qualifications are met.

Page 10-185, Subarticle 1087-2(C) Thermoplastic Composition, line 34, replace "thermoplastic" with "material".

Page 10-185, Subarticle 1087-2(C) Thermoplastic Composition, line 36, replace "alkyd/maleic binder" with "binder".

Page 10-185, Subarticle 1087-2(C) Thermoplastic Composition, line 38, replace "maleic-modified glycerol of resin" with "rosin ester".

Page 10-186, Subarticle 1087-2(C) Thermoplastic Composition, insert the following paragraph after line 2:

The integrated multipolymer binder shall consist of a mixture of modified rosin ester, polyamide and a copolymer (e.g. EVA) with waxes and/or plasticizers. At least 3% of the total formulation weight shall be 100% polyamide. The binder shall contain no petroleum hydrocarbon resins.

Page 10-186, Subarticle 1087-2(C) Thermoplastic Composition, lines 3, 6, 9 and 11, replace "thermoplastic material" with "material".

Page 10-186, Article 1087-3 COLOR, after line 27, replace "Crystal: Color No. 17886 (White)" with "White: Color No. 17925".

Page 10-186, Subarticle 1087-4(A) Composition, lines 31-34, replace the second paragraph with the following:

Manufacture the beads from 100% recycled or virgin non-pigmented glass from a composition designed to be highly resistant to traffic wear and to the effects of weathering. All intermix and drop-on glass beads shall be manufactured using 100% North American recycled glass cullet, virgin North American glass or a combination of the two.

Page 10-187, Subarticle 1087-4(C) Gradation & Roundness, lines 4-6, replace the first

paragraph and table with the following:

Use drop-on and intermixed glass beads in all pavement markings with at least 80% true spheres when tested in accordance with ASTM D1155. Drop-on glass beads for permanent pavement markings shall be high performance glass beads listed on the NCDOT APL. If otherwise specified, or at the direction of the Engineer, other drop-on reflective media may be used on permanent markings. Drop-on glass beads used on any interim or temporary pavement markings shall meet Table 1087-2.

TABLE 1087-2
GLASS BEAD GRADATION REQUIREMENTS

Sieve Size	Gradation Requirements	
	Minimum	**Maximum**
Passing #20	95%	100%
Retained on #30	5%	20%
Retained on #50	40%	80%
Retained on #80	15%	50%
Passing #80	0%	10%
Retained on #200	0%	5%

Page 10-187, Article 1087-5 PACKAGING FOR SHIPMENT, line 31, replace "Thermoplastic pavement marking materials" with "Thermoplastic and integrated multipolymer pavement marking materials".

Page 10-188, Subarticle 1087-7(B) Thermoplastic Pavement Marking Material Composition, line 17, replace **"(B) Thermoplastic Pavement Marking Material Composition**" with
"**(B) Thermoplastic and Integrated Multipolymer Pavement Marking Material Composition**".

Page 10-188, Subarticle 1087-7(C) Flash Point, line 22, replace "thermoplastic" with "thermoplastic and integrated multipolymer material".

Page 10-188, Subarticle 1087-7(D) Requirements, line 25, replace "thermoplastic material" with "thermoplastic and integrated multipolymer material".

Page 10-189, Subarticle 1087-7(D), after line 15, add the following:

(9) Tensile Elongation

The integrated multipolymer material shall have an elongation of at least 10% when tested in accordance with ASTM D638 (1"x 6", 0.25"/min).

(10) Abrasion Resistance

The integrated multipolymer material shall have no more than 0.40 g weight loss following taber abrasion with CS17 wheels for 1000 cycles with 1 kg weight per ASTM D4060.

Page 10-189, Article 1087-8 MATERIAL CERTIFICATION, lines 22-23, replace the third paragraph with the following:

Reflective media not covered in this, or other specifications must meet AASHTO M 247 Type 3 or 4 and a NCDOT Type 2 Material Certification must be provided.

Page 10-189, Article 1087-8 MATERIAL CERTIFICATION, after line 23, add the following to the table:

Integrated Multipolymer	Type 2 Material Certification and Type 3 Material Certification

Page 12-3, Subarticle 1205-3(F) Surface Preparation and Curing Compound Removal, line 8, add the following as a second sentence of the first paragraph:

Only apply markings to dry clean surfaces.

Page 12-4, Subarticle 1205-3(G)(1) General for all types of Pavement Markings, line 16, replace the first sentence of the eighth paragraph with the following:

Protect the pavement markings until they are track free before exposing them to traffic.

Page 12-4, Subarticle 1205-3(G)(1) General for all types of Pavement Markings, lines 22-24, delete the second sentence of the tenth paragraph.

Page 12-4, Subarticle 1205-3(G)(1) General for all types of Pavement Markings, after line 24, replace "White: Color No. 17886" with "White: Color No. 17295".

Page 12-5, Subarticle 1205-3(I) Removal of Pavement Markings, line 32, add the following as the third sentence of the seventh paragraph:

Before applying integrated multipolymer (IMP) pavement markings over existing thermoplastic pavement markings, remove at least 85% of the oxidized existing thermoplastic.

Page 12-5, Subarticle 1205-3(I) Removal of Pavement Markings, line 35, replace "thermoplastic" with "thermoplastic or IMP".

Page 12-6, Article 1205-4 THERMOPLASTIC, line 3, replace "**1205-4 THERMOPLASTIC**" with **"1205-4THERMOPLASTIC AND INTEGRATED MULTIPOLYMER (IMP)".**

Page 12-6, Subarticle 1205-4(A) Application Equipment, lines 7, 16, 20, 24, 25, 27 and 29, delete "thermoplastic"

Page 12-6, Subarticle 1205-4(B) Weather Limitations and Seasonal Limitations, line 38, replace "thermoplastic pavement markings" with "thermoplastic or integrated multipolymer pavement markings".

Page 12-6, Subarticle 1205-4(B) Weather Limitations and Seasonal Limitations, line 42,

delete “thermoplastic”.

Page 12-7, Subarticle 1205-4(C) Application, lines 2, 3, 10, 21 and 31, delete “thermoplastic”.

Page 12-7, Subarticle 1205-4(C) Application, after line 17, in Table 1205-2 MINIMUM REFLECTOMETER REQUIREMENTS FOR THERMOPLASTIC replace “Standard Glass Beads” with “High Performance Glass Beads” and for the Reflectivity of White replace “375 mcd/lux/m^2” with “425 mcd/lux/m^2” and Yellow replace “250 mcd/lux/m^2” with “325 mcd/lux/m^2”

Page 12-7, Subarticle 1205-4(C) Application, line 23, replace “thermoplastic pavement marking” with “final pavement marking”.

Page 12-7, Subarticle 1205-4(C) Application, after line 32, replace “**TABLE 1205-3 THICKNESS REQUIREMENTS FOR THERMOPLASTIC**” with “**TABLE 1205-3 THICKNESS REQUIREMENTS FOR THERMOPLASTIC AND INTEGRATED MULTIPOLYMER**”.

Page 12-9, Subarticle 1205-5(C) Observation Period, before line 1, replace “375 mcd/lux/m^2” with “425 mcd/lux/m^2” and replace “250 mcd/lux/m^2” with “325 mcd/lux/m^2”.

Page 12-11, Subarticle 1205-8(C) Application, lines 17-20, replace the first paragraph with the following:

Final pavement marking application of paint shall be placed in 1 application of 30 mils wet and consist of reflective media applied at a rate to immediately obtain the minimum retroreflective values.

Page 12-11, Subarticle 1205-8(C) Application, line 26, delete “15 mil”.

Page 12-11, Subarticle 1205-8(C) Application, after line 31, replace Table 1205-6 with the following:

TABLE 1205-6
REFLECTOMETER REQUIREMENTS
FOR PAINT

Item	Color	Reflectivity
Standard Glass Beads	White	225 mcd/lux/m^2
	Yellow	200 mcd/lux/m^2
High Performance Glass Beads	White	425 mcd/lux/m^2
	Yellow	325 mcd/lux/m^2

Page 12-12, Article 1205-10 MEASUREMENT AND PAYMENT, lines 5-7, delete and replace the second sentence of the first paragraph with the following:

In addition, *Paint Pavement Marking Lines* will be paid per linear foot for each 15 mil wet application placed in accordance with Subarticle 1205-8(C) for temporary pavement markings

during temporary traffic patterns and in accordance with Subarticle 1205-8(C) final paint pavement marking lines of 1 application of 30 mils wet will be measured and paid as 2 applications of 15 mils wet.

Page 12-12, Article 1205-10 MEASUREMENT AND PAYMENT, lines 12-14, delete and replace the second sentence of the second paragraph with the following:

In addition, *Paint Pavement Marking Symbols* will be paid for each 15 mil wet application placed in accordance with Subarticle 1205-8(C) for temporary pavement markings during temporary traffic patterns and in accordance with Subarticle 1205-8(C) final paint pavement marking symbols of 1 application of 30 mils wet will be measured and paid as 2 applications of 15 mils wet.

Page 12-12, Article 1205-10 MEASUREMENT AND PAYMENT, lines 17-19, delete and replace the third sentence of the third paragraph with the following:

In addition, *Paint Pavement Marking Characters* will be paid for each 15 mil wet application placed in accordance with Subarticle 1205-8(C) for temporary pavement markings during temporary traffic patterns and in accordance with Subarticle 1205-8(C) final paint pavement marking characters of 1 application of 30 mils wet will be measured and paid as 2 applications of 15 mils wet.

Page 12-12, Article 1205-10 MEASUREMENT AND PAYMENT, lines 17-19, replace the second sentence of the ninth paragraph with the following:

No direct payment will be made for the work involved in applying the lines, including but not limited to surface preparation, reapplication of molten pavement marking crossed by a vehicle, removal of all pavement marking materials spilled on the roadway surface, and repair of markings tracked by a vehicle.

Page 12-13, Article 1205-10 MEASUREMENT AND PAYMENT, after line 12, add the following to the pay item and pay unit list:

Pay Item	**Pay Unit**
Integrated Multipolymer Pavement Marking Lines, __", __ mils	Linear Foot
Integrated Multipolymer Pavement Marking Symbols, __ mils	Each
Integrated Multipolymer Pavement Marking Characters, __ mils	Each

SNOWPLOWABLE DELINEATION:

(10-15-24) 1253 SP12 R53

Description

Furnish, install, and maintain **Polycarbonate H-shaped** snowplowable delineation.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Epoxy	1081
Pavement Markings	1087
Snowplowable Pavement Markers	1086-3

Any snowplowable pavement delineation shall conform to the applicable requirements of Sections 1086, 1087, and 1081 of the *Standards and Specifications.* Use snowplowable delineation markers and markings listed on the NCDOT APL. Any treatment that requires pavement cutting or milling shall be installed within 7 calendar days of the pavement cutting or milling operation.

Construction Methods

(A) General

For any snowplowable delineation, prior to installation, by brushing, blow cleaning, vacuuming or other suitable means, ensure that all materials and the pavement surface are free of dirt, grease, dust, oil, moisture, mud, grass, or any other material that would prevent adhesion to the pavement by brushing blow cleaning, or vacuuming. If required, apply a primer per manufactures recommendations to pavement surfaces before applying pavement marking material.

Install snowplowable delineation per manufacturers specifications every 80 feet. Make sure pavement markers are oriented to traffic correctly and pavement markings are applied in a uniform thickness. Do not apply markings over longitudinal joints. Protect the pavement markings until they are tack free. Apply applicable Sections 1205 and 1250 of the *Standards Specifications*.

If damage occurs during installation the effected treatments shall be corrected or replaced. This work shall be considered incidental to the installation of the marking or marker.

(B) Polycarbonate H-shaped Markers

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

Install polycarbonate H-shaped markers castings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the casting of the polycarbonate H-shaped markers.

If saw cutting, milling, or grooving operations are used, promptly remove all resulting debris from the pavement surface. Install the marker housings within 7 calendar days after saw cutting , milling, or grooving the pavement. Remove and dispose of loose material from the

slots by brushing, blow cleaning or vacuuming. Dry the slots before applying the epoxy adhesive. Install polycarbonate H-shaped markers according to the manufacturer's recommendations.

Protect the polycarbonate H-shaped markers until the epoxy has initially cured and is track free.

(C) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial polycarbonate H-shaped markers specified in this section.

If during reflector replacement it is discovered that the housing is missing or broken this will be paid as *Polycarbonate H-shaped Markers*. Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing; patch the existing marker slots as directed by the Engineer and install the new marker approximately one foot before or after the patch. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

Maintenance

Maintain all installed snowplowable delineation before acceptance by the Engineer.

Measurement and Payment

Polycarbonate H-shaped Markers will be measured and paid as the actual number of polycarbonate H-shaped markers satisfactorily placed and accepted by the Engineer.

Replace Snowplowable Pavement Marker Reflector will be measured and paid in accordance with Article 1253-5.

Payment will be made under:

Pay Item	**Pay Unit**
Polycarbonate H-shaped Markers	Each

PERMANENT SEEDING AND MULCHING:
(7-1-95)(Rev. 1-16-24) 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 *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.

COIR FIBER MAT:
(9-16-25) 1629 SP16 R05

Revise the *Standard Specifications* as follows:

Page 16-9, Article 1629-2 MATERIALS, lines 22-24, delete and replace the last paragraph with the following:

Provide #3 or #4 uncoated reinforcing steel anchors, 24 inches in length, bent into a U-shape with a 4-inch diameter bend and a 4-inch straight leg extending from the bend to catch and secure the coir fiber mat.

WATTLE DEVICES:
(1-1-24)(Rev. 9-16-25) 1642 SP16 R10

Revise the *Standard Specifications* as follows:

Page 16-23, Subarticle 1642-2(B) Wattle, lines 10-12, delete and replace with the following:

(B) Wattle and Wattle Barrier

Wattles shall meet Table 1642-1.

TABLE 1642-1 100% CURLED WOOD (EXCELSIOR) FIBERS - WATTLE	
Property	**Property Value**
Minimum Diameter	12 inches
Minimum Density	2.5 pcf +/- 10%
Net Material	Synthetic
Net Openings	1 inch x 1 inch
Net Configuration	Totally Encased
Minimum Weight	20 lb +/- 10% per 10 foot length

Coir Fiber Wattles shall meet Table 1642-2.

TABLE 1642-2 100% COIR (COCONUT) FIBERS WATTLE	
Property	**Property Value**
Minimum Diameter	12 inches
Minimum Density	3.5 pcf +/- 10%
Net Material	Coir Fiber
Net Openings	2 inch x 2 inch
Net Strength	90 lb
Minimum Weight	2.6 pcf +/- 10%

Wattle Barriers shall meet Table 1642-3.

TABLE 1642-3 100% CURLED WOOD (EXCELSIOR) FIBERS – WATTLE BARRIER	
Property	**Property Value**
Minimum Diameter	18 inches
Minimum Density	2.9 pcf +/- 10%
Net Material	Synthetic
Net Openings	1 inch x 1 inch
Net Configuration	Totally Encased
Minimum Weight	5 pcf +/- 10%

Coir Fiber Wattle Barriers shall meet Table 1642-4.

TABLE 1642-4 100% COIR (COCONUT) FIBERS WATTLE BARRIER	
Property	**Property Value**
Minimum Diameter	18 inches
Minimum Density	5 pcf +/- 10%
Net Material	Coir Fiber
Net Openings	2 inch x 2 inch
Net Strength	90 lb
Minimum Weight	10 pcf +/- 10%

Pages 16-24 & 16-25, Article 1642-5 MEASUREMENT AND PAYMENT, lines 42-47 & lines 1-2, delete and replace with the following:

Wattle 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 *Wattle*.

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of coir fiber 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*.

Wattle Barrier will be measured and paid as the actual number of linear feet of wattle barrier 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 *Wattle Barrier*.

Coir Fiber Wattle Barrier will be measured and paid as the actual number of linear feet of coir fiber wattle barrier 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*.

Page 16-25, Article 1642-5 MEASUREMENT AND PAYMENT, after line 9, delete and replace "___ Wattle Check" with "Wattle".

Page 16-25, Article 1642-5 MEASUREMENT AND PAYMENT, after line 9, delete and replace "___ Wattle Barrier" with "Wattle Barrier".

Page 16-25, Article 1642-5 MEASUREMENT AND PAYMENT, after line 9, add the following:

Pay Item	**Pay Unit**
Coir Fiber Wattle	Linear Foot
Coir Fiber Wattle Barrier	Linear Foot

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)(Rev. 1-16-24) 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(D) of the *Standard Specifications*.

STANDARD SPECIAL PROVISION
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.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed

shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% 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 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
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
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

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

STANDARD SPECIAL PROVISION
ERRATA

(1-16-24)(Rev. 6-16-26) Z-4

Revise the *2024 Standard Specifications* as follows:

Division 1

Page 1-1, Article 101-2 ABBREVIATIONS, line 25, replace "American Wood-Preservers' Association" with "American Wood Protection Association".

Page 1-18, Article 102-10 BID BOND OR BID DEPOSIT, line 26, replace " Subarticle 102-8(A)(8)(b)" with "Subarticle 102-8(A)(12)(b)".

Page 1-20, Subarticle 102-14(A) State Funded Projects, line 3, replace "$30,000" with "$40,000".

Page 1-20, Subarticle 102-14(B) Federal Aid Projects, line 7, replace "$30,000" with "$40,000".

Page 1-36, Subarticle 104-12(B) Evaluation of Proposals, line 21, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-36, Subarticle 104-12(D) Preliminary Review, line 37, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-37, Subarticle 104-12(E) Final Proposal, line 3, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-37, Subarticle 104-12(F) Design-Build VEPs, line 36, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-38, Subarticle 104-12(G) Modifications, line 1, replace "Design-Build Unit" with "Alternative Delivery Unit".

Division 3

Page 3-5, Article 305-2 MATERIALS, after line 16, replace " 1032-3(A)(7)" with "1032-3" and add the item "Galvanized Corrugated Steel Pipe" with Section "1032-3".

Page 3-6, Article 310-2 MATERIALS, after line 9, add the item "Galvanized Corrugated Steel Pipe" with Section "1032-3".

Division 6

Page 6-15, Article 610-1 DESCRIPTION, line 20, replace "The work includes" with "The work includes, but is not limited to,".

Page 6-15, Article 610-1 DESCRIPTION, line 22, replace “applying the tack coat as specified.” with “applying the tack coat in accordance with Section 605.”.

Page 6-30, Article 610-14 DENSITY ACCEPTANCE, line 39, replace “QC process.” with “QC process in accordance with Section 609.”.

Page 6-31, Article 610-16 MEASUREMENT AND PAYMENT, line 13, replace "*Hot Mix Asphalt Pavement*” with “*Asphalt Concrete _____ Course, Type _____*”.

Page 6-50, Subarticle 661-4(A) Equipment, lines 4-7, replace the first two sentences of the seventh paragraph with the following:

When an erected fixed stringline is utilized for longitudinal profile and cross slope control furnish and erect the necessary guide line for the equipment.

Division 7

Page 7-18, Subarticle 710-10(A) General, lines 7-8, delete “for *Surface Testing Concrete Pavement*” from the last paragraph.

Division 8

Page 8-27, Article 846-1 DESCRIPTION, line 8, delete “4 inch” from the first paragraph.

Division 9

Page 9-17, Article 904-4 MEASUREMENT AND PAYMENT, prior to line 1, replace " Sign Erection, Relocate Type (Ground Mounted)” with “Sign Erection, Relocate Type ___ (Ground Mounted)”.

Division 10

Page 10-51, Article 1024-4 WATER, prior to line 1, delete the “unpopulated blank row” in Table 1024-2 between “Time of set, deviation from control” and “Chloride Ion Content, Max.”.

Page 10-170, Subarticle 1081-1(C) Requirements, line 4, replace "maximum” with “minimum”.

Division 11

Page 11-15, Article 1160-4 MEASUREMENT AND PAYMENT, line 24, replace “Where barrier units are moved more than one” with “Where barrier units are moved more than once”.

Division 15

Page 15-10, Article 1515-4 MEASUREMENT AND PAYMENT, lines 11, replace " All piping” with “All labor, the manhole, other materials, excavation, backfilling, piping”.

Division 16

Page 16-14, Article 1633-5 MEASUREMENT AND PAYMENT, line 20-24 and prior to line 25, delete and replace with the following " *Flocculant* will be measured and paid in accordance with Article 1642-5 applied to the temporary rock silt checks."

Page 16-3, Article 1609-2 MATERIALS, after line 26, replace "Type 4" with "Type 4a".

Page 16-25, Article 1644-2 MATERIALS, after line 22, replace "Type 4" with "Type 4a".

Page 16-27, Article 1644-5 MEASUREMENT AND PAYMENT, line 31, replace "Article 1630-4" with "Article 1630-3".

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, line 23, delete and replace "1.25" with "1-1/4".

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, line 24, delete and replace ")(1.25" with ", 1-1/4".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES

(Imported Fire Ant, Guava Root Knot Nematode, Spongy Moth (formerly known as gypsy moth), Witchweed, Cogon Grass, And Any Other Regulated Noxious Weed or Plant Pest)

(3-18-03)(Rev. 3-18-25) 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, 919-707-3730, or *https://www.ncagr.gov/divisions/plant-industry/plant-protection/plant-industry-plant-pest-quarantines* 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 present a hazard of spreading imported fire ant, guava root knot nematode, spongy moth (formerly known as gypsy moth), witchweed, cogon grass, or other regulated noxious weed or plant pest.

STANDARD SPECIAL PROVISION

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.

STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 1/16/2024) Z-6

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its

books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:

(i) Withholding payments to the contractor under the contract until the contractor complies; and/or

(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.

2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.

3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

   "The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.

5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.

6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability

   Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.

2. Eligibility

   Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.

3. Time Limits and Filing Options

   Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:

   (i) The date of the alleged act of discrimination; or

   (ii) The date when the person(s) became aware of the alleged discrimination; or

   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and related discrimination complaints may be submitted to the following entities:

   - North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
   - Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
   - US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints

   Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.

5. Discrimination Complaint Form

   Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.

6. Complaint Basis

   Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

TABLE 103-1
COMPLAINT BASIS

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990
Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *

3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 6-16-26) Z-10

Description

The North Carolina Department of Transportation administers a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternative OJT Program. All Contractors will be automatically placed in the Alternative OJT Program.

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.

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

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special 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 Unit, will assign annual training goals based on the Contractor's activity over the past three years' on federal projects with the Department. At the beginning of each year, all eligible Contractors 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 implement a self-imposed on-the-job training program for the calendar year. This agreement will specify the annual training goals agreed upon by both parties. The number of training assignments may range from 1 to 15 per Contractor per calendar year, unless a higher number is agreed to by the Contractor. The Contractor shall sign an agreement committing to fulfill their annual goal for the year.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions.

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 special 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 trainees in each occupation shall be in their first year of 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 at minimum 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 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.

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PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

TEMPORARY SHORING (1-16-24)	GT1.1 - GT1.12
STANDARD SHORING (1-16-24)	GT2.1 - GT2.4
TEMPORARY SOIL NAIL WALLS (1-16-24)	GT3.1 - GT3.9
MECHANICALLY STABILIZED EARTH RETAINING WALLS (10-19-21)	GT4.1 - GT4.12
SHORED MECHANICALLY STABILIZED EARTH RETAINING WALLS (SPECIAL)	GT5.1 - GT5.23

DocuSigned by:
Carolinas Geotechnical Group, PLLC
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TEMPORARY SHORING:

(2-20-07)(Rev. 1-16-24) SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide.*

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define "temporary wall" as a temporary MSE wall and "Temporary Wall Vendor" as the vendor supplying the temporary MSE wall. Define "reinforcement" as geotextile, geogrid, geostrip, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextiles or geogrids wrapped behind welded wire facing or geostrips connected to welded wire facing. Define "temporary geotextile

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wall" as a temporary geosynthetic wall with geotextile reinforcement, "temporary geogrid wall" as a temporary geosynthetic wall with geogrid reinforcement and "temporary geostrip wall" as a temporary geosynthetic wall with geostrip reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define "Wire Wall Vendor" as the vendor supplying the temporary wire wall.

(D) Embedment

Define "embedment" for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define "embedment" for temporary walls as the wall embedment below the grade at the wall face.

(E) Positive Protection

Define "unanchored or anchored portable concrete barrier" as portable concrete barrier (PCB) that meets *Roadway Standard Drawing* No. 1170.01. Define "concrete barrier" as unanchored or anchored PCB or an approved equal. Define "temporary guardrail" as temporary steel beam guardrail that meets *Roadway Standard Drawing* No. 862.02.

Materials

Refer to the *Standard Specifications*.

Item	**Section**
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-7
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement	1024-1
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Water	1024-4
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *Standard Specifications*. Use Class IV select material for temporary guardrail and Class A concrete that meets Article 450-2 of the *Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

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(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 pounds of Portland cement. Provide grout with a compressive strength at 3 and 28 days of at least 1,500 and 4,000 psi, respectively.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g.,

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bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5a geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid and Geostrip Reinforcement

Use geogrids with a roll width of at least 4 feet. Use geogrids for geogrid reinforcement and geostrips for geostrip reinforcement with an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids and geostrips is available from: connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide geogrids and geostrips with design strengths in accordance with the accepted submittals. Geogrids and geostrips are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	**Shoring Backfill**
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

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(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor's option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater or flood elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf,

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(b)

Friction Angle (ϕ)	Shoring Backfill
30°	A-2-4 Soil
34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. Design temporary shoring for a traffic (live load) surcharge in accordance with Article 11.5.6 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or Type 1 grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define "top of shoring" for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works.*

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

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(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid and geostrip reinforcement, use approved geosynthetic reinforcement properties available from the website shown elsewhere in this provision. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use “L” shaped welded wire facing with 18 to 24 inch long legs. Locate geosynthetic reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill. Attach geostrip reinforcement to welded wire facing with a connection approved by the Department.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid, geostrip and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

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(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *Standard Specifications* and *Roadway Standard Drawing* No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and *Roadway Standard Drawing* Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

(1) Horizontal wires of welded wire facing are level in all directions,

(2) Shoring location is within 6 inches of horizontal and vertical alignment shown in the accepted submittals, and

(3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

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Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or Type 1 grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

(a) Materials in accordance with this provision are required instead of materials conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,

(b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and

(c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.

(d) Mix and place neat cement grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

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Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

(i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
(ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

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Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Attach geostrip reinforcement to welded wire facing and wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals. Cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

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Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define "top of shoring" as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define "bottom of shoring" as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

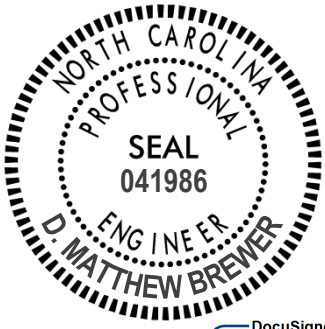
No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Article 1170-4 of the *Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Article 862-6 of the *Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Shoring	Square Foot



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STANDARD SHORING: **(1-16-24)**

Description

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Geotechnical Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to the *Standard Specifications*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-7
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or Type 1 grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Geotechnical Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use the following:

(1) A-2-4 soil for backfill around culverts,

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(2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and

(3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

(B) Standard Temporary Walls

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 4a geotextile for geotextile reinforcement except for the ultimate tensile strength. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Use geogrids for geogrid reinforcement with a roll width of at least 4 ft and an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Based on actual wall height, groundwater or flood elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

(B) Temporary Guardrail

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Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor's option or if clear distance for standard temporary shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above standard temporary walls.

(C) Standard Shoring Selection Forms

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

Construction Methods

Construct standard shoring in accordance with the *Temporary Shoring* provision.

(A) Standard Temporary Shoring Installation

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Geotechnical Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use "surcharge case with traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. Otherwise, use "slope or surcharge case with no traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-piles with timber lagging for standard temporary shoring.

(B) Standard Temporary Walls Installation

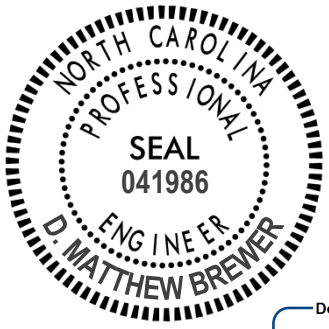
Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Geotechnical Standard Detail No. 1801.02. Place separation geotextiles between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Measurement and Payment

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.

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TEMPORARY SOIL NAIL WALLS: (1-16-24)

Description

Construct temporary soil nail walls consisting of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face. A soil nail consists of a solid or hollow steel bar grouted in a drilled hole inclined at an angle below horizontal. At the Contractor's option, use temporary soil nail walls instead of temporary shoring for full cut sections. Design and construct temporary soil nail walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified Anchored Wall Contractor to construct temporary soil nail walls. Define "soil nail wall" as a temporary soil nail wall and "Soil Nail Wall Contractor" as the Anchored Wall Contractor installing soil nails and applying shotcrete. Define "nail" as a soil nail.

Provide positive protection for soil nail walls at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geocomposites	1056
Portland Cement	1024-1
Reinforcing Steel	1070
Shotcrete	1002
Select Material, Class IV	1016
Steel Plates	1072-2
Water	1024-4

Use Type 5 grout for soil nails.

Use Class IV select material for temporary guardrail. Provide soil nails consisting of grouted steel bars and nail head assemblies. Use deformed solid steel bars that meet AASHTO M 275 or M 31, Grade 60, 75 or 80. Splice solid bars in accordance with Article 1070-9 of the *Standard Specifications*. Use hollow steel bars manufactured by DYWIDAG-Systems International USA Inc., Nucor Skyline, Williams Form Engineering Corp. or an approved equal.

Use centralizers that meet Article 34.3.4 of the *AASHTO LRFD Bridge Construction Specifications*. Provide nail head assemblies consisting of nuts, washers and bearing plates. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 6 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store soil nail wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

Preconstruction Requirements

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(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of soil nail walls except for barrier above walls. Concrete barrier with the minimum required clear distance is required above soil nail walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and soil nail walls. At the Contractor's option or if clear distance for soil nail walls is less than 4 ft, use temporary guardrail with 8 ft posts and a clear distance of at least 2.5 ft. Place ABC in clear distance and around guardrail posts instead of pavement.

(C) Soil Nail Wall Designs

Before beginning soil nail wall design, survey existing ground elevations in the vicinity of wall locations to determine actual design heights (H). Use a prequalified Anchored Wall Design Consultant to design soil nail walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Anchored Wall Design Consultant.

Design soil nail walls in accordance with the plans and the *AASHTO LRFD Bridge Design Specifications* unless otherwise required. Design soil nails that meet the following unless otherwise approved:

(1) Horizontal and vertical spacing of at least 3 ft,

(2) Inclination of at least 12° below horizontal and

(3) Diameter of 4" to 10".

Do not extend nails beyond right-of-way or easement limits. If existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with nails, maintain a clearance of at least 6" between obstructions and nails.

Design soil nail walls for a traffic surcharge of 250 psf if traffic will be above and within H of walls. This traffic surcharge does not apply to construction traffic. Design soil nail walls for any construction surcharge if construction traffic will be above and within H of walls. For temporary guardrail with 8 ft posts above soil nail walls, analyze shotcrete and top row of nails for a nominal horizontal load of 300 lb/ft of wall with a load factor of 1.0.

Place geocomposite sheet drains with a horizontal spacing of no more than 10 ft and center drains between adjacent nails. Attach sheet drains to excavation faces. Design shotcrete in accordance with Article 11.12.6.2 of the *AASHTO LRFD Bridge Design Specifications*.

Submit PDF files of working drawings and design calculations for soil nail wall designs in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles, typical sections and details of soil nail wall design and construction sequence. Include details in working drawings of soil nail locations, unit grout/ground bond strengths, shotcrete reinforcement and if necessary, obstructions extending through walls or interfering with nails. Include details in construction sequence

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of excavation, grouting, installing reinforcement, nail testing and shotcreting with mix designs and shotcrete nozzleman certifications. Do not begin soil nail wall construction until a design submittal is accepted.

Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. Include analysis of temporary conditions during construction in design calculations. At least one analysis is required for each wall section with different nail lengths. Analyze internal and compound stability with a computer software program that uses limit equilibrium methods and submit all PDF output files from the program with the design calculations. See Article C11.12.2 of the AASHTO LRFD specifications for determining the maximum soil nail force, T_{maxsn}. Once T_{maxsn} and pullout length behind slip surface, L_P, are determined from limit equilibrium methods at the target soil failure resistance factor (1 over factor of safety output from computer software), use these values for soil nail (pullout and tensile resistance) and wall facing (flexure, punching shear and headed-stud tensile resistance) design in accordance with Articles 11.12.5.2, 11.12.6.1 and 11.12.6.2 of the AASHTO LRFD specifications.

(1) When designing soil nail walls with computer software Snail manufactured by the California Department of Transportation (CALTRANS), use Snail version 2.2.0 or later, to calculate factors of safety and T_{maxsn} and L_P values in accordance with the following:Allowable Stress Design for Analysis Method with no load factors applied except those applied to factored surcharge loads from structures or traffic,

(2) Perform Below Toe Search option selected when any soil layer has a friction angle less than 30° and

(3) Default value of 0.33 for Interface Friction Reduction Factor.

When designing soil nail walls with computer software other than Snail, use bi-linear (or tri-linear, as applicable) search surfaces intended to reproduce Snail results. Factors of safety and T_{maxsn} and L_P values are acceptable if they are within 5% of the factors of safety and T_{maxsn} and L_P values calculated by the Engineer using the computer software Slide2 manufactured by Rocscience, Inc.

(D) Preconstruction Meeting

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls.

Install foundations located behind soil nail walls before beginning wall construction. Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method

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and a revised soil nail wall design may be required.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *Standard Specifications* and Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and Roadway Standard Drawing No. 862.01, 862.02 and 862.03.

(A) Excavation

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

(1) Heights not to exceed vertical nail spacing,

(2) Bottom of lifts no more than 3 ft below nail locations for current lift and

(3) Horizontal and vertical alignment within 6" of location shown in the accepted submittals.

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Apply shotcrete to excavation faces within 24 hours of excavating each lift unless otherwise approved. Shotcreting may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If excavation faces will be exposed for more than 24 hours, use polyethylene sheets anchored at top and bottom of lifts to protect excavation faces from changes in moisture content.

If an excavation becomes unstable at any time, suspend soil nail wall construction and temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and a revised soil nail wall design may be required.

Do not excavate the next lift until nail installations and testing and shotcrete application for the current lift are accepted and grout and shotcrete for the current lift have cured at least 3 days and 1 day, respectively.

(B) Soil Nails

Drill and grout nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised soil nail wall design may be required.

The drilling, steel bar and grouting requirements below are for solid bar nails and may not apply to hollow bar nails. Hollow bar nails are typically installed by simultaneously drilling and grouting as a sacrificial drill bit is advanced and grout is pumped through the bar. For hollow bar nails, submit drilling and grouting procedures for approval before installing soil nails.

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(1) Drilling

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within 6" of locations and 2° of inclination shown in the accepted submittals unless otherwise approved.

Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

(2) Steel Bars

Center solid steel bars in drill holes with centralizers. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

Do not insert solid steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or redrill the hole.

(3) Grouting

Mix and place grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *Standard Specifications*. Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

(4) Nail Heads

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail

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heads are evenly loaded.

(C) Sheet Drains

Install geocomposite sheet drains as shown in the accepted submittals. Before installing shotcrete reinforcement, place sheet drains with the geotextile side against excavation faces. For highly irregular faces and at the discretion of the Engineer, sheet drains may be placed after shotcreting over weep holes through the shotcrete. Hold sheet drains in place with anchor pins so drains are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous sheet drains are not allowed. If splices are needed, overlap sheet drains at least 12" so flow is not impeded. Cut off excess sheet drain length and expose drain ends below shotcrete when soil nail wall construction is complete.

(D) Shotcrete

Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the *Standard Specifications*. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

(E) Construction Records

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

(1) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;

(2) Wall description, county, Department’s contract, TIP and WBS element number;

(3) Wall station and number and lift location, dimensions, elevations and description;

(4) Nail locations, dimensions and inclinations, bar types, sizes and grades and temporary casing information;

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(5) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;

(6) Grout volume, temperature, flow and density records;

(7) Ground and surface water conditions and elevations if applicable;

(8) Weather conditions including air temperature at time of grout placement and shotcrete application; and

(9) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF file of all corresponding construction records.

Nail Testing

"Proof tests" are performed on nails incorporated into walls, i.e., production nails. Define "test nail" as a nail tested with a proof test. Proof tests are typically required for at least one nail per nail row per soil nail wall or at least 5% of production nails, whichever is greater. More or less test nails may be required depending on subsurface conditions encountered. The Engineer will determine the number and locations of proof tests required. Do not test nails until grout and shotcrete attain the required 3-day compressive strength.

(A) Test Equipment

Use the following equipment to test nails:

(1) Two dial gauges with rigid supports,

(2) Hydraulic jack and pressure gauge and

(3) Jacking block or reaction frame.

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Submit identification numbers and calibration records for load cells, jacks and pressure gauges with the soil nail wall design. Calibrate each jack and pressure gauge as a unit.

Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

(B) Test Nails

Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing. Provide unbonded and bond lengths of at least 3 ft and 10 ft, respectively.

Steel bars for production nails may be overstressed under higher test nail loads. If necessary, use larger size or higher grade bars with more capacity for test nails instead of shortening bond lengths to less than the minimum required.

(C) Proof Tests

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Test proof test nails in accordance with the accepted submittals and Article 34.5.5.3, respectively of the *AASHTO LRFD Bridge Construction Specifications*.

(D) Test Nail Acceptance

Submit 2 copies of test nail records including load versus movement and time versus creep movement plots within 24 hours of completing each proof test. The Engineer will review the test nail records to determine if test nails are acceptable. Test nail acceptance is based in part on the acceptance criteria in Article 34.5.5.4 of the *AASHTO LRFD Bridge Construction Specifications*.

Maintain stability of unbonded lengths for subsequent grouting. If a test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a test nail is unacceptable, either perform additional proof tests on adjacent production nails or revise the soil nail design or installation methods for the production nails represented by the unacceptable test nail as determined by the Engineer. Submit a revised soil nail wall design for acceptance, provide an acceptable test nail with the revised design or installation methods and install additional production nails for the nails represented by the unacceptable test nail.

After completing nail testing for each soil nail wall or stage of a wall, provide a PDF file of all corresponding test nail records.

Measurement and Payment

Temporary soil nail walls will be measured and paid in square feet. Temporary soil nail walls will be paid for at the contract unit price for *Temporary Shoring*. Temporary soil nail walls will be measured as the square feet of exposed wall face area. No measurement will be made for any embedment or pavement thickness above soil nail walls.

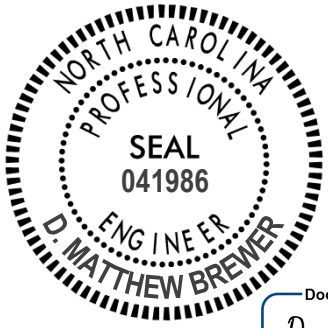
The contract unit price for *Temporary Shoring* will be full compensation for providing soil nail wall designs, submittals, labor, tools, equipment and soil nail wall materials, excavating, hauling and removing excavated materials, installing and testing soil nails, grouting, shotcreting and supplying sheet drains and any incidentals necessary to construct soil nail walls. No additional payment will be made and no extension of completion date or time will be allowed for repairing property damage, overexcavations or unstable excavations, unacceptable test nails or thicker shotcrete.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor’s convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *Standard Specifications*. No additional payment will be made for anchoring PCB for soil nail walls. Costs for anchoring PCB will be incidental to soil nail walls.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *Standard Specifications*.

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D. Matthew Brewer
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MECHANICALLY STABILIZED EARTH RETAINING WALLS (1-16-24)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. Use precast concrete panels for vertical facing elements and coarse aggregate in the reinforced zone unless noted otherwise in the plans. Provide reinforced concrete coping and pile sleeves as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define MSE wall terms as follows:
Geosynthetic Reinforcement – Polyester Type (PET), HDPE or Polypropylene (PP) geosynthetic grids, i.e., geogrid reinforcement or polymer straps, i.e., geostrip reinforcement,
Geogrid – PET, HDPE or PP geogrid,
Reinforcement – Steel or geosynthetic reinforcement,
Aggregate – Coarse or fine aggregate,
Panel – Precast concrete panel,
Coping – Precast or CIP concrete coping,
Design Height (H) – Wall height + wall embedment as shown in the plans,
MSE Wall – Mechanically stabilized earth retaining wall,
MSE Wall Vendor – Vendor supplying the chosen MSE wall system,
MSE Panel Wall – MSE wall with panels,
MSE Segmental Wall – MSE wall with segmental retaining wall (SRW) units and
Abutment Wall – MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall (even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall).

For bridge approach fills behind end bents with MSE abutment walls, design reinforcement connected to end bent caps in accordance with the plans and this provision.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status for MSE walls with design heights greater than 35 ft or walls supporting or adjacent to railroads or interstate highways. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Aggregate	1014
Asphalt Concrete Base Course, Type B25.0C	620
Corrugated Steel Pipe	1032-3

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Epoxy, Type 3A	1081
Geosynthetics	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Select Material, Class V	1016
Shoulder Drain Materials	816-2
Steel Pipe	1036-4(A)

Use galvanized corrugated steel pipe with a zinc coating weight of 2 oz/sf (G200) for pile sleeves. Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for CIP coping, leveling concrete and pads. Use galvanized steel pipe, threaded rods and nuts for the PET geogrid reinforcement vertical obstruction detail. Provide galvanized Grade 36 anchor rods and Grade A hex nuts that meet AASHTO M 314 for threaded rods and nuts.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Provide steel strip connectors embedded in panels fabricated from structural steel that meets the requirements for steel strip reinforcement. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate and the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard Specifications* or
2. Gradation that meets Class III, Type 3 select material in accordance with Article

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1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with chemical properties that meet the following requirements:

AGGREGATE pH REQUIREMENTS		
Aggregate Type (in reinforced zone)	**Reinforcement or Connector Material**	**pH**
Coarse or Fine	Steel	5 – 10
Coarse or Fine	Geosynthetic	4.5 – 9

AGGREGATE ELECTROCHEMICAL REQUIREMENTS (Steel Reinforcement/Connector Materials Only)			
Aggregate Type (in reinforced zone)	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	≥ 5,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Fine	≥ 3,000 Ω · cm		

Use aggregate from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006 of the *Standard Specifications*. Sample and test aggregate in accordance with the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*.

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and steel strip reinforcement ("straps") that meet ASTM A572, A1011 or A463. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip reinforcement. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications* or provide aluminized steel strip reinforcement that meet ASTM A463, Type 2-100.

2. Geosynthetic Reinforcement

Provide Type 1 material certifications and identify geosynthetic reinforcement in accordance with Article 1056-3 of the *Standard Specifications*. Define machine

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direction (MD) and cross-machine direction (CD) for geogrids per Article 1056-3 of the *Standard Specifications*.

Use HDPE or PP geogrid for geogrid reinforcement cast into backwalls of end bent caps. Use PET or HDPE geogrid for geogrid reinforcement connected directly to SRW units and only HDPE geogrid for geogrid reinforcement cast into panels.

Provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets for PP geogrids that meet the following:

PP GEOGRID REQUIREMENTS		
Property	**Requirement[1]**	**Test Method**
Aperture Dimensions[2]	1" x 1.2"	N/A
Minimum Rib Thickness[2]	0.07" x 0.07"	N/A
Tensile Strength @ 2% Strain[2]	580 lb/ft x 690 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	1,200 lb/ft x 1,370 lb/ft	
Ultimate Tensile Strength[2]	1,850 lb/ft x 2,050 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	2,000,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.55 lb–ft/degrees	ASTM D7864
UV Stability (Retained Strength)	100% (after 500 hr of exposure)	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength ($X_{j_{ave}}$) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

C. Bearing Pads

For MSE panel walls, use preformed ethylene propylene diene monomer rubber bearing pads that meet ASTM D2000 Grade 2, Type A, Class A with a durometer hardness of 60 or 80 ± 5. Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins,

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plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip panel anchors and connectors. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Segmental Wall Design Consultant to design MSE segmental walls. Provide MSE segmental wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Segmental Wall Design Consultant. Provide MSE panel wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the MSE Wall Vendor.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. For abutment walls only, design MSE walls for seismic if wall sites meet either or both of the following:

- Wall site is in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*,
- Wall site is classified as AASHTO Site Class E, as noted in the plans, and is in or west of Pender, Duplin, Wayne, Johnston, Wake, Durham or Person County.

Connect reinforcement to panels or SRW units with methods or devices approved for the chosen system. Use a uniform reinforcement length throughout the height of the wall of at least 0.7H or 6 ft, whichever is longer, unless noted otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

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Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. If an MSE wall system with geosynthetic reinforcement includes any steel parts for obstructions, bin walls, connections or other components, design steel exposed to aggregate for the design life noted in the plans and aggregate type in the reinforced zone. Use "loss of galvanizing" metal loss rates for nonaggressive backfill in accordance with the AASHTO LRFD specifications for galvanized and aluminized steel and metal loss rates for carbon steel in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Carbon Steel Loss Rate (after coating depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For PET or HDPE geogrid and geostrip reinforcement and geosynthetic connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone. For geogrid reinforcement connected to end bent caps, embed reinforcement or connectors in caps as shown in the plans. For PP geogrid reinforcement connected to end bent caps, use the following design parameters for the aggregate type in the reinforced approach fill.

PP GEOGRID REINFORCEMENT DESIGN PARAMETERS				
Aggregate Type (in reinforced zone)	**T_{al} (MD)**	**F***	**α**	**ρ**
Coarse	400 lb/ft	0.70	0.8	32.0°
Fine	428 lb/ft	0.54	0.8	28.35°

Where,

T_{al} = long-term design strength (LTDS),
F* = pullout resistance factor,
α = scale effect correction factor and
ρ = soil-geogrid friction angle.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 psf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of *FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I* (Publication No. FHWA-NHI-10-024) except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

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ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

When shown in the plans for abutment walls, use pile sleeves to segregate piles from aggregate in the reinforced zone. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Design reinforcement for obstructions and locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations. Modify PET geogrid reinforcement for obstructions as shown in the plans.

Use 6" thick CIP unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

WALL EMBEDMENT REQUIREMENTS		
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**	
6:1 or flatter (except abutment walls)	H/20	1 ft for H ≤ 10 ft 2 ft for H > 10 ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. H is the maximum design height per wall.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Roadway Standard Drawing No. 816.02.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

NUMBER OF BEARING PADS

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Facing Area per Panel (A)	Maximum Height of Wall Above Horizontal Panel Joint	Minimum Number of Pads per Horizontal Panel Joint
A ≤ 30 sf	25 ft	2
	35 ft[1]	3
30 sf < A ≤ 75 sf	25 ft	3
	35 ft[1]	4

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, coarse aggregate is required in any SRW unit core spaces and between and behind SRW units for a horizontal distance of at least 18".

Separation geotextiles are required between the aggregate and overlying fill sections. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. When placing pavement sections directly on the reinforced zone, cap aggregate with 4" of asphalt concrete base course. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE segmental walls with dowels, attach dowels to top courses of SRW units in accordance with the following:

1. Set dowels in core spaces of SRW units filled with grout instead of coarse aggregate or
2. Embed adhesively anchored dowels in holes of solid SRW units with epoxy.

For MSE panel walls with coping, connect CIP concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, pile sleeves, etc. If

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necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps, curved MSE walls with tight (short) radii and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact M&T before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, an MSE Wall Vendor representative is required to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

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Unless required otherwise in the plans, install foundations and if required, pile sleeves located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct CIP concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Stagger SRW units to create a running bond by centering SRW units over joints in the row below as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

A. SRW units are level from front to back and between units when checked with a 4 ft long level,

B. Vertical joint widths are 1/4" maximum for SRW units and 3/4", ±1/4" for panels,

C. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and

D. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Before placing aggregate, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other

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types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. If pile sleeves are required, fill sleeves with loose uncompacted sand before constructing end bent caps.

Install dowels as necessary for SRW units and place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct CIP concrete coping in accordance with Subarticle 452-4(B) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces. If the gap between a single faced barrier and wall face is wider than 2", fill gap with Class V select material (standard size No. 78M stone). Otherwise, fill gap with backer rod and seal joint between barrier and MSE wall with silicone sealant.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. 4 will be measured and paid in square feet. MSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define “top of wall” as top of coping or top of panels or SRW units for MSE walls without coping.

The contract unit price for *MSE Retaining Wall No. 4* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, hauling and removing excavated materials, placing and compacting aggregate and backfill material and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, aggregate concrete base course, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. 4* will also be full compensation for reinforcement and connector design for reinforcement connected to end bent caps, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. 4*.

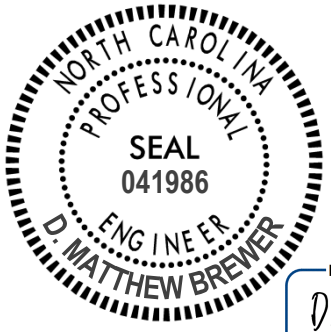
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The contract unit price for *MSE Retaining Wall No. 4* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract. The contract unit price for *MSE Retaining Wall No. 4* also does not include the cost for constructing bridge approach fills behind end bents with MSE abutment walls. See *Bridge Approach Fills* provision for measurement and payment of Type 2 Bridge Approach Fills.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item	**Pay Unit**
MSE Retaining Wall No. 4	Square Foot



DocuSigned by:
D. Matthew Brewer
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SHORED MECHANICALLY STABILIZED EARTH RETAINING WALLS (SPECIAL)

1.0 GENERAL

A Shored Mechanically Stabilized Earth (SMSE) retaining wall is defined as a soil retaining system with steel or geogrid tensile reinforcements in the reinforced zone connected to vertical precast concrete panels, as required in the plans, combined with a Soil Nail Wall system consisting of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face supporting the excavation. Segmental retaining wall (SRW) units may not be used. When a composite MSE and Soil Nail Wall, otherwise referred to as a SMSE, system is proposed on a project, the MSE component of the system should consider the long-term retaining benefits provided by the Soil Nail Wall and the potential reduction in excavation and reinforced backfill. Contributions of the Soil Nail Wall include a reduction in lateral loads on the MSE mass and significant contributions to global stability.

Only use coarse aggregate in the reinforced zone of MSE portion of SMSE retaining walls. Provide reinforced concrete coping as required. Design and construct SMSE retaining walls based on actual elevations, required embedment and wall dimensions in accordance with the contract and accepted submittals.

For this provision, "SMSE Wall" refers to the entire wall system, "MSE Wall" refers to the mechanically stabilized earth wall part of the SMSE wall and "Soil Nail Wall" refers to the soil nail wall portion of the SMSE wall.

2.0 MATERIALS

MSE Wall System

Refer to the *Standard Specifications*.

Item	Section
Aggregate	1014
Anchor Pins	1056-2
Curing Agents	1026
Epoxy, Type 3A	1081
Geotextiles, Type 2	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Precast Wall Facing Panels	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Shoulder Drain Materials	816-2
Wire Staples	1060-8(D)

Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for cast-in-place coping, leveling concrete and pads.

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Use panels from producers approved by the Department and licensed by the MSE Wall Vendor. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate except do not use No. 57 or 57M stone in the reinforced zone of MSE walls with geosynthetic reinforcement or connectors. Use the following for fine aggregate:

1) Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard Specifications* or
2) Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with electrochemical properties that meet the following requirements:

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AGGREGATE ELECTROCHEMICAL REQUIREMENTS					
Aggregate Type	**Reinforcement or Connector Material**	**pH**	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	Steel	Not Required			
Fine	Steel	5 – 10	≥ 3,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Coarse or Fine	Polyester Type (PET) Geogrid	5 – 8	N/A*	N/A*	N/A*
Coarse or Fine	Geostrip or Polyolefin Geogrid	4.5 – 9	N/A*	N/A*	N/A*

* Resistivity, chlorides and sulfates are not applicable to geosynthetics.

Use aggregate from a source that meets the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*. Perform pH tests for coarse aggregate in accordance with Materials and Tests (M&T) Unit Chemical Procedure C-Elec. Perform organic content tests for fine aggregate in accordance with AASHTO T 267 instead of Subarticle 1014-1(D) of the *Standard Specifications*. Perform electrochemical tests for fine aggregate in accordance with the following test procedures:

Property	**Test Method**
pH	AASHTO T 289
Resistivity	AASHTO T 288
Chlorides	AASHTO T 291
Sulfates	AASHTO T 290

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications*.

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Geosynthetic Reinforcement

Define "machine direction" (MD) for geosynthetics in accordance with ASTM D4439. Provide Type 1 material certifications for geosynthetic strengths in the MD in accordance with Article 1056-3 of the *Standard Specifications*. Test geosynthetics in accordance with ASTM D6637.

C. Bearing Pads

For MSE panel walls, use bearing pads that meet Section 3.6.1.a of the *FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I* (Publication No. FHWA-NHI-10-024). Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

Soil Nail Wall System

Refer to the *Standard Specifications*.

Item	**Section**
Anchor Pins	1056-2
Curing Agents	1026
Geocomposites	1056
Joint Materials	1028
Masonry	1040
Grout, Type 2	1003
Portland Cement Concrete, Class A	1000
Reinforcing Steel	1070
Select Material, Class VI	1016
Shotcrete	1002
Shoulder Drain Materials	816-2
Steel Plates	1072-2

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Provide Class VI select material (standard size No. 57 stone) for leveling pads. Use Class A concrete for concrete facing and neat cement grout for Type 2 grout.

Provide soil nails consisting of grouted steel bars and nail head assemblies. Use epoxy coated or encapsulated deformed steel bars that meet AASHTO M 275 or M 31, Grade 60 or 75. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*. Provide epoxy coated bars that meet Article 1070-7 of the *Standard Specifications*.

For encapsulated bars, use nonperforated corrugated HDPE sheaths at least 0.04" thick that meet AASHTO M 252. Provide at least 0.4" of grout cover between bars and sheathing and at least 0.8" of grout cover between sheathing and drill hole walls.

Fabricate centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not detrimental to steel bars (no wood). Size centralizers to position bars within 1" of drill hole centers and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around bars. Centralizers are required both inside and outside sheaths for encapsulated nails.

Provide nail head assemblies consisting of nuts, washers and bearing plates with welded stud shear connectors. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 3 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store soil nail wall materials so materials are kept clean and free of damage. Do not crack, fracture or otherwise damage grout inside sheaths of encapsulated nails. Bent, damaged or defective materials will be rejected.

3.0 MSE PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the

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panel production facility on the working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Use a prequalified MSE Wall Design Consultant to design MSE walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Wall Design Consultant.

Design shored MSE walls with a minimum reduced reinforcement length of 6 feet or 0.4 times the wall height, whichever is greater; except for the top two layers of reinforcement, which must have a minimum length of 0.7 times the wall height or extend 5 feet beyond the top of the soil nail wall, whichever is longer. Where the soil nail wall is less than 2/3 times the wall height, design the MSE wall in accordance with the plans, AASHTO LRFD Bridge Design Specifications and any NCDOT restrictions for the chosen MSE wall system unless otherwise required, using a minimum reinforcement length of 0.7 times the wall height. Where the soil nail wall extends to near the MSE wall height disallowing extension of the upper reinforcement, either connect the reinforcement to the soil nail wall, use a minimum reinforcement length of 0.7 times the wall height, or submit an alternate detail to the Engineer for review and acceptance. Use a maximum vertical reinforcement spacing of 2.5 feet. Extend the reinforcement to the soil nail wall, where applicable. Otherwise extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. Use corrosion loss rates for galvanizing in accordance with the AASHTO LRFD specifications for nonaggressive backfill and carbon steel corrosion rates in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Corrosion Loss Rate (after zinc depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For geosynthetic reinforcement and connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 lb/sf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft. posts or concrete barrier rail above MSE walls, analyze top 2

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reinforcement layers for traffic impact loads in accordance with Section 7.2 of the FHWA MSE wall manual shown elsewhere in this provision except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations.

Use 6" thick cast-in-place unreinforced concrete leveling pads beneath panels that are continuous at steps and extend at least 6" in front of and behind bottom row of panels. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

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EMBEDMENT REQUIREMENTS [3,4,5,6]	
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**
Horizontal (walls)	H/20
Horizontal (abutments)	H/10
3H:1V	H/10
2.5H:1V	H/8.5
2H:1V	H/7
1.5H:1V	H/5
1.25H:1V	H/4
1H:1V	H/3

Notes:
(a) Front slope is as shown in the plans.
(b) Define "H" as the maximum design height plus embedment per wall with the design height and embedment as shown in the plans.
(c) Maintain a minimum bench width of 4.0 ft. in front of the wall for the entire length.
(d) Minimum Embedment of 2 ft. unless larger depths dictated by the above table.
(e) Maximum Slope of 1H:1V will be maintained on front slopes for the entire length of the wall.
(f) Submit with the wall design internal, external, and global stability analyses.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Standard Drawing No. 816.02 of the *Roadway Standard Drawings*.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

NUMBER OF BEARING PADS		
Facing Area per Panel (A)	**Maximum Wall Height Above Horizontal Panel Joint**	**Minimum Number of Pads per Horizontal Panel Joint**
$A \leq 30$ sf	25 ft	2
	35 ft[1]	3
30 sf $< A \leq$ 75 sf	25 ft	3
	35 ft[1]	4

(a) Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, separation geotextiles are required between the aggregate and

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overlying fill or pavement sections except when concrete pavement, full depth asphalt or cement treated base is placed directly on aggregate. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE panel walls with coping, connect cast-in-place concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels, coping, bin walls, slip joints, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW, version 3.0 with update 14.93 or later, manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

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4.0 SOIL NAIL PRECONSTRUCTION REQUIREMENTS

A. Soil Nail Wall Designs

For soil nail wall designs, submit PDF file of working drawings and design calculations at least 30 days before the preconstruction meeting. Do not begin soil nail wall construction until a design submittal is accepted.

Use a prequalified Anchored Wall Design Consultant to design soil nail walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Anchored Wall Design Consultant.

Design soil nail walls in accordance with the plans and allowable stress design method in the *FHWA Geotechnical Engineering Circular No. 7 "Soil Nail Walls"* (Publication No. FHWA-IF-03-017) unless otherwise required. Design soil nail walls for seismic if walls are located in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*.

Design soil nails that meet the following unless otherwise approved:

1) Horizontal and vertical spacing of at least 3 ft,
2) Inclination of at least 12° below horizontal,
3) Clearance between ends of bars and drill holes of at least 6" and
4) Diameter of 6" to 10".

Four inch diameter soil nails may be approved for nails in rock at the discretion of the Engineer. Do not extend nails beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with nails, maintain a clearance of at least 6" between obstructions and nails.

Provide wall drainage systems consisting of geocomposite drain strips, drains and outlet components. Place drain strips with a horizontal spacing of no more than 10 ft and center strips between adjacent nails. Attach drain strips to excavation faces and connect strips to leveling pads. Locate a continuous aggregate shoulder drain along the base of concrete facing in front of leveling pads. Provide drains and outlet components in accordance with Standard Drawing No. 816.02 of the *Roadway Standard Drawings*.

Use shotcrete at least 8" thick and reinforce shotcrete with #4 waler bars around nail heads. Two waler bars (one on each side of nail head) in the horizontal and vertical directions are required for a total of 4 bars per nail.

Use No. 57 stone for aggregate leveling pads. Use 6" thick leveling pads beneath concrete facing. Unless required otherwise in the plans, embed top of leveling pads at least 12" below bottom of walls shown in the plans.

Submit working drawings and design calculations including unit grout/ground bond strengths for acceptance in accordance with Article 105-2 of the *Standard Specifications*.

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Submit working drawings showing plan views, wall profiles with nail locations including known test nail locations, typical sections and details of nails, drainage, shotcrete, leveling pads and concrete facing. If necessary, include details on working drawings for concrete barrier rail with moment slab and obstructions extending through walls or interfering with nails, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different nail lengths.

When designing soil nail walls with computer software other than SnailWin, use SnailWin version 3.10 or later, developed by the California Department of Transportation (CALTRANS) to verify the design. Use SnailWin in accordance with the following:

1) Pre-factored yield stress (150, 75 or 60 ksi) and punching shear for reinforcement (nail) strengths,

2) Allowable bond strengths for bond stress,

3) Default value of 1.0 for bond stress factor, and

4) Pullout controls for all nails, i.e., yield stress or punching shear do not control.

Determine $T_{max\text{-}s}$ from SnailWin as shown in Table D.4 of FHWA GEC 7 and use the factored maximum design nail force ($T_{max\text{-}s}/0.55$) for design. At least one SnailWin analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest nails. Submit electronic SnailWin input files and PDF output files with design calculations.

B. Soil Nail Wall Construction Plan

Submit 4 copies and a PDF copy of a soil nail wall construction plan at least 30 days before the preconstruction meeting. Do not begin soil nail wall construction until the construction plan submittal is accepted. Provide detailed project specific information in the soil nail wall construction plan that includes the following:

1) Overall description and sequence of soil nail wall construction;

2) List and sizes of excavation equipment, drill rigs and tools, tremies and grouting equipment;

3) Procedures for excavations, drilling and grouting, soil nail and wall drainage system installation and facing construction;

4) Details of shotcrete equipment and application including mix process, test panels, thickness gauges and shooting methods;

5) Shotcrete nozzleman with certification in accordance with Article 1002-1 of the *Standard Specifications*;

6) Plan and methods for nail testing with calibration certificates dated within 90 days of the submittal date;

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7) Examples of construction and test nail records to be used in accordance with Sections 4.0(F) and 5.0(E) of this provision;

8) Approved packaged grout or grout mix design with acceptable ranges for flow and density that meets Section 1003 of the *Standard Specifications*;

9) Shotcrete mix design that meets Section 1002 of the *Standard Specifications*; and

10) Other information shown in the plans or requested by the Engineer.

If alternate construction procedures are proposed or necessary, a revised soil nail wall construction plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend soil nail wall construction until a revised plan is accepted.

C. Preconstruction Meeting

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

5.0 CORROSION MONITORING

Corrosion monitoring is required for SMSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact the NCDOT Materials & Tests (M&T) Unit before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and assistance with installation, if necessary.

6.0 MSE WALL VENDOR SITE ASSISTANCE

Unless otherwise approved, provide an MSE Wall Vendor representative to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

7.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of SMSE walls. Direct run off away from SMSE walls, select material and backfill. Contain and maintain select material and backfill and protect material from erosion.

Construct to the tolerances found in Table 4 of FHWA-CFL/TD-06-001.

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Perform necessary clearing and grubbing in accordance with Section 200 of the *Standard Specifications*. Excavate as necessary for SMSE walls in accordance with the accepted submittals.

A. MSE Wall Installation

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct cast-in-place concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels.

Erect and support panels so the final wall position is as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

1. Vertical joint widths are 3/4", ±1/4" for panels,
2. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and
3. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Place reinforcement in slight tension free of

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kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*.

Place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct cast-in-place concrete coping in accordance with Subarticle 452-3(C) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold separation geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

B. Soil Nail Wall Installation

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls.

Notify the Engineer before blasting in the vicinity of soil nail walls. Perform blasting in accordance with the contract. Unless required otherwise in the plans, install foundations located behind soil nail walls before beginning wall construction.

Install soil nail walls in accordance with the accepted submittals and as directed. Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method and a revised soil nail wall design or construction plan may be required.

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1) Excavation

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

a) Heights not to exceed vertical nail spacing,
b) Bottom of lifts no more than 3 ft below nail locations for current lift and
c) Horizontal and vertical alignment within 2" of location shown in the accepted submittals.

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Apply shotcrete to excavation faces within 24 hours of excavating each lift unless otherwise approved. Shotcreting may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If excavation faces will be exposed for more than 24 hours, use polyethylene sheets anchored at top and bottom of lifts to protect excavation faces from changes in moisture content.

If an excavation becomes unstable at any time, suspend soil nail wall construction and temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and a revised soil nail wall design or construction plan may be required.

Do not excavate the next lift until nail installations and testing and shotcrete application for the current lift are accepted and grout and shotcrete for the current lift have cured at least 3 days and 1 day, respectively.

2) Soil Nails

Install soil nails in the same way as acceptable test nails. Drill and grout nails the same day and do not leave drill holes open overnight.

Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised soil nail wall design or construction plan may be required.

a) Drilling

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within 6" of locations and 2° of inclination shown in the accepted submittals unless otherwise approved.

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Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

b) Steel Bars

Center steel bars in drill holes with centralizers. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

Do not insert steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or redrill the hole.

c) Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

d) Nail Heads

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail heads are evenly loaded.

3) Wall Drainage Systems

Install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. Before installing shotcrete

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reinforcement, place geocomposite drain strips with the geotextile side against excavation faces. For highly irregular faces and at the discretion of the Engineer, drain strips may be placed after shotcreting over weep holes through the shotcrete. Hold drain strips in place with anchor pins so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Connect drain strips to leveling pads by embedding strip ends at least 4" into No. 57 stone.

4) Shotcrete

Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness. Nail head assembly shall have a minimum of 3” of shotcrete cover.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the *Standard Specifications*. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

5) Leveling Pads

Construct aggregate leveling pads at elevations and with dimensions shown in the accepted submittals. Compact leveling pads with a vibratory compactor to the satisfaction of the Engineer.

6) Construction Records

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

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a) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;

b) Wall description, county, Department's contract, TIP and WBS element number;

c) Wall station and number and lift location, dimensions, elevations and description;

d) Nail locations, dimensions and inclinations, bar types, sizes and grades, corrosion protection and temporary casing information;

e) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;

f) Grout volume, temperature, flow and density records;

g) Ground and surface water conditions and elevations if applicable;

h) Weather conditions including air temperature at time of grout placement and shotcrete application; and

i) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF copy of all corresponding construction records.

8.0 NAIL TESTING

Test soil nails in accordance with the contract and as directed. "Verification tests" are performed on nails not incorporated into soil nail walls, i.e., sacrificial nails and "proof tests" are performed on nails incorporated into walls, i.e., production nails. Define "verification test nail" and "proof test nail" as a nail tested with either a verification or proof test, respectively. Define "test nails" as verification or proof test nails.

Verification tests are typically required for at least one nail per soil type per soil nail wall or 2 nails per wall, whichever is greater. Proof tests are typically required for at least one nail per nail row per soil nail wall or at least 5% of production nails, whichever is greater. More or less test nails may be required depending on subsurface conditions encountered. The Engineer will determine the number and locations of verification and proof tests required. The approximate known test nail locations are shown in the plans.

Do not test nails until grout and shotcrete attain the required 3 day compressive strength. Do not install any production nails until verification tests are accepted.

A. Test Equipment

Use the following equipment to test nails:

1) Two dial gauges with rigid supports,

2) Hydraulic jack and pressure gauge,

3) Jacking block or reaction frame and

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4) Electrical resistance load cell (verification tests only).

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Submit identification numbers and calibration records for load cells, jacks and pressure gauges with the soil nail wall construction plan. Calibrate each jack and pressure gauge as a unit.

Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

B. Test Nails

Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing. Provide unbonded and bond lengths of at least 3 ft and 10 ft, respectively.

Steel bars for production nails may be overstressed under higher test nail loads. If necessary, use larger size or higher grade bars with more capacity for test nails instead of shortening bond lengths to less than the minimum required.

C. Verification Tests

Install verification test nails with the same equipment, installation methods and drill hole diameter and inclination as production nails.

Determine maximum bond length for verification test nails (L_{BVT}) using the following:

$$L_{BVT} \leq (C_{RT} \times A_t \times f_y) / (Q_{ALL} \times 3)$$

Where,
L_{BVT} = bond length (ft),
C_{RT} = reduction coefficient, 0.9 for Grade 60 and 75 bars or 0.8 for Grade 150 bars,
A_t = bar area (in^2),
f_y = bar yield stress (ksi) and
Q_{ALL} = allowable unit grout/ground bond strength (kips/ft).

Determine design test load for verification test nails (DTL_{VT}) based on as-built bond length and allowable unit grout/ground bond strength using the following:

$$DTL_{VT} = L_{BVT} \times Q_{ALL}$$

Where,
DTL_{VT} = design test load (kips).

Perform verification tests by incrementally loading nails to failure or a load of 300% of DTL_{VT} based on the following schedule:

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Load	Hold Time
AL*	1 minute
0.25 DTL_{VT}	10 minutes
0.50 DTL_{VT}	10 minutes
0.75 DTL_{VT}	10 minutes
1.00 DTL_{VT}	10 minutes
1.25 DTL_{VT}	10 minutes
1.50 DTL_{VT}	60 minutes (creep test)
1.75 DTL_{VT}	10 minutes
2.00 DTL_{VT}	10 minutes
2.50 DTL_{VT}	10 minutes
3.00 DTL_{VT}	10 minutes
AL*	1 minute

* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL_{VT}.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and permanent set after load is reduced to alignment load. Monitor verification test nails for creep at the 1.5 DTL_{VT} load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6, 10, 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

D. Proof Tests

Determine maximum bond length for proof test nails (L_{BPT}) using the following:

$$L_{BPT} \leq (C_{RT} \times A_t \times f_y) / (Q_{ALL} \times 1.5)$$

Where variables are defined in Section 8.0(C) above.

Determine design test load for proof test nails (DTL_{PT}) based on as-built bond length and allowable unit grout/ground bond strength using the following:

$$DTL_{PT} = L_{BPT} \times Q_{ALL}$$

Where variables are defined in Section 8.0(C) above.

Perform proof tests by incrementally loading nails to failure or a load of 150% of DTL_{PT} based on the following schedule:

Docusign Envelope ID: 1F15D06E-3A6E-8230-809D-1CA978111D91

Load	Hold Time
AL*	Until movement stabilizes
0.25 DTL_{PT}	Until movement stabilizes
0.50 DTL_{PT}	Until movement stabilizes
0.75 DTL_{PT}	Until movement stabilizes
1.00 DTL_{PT}	Until movement stabilizes
1.25 DTL_{PT}	Until movement stabilizes
1.50 DTL_{PT}	10 or 60 minutes (creep test)
AL*	1 minute

* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL_{PT}.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor proof test nails for creep at the 1.5 DTL_{PT} load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6 and 10 minutes. If test nail movement between 1 and 10 minutes is greater than 0.04", maintain the 1.5 DTL_{PT} load increment for an additional 50 minutes and record movement at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

E. Test Nail Acceptance

Submit 2 copies of test nail records including load versus movement and time versus creep movement plots within 24 hours of completing each verification or proof test. The Engineer will review the test nail records to determine if test nails are acceptable. Test nail acceptance is based in part on the following criteria.

1) For verification tests, total movement during creep test is less than 0.08" between the 6 and 60 minute readings and creep rate is linear or decreasing throughout hold time.
2) For proof tests, total movement during creep test is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings and creep rate is linear or decreasing throughout hold time.
3) Total movement at maximum load exceeds 80% of the theoretical elastic elongation of the unbonded length.
4) Pullout failure does not occur at or before the 2.0 DTL_{VT} or 1.5 DTL_{PT} load increment. Define “pullout failure” as the inability to increase load while movement continues. Record pullout failure load as part of test nail data.

For proof test nails, maintain stability of unbonded lengths for subsequent grouting. If a proof test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the proof test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a verification test nail is unacceptable, revise the soil nail design or installation methods. Submit a revised soil nail wall design or construction

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plan for acceptance and provide acceptable verification test nails with the revised design or installation methods.

If the Engineer determines a proof test nail is unacceptable, either perform additional proof tests on adjacent production nails or revise the soil nail design or installation methods for the production nails represented by the unacceptable proof test nail as determined by the Engineer. Submit a revised soil nail wall design or construction plan for acceptance, provide an acceptable proof test nail with the revised design or installation methods and install additional production nails for the nails represented by the unacceptable proof test nail.

After completing nail testing for each soil nail wall or stage of a wall, provide a PDF copy of all corresponding test nail records.

9.0 MEASUREMENT AND PAYMENT

SMSE Retaining Wall will be measured and paid in square feet. SMSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define "top of wall" as top of coping or top of panels for MSE walls without coping. No payment will be made for the Soil Nail Wall part of the SMSE wall.

The contract unit price for SMSE Retaining Wall will be full compensation for providing designs, submittals, labor, tools, equipment and SMSE wall materials, excavating, backfilling, hauling and removing excavated materials and supplying site assistance, leveling pads, panels, reinforcement, aggregate, wall drainage systems, geotextiles, bearing pads, coping, miscellaneous components and any incidentals necessary to construct SMSE walls. The contract unit price for SMSE Retaining Wall will also be full compensation for reinforcement connected to and aggregate behind end bent caps in the reinforced zone, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for SMSE Retaining Wall.

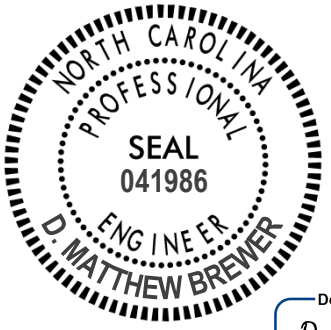
The contract unit price for SMSE Retaining Wall does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

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Payment will be made under:

Pay Item	**Pay Unit**
SMSE Retaining Wall No. 5	Square Foot



DocuSigned by:
D. Matthew Brewer
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10/26/23

PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL

CONTAMINATED SOIL / CONTAMINATED MATERIAL (3/25/2024)

The Contractor's attention is directed to the fact that soil contaminated with petroleum hydrocarbon compounds and coal combustion by-products (coal ash) exists within the project area. The known areas of contamination are indicated on corresponding plans sheets. Information relating to these contaminated areas, sample locations, and investigation reports will be available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "U-6146", "Individual Sheets/520 GeoEnvironmental":

http://dotw-xfer01.dot.state.nc.us/dsplan/

Petroleum Contaminated Soil

Petroleum contaminated soil may be encountered during any earthwork activities on the project. The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. The Engineer shall determine if soil is contaminated based on areas shown on the plans, petroleum odors, and unusual soil staining. Contaminated soil not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall transport all petroleum contaminated soil excavated from the project to a facility licensed to accept petroleum contaminated soil.

In the event that a stockpile is needed, the stockpile shall be created within the property boundaries of the source material and in accordance with the Diagram for Temporary Containment and Treatment of Petroleum-Contaminated Soil per North Carolina Department of Environmental Quality's (NCDEQ) Division of Waste Management UST Section GUIDELINES FOR EX SITU PETROLEUM CONTAMINATED SOIL REMEDIATION. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for off-site temporary storage. The Contractor shall provide copies of disposal manifests completed per the disposal facilities requirements and weigh tickets to the Engineer.

Coal Combustion By-Product (Coal Ash) Contaminated Material

Coal ash contaminated material may be encountered during earthwork activities on Parcel 22. The Contractor shall only excavate those materials that the Engineer designates necessary to complete a particular task. Coal ash contaminated material not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. Coal ash contaminated material removed during construction shall be transported to a waste treatment and disposal facility that is fully approved and permitted by all applicable environmental regulatory agencies to receive, treat and/or dispose of the material. It shall be the Contractor's responsibility to locate such a facility. All material shall be contained appropriately during transport to the disposal facility. Departmental approval of the specific facility identified for use by the Contractor shall occur prior to removal of any material from the project limits.

The Contractor shall provide the Department with all transportation manifests and certificates of acceptance from the receiving disposal facility weekly. The Department will be the regulatory generator of all waste excavated and removed from within its right of way. The Contractor, with

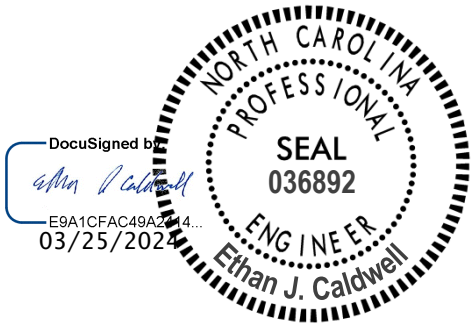
the approval of the Engineer, is authorized to sign all waste transportation and disposal manifests on behalf of the Department.

Measurement and Payment:
The quantity of contaminated soil/contaminated material hauled and disposed of shall be the actual number of tons of material, which has been acceptably transported and weighed with certified scales as documented by disposal manifests and weigh tickets. The quantity of petroleum contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Petroleum Contaminated Soil". The quantity of coal ash contaminated material, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Coal Ash Contaminated Material."

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to stockpiling, loading, transportation, weighing, laboratory testing, disposal, equipment, decontamination of equipment, labor, and personal protective equipment.

Payment shall be made under:

Pay Item	**Pay Unit**
Hauling and Disposal of Petroleum Contaminated Soil	Ton
Hauling and Disposal of Coal Ash Contaminated Material	Ton





Signed by:
Matthew V. Springer
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06/17/2025

YIELD LINES PAVEMENT MARKING:

(1-15-24)(Rev. 6-17-25)

Description

Install yield lines in accordance with this special provision, Section 1205 of the *Standard Specifications* and as directed by the Engineer.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Pavement Markings	1087

The material for yield line pavement markings shall be thermoplastic, integrated multipolymer, polyurea, type III cold applied plastic, or heated-in-place thermoplastic. Paint may be used for temporary yield line pavement markings.

Application

Refer to Section 1205 of the *Standard Specifications* and refer to Division 12 of the *Roadway Standard Drawings* on application of products used for yield lines. Refer to the integrated multipolymer (IMP) pavement marking special provision found elsewhere in this contract as applicable. Yield lines shall be a row of solid white isosceles triangles with 3 to 12 inches between each one, 12 to 24 inches in width, with a height 1.5 times the width. Yield lines shall point towards traffic, and they shall be placed at least 4 feet before the nearest controlled crosswalk. For unsignalized midblock crosswalks, yield lines shall be placed with the Yield Here to Pedestrians sign located 20 to 50 feet in advance of the crosswalk. Yield lines are not symbols or characters.

Measurement and Payment

Yield Line _____ Pavement Marking, __", __mils (for thermoplastic, integrated multipolymer, polyurea and heated-in-place thermoplastic material), *Yield Line Pavement Marking, Type III (__")* (for Type 3 cold applied plastic material), or *Yield Line Pavement Marking, __"* (for paint material) will be measured and paid as the actual number of linear feet of pavement marking lines satisfactorily placed and accepted by the Engineer. The quantity of lines will be the summation of the linear feet of solid line measured end-to-end of the line.

Payment will be made under:

Pay Item	**Pay Unit**
Yield Line _____ Pavement Marking, __", __mils	Linear Feet
Yield Line Cold Applied Plastic Pavement Marking, Type III (__")	Linear Feet
Yield Line Paint Pavement Marking, __"	Linear Feet

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TC-1

U-6146/B-5857 Gaston County
9/18/2026

WORK ZONE TRAFFIC CONTROL
Project Special Provisions
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TC-2

U-6146/B-5857 Gaston County
9/18/2026

ADA COMPLIANT PEDESTRIAN TRAFFIC CONTROL DEVICES:
(10/31/2017) (Rev. 6/3/2022)

Description

Furnish, install, and maintain all ADA compliant pedestrian traffic control devices for existing pedestrian facilities that are disrupted, closed, or relocated by planned work activities.

The ADA compliant pedestrian traffic control devices used to either close, redirect, divert or detour pedestrian traffic for project U-6146/B-5857 are Pedestrian Channelizing Devices.

Construction Methods

The ADA compliant pedestrian traffic control devices involved in the closing or redirecting of pedestrians as designated on the Transportation Management Plan (TMP) shall be manufactured and assembled in accordance with the requirements of the Americans with Disabilities Act (ADA) and be on the NCDOT approved products list.

Pedestrian Channelizing Devices shall be manufactured and assembled to be connected as to eliminate any gaps that allow pedestrians to stray from the channelizing path. Any Pedestrian Channelizing Devices used to close or block a pedestrian facility shall have a “SIDEWALK CLOSED” sign affixed to it if designated on the TMP.

Measurement and Payment

Pedestrian Channelizing Devices will be measured and paid as the maximum number of linear feet of *Pedestrian Channelizing Devices* furnished, acceptably placed, and in use at any one time during the life of the project.

No direct payment will be made for any sign affixed to a pedestrian channelizing device. Signs mounted to pedestrian channelizing devices will be considered incidental to the device.

Relocation, replacement, repair, maintenance, or disposal of *Pedestrian Channelizing Devices* will be incidental to the pay item.

Payment will be made under:

Pay Item	Pay Unit
Pedestrian Channelizing Devices	Linear Foot

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TC-3

U-6146/B-5857 Gaston County
9/18/2026

TEMPORARY RIVER WARNING SIGNS:

Description
Furnish, erect, maintain, and remove stationary Temporary River Warning Signs in accordance with the contract and plans.

Materials

Refer to Division 10.

Item Section

Work Zone Signs 1089-1
Work Zone Sign Supports 1089-2

Construction Methods

A written agreement provided by the Engineer with the property owner/representative shall be executed prior to sign erection.

Erect Temporary River Warning Signs at locations identified in the plans. Exact placement of the Temporary River Warning Signs within an individual property shall be approved by the Engineer.

All Temporary River Warning Signs shall be erected on stationary supports.

Install Temporary River Warning Signs to stand within 2° of plumb in all directions and under all conditions. Erect signs per *Roadway Standard Drawing 1110.01.*

Splicing of Temporary River Warning Sign posts is acceptable. Splice Temporary River Warning Sign posts according to *Roadway Standard Drawing 1110.01.* Remove entire post when removing signs with spliced posts.

Measurement and Payment

Temporary River Warning Sign will be measured and paid for as the actual number of signs satisfactorily installed and accepted by the Engineer.

No direct payment will be made for Temporary River Warning Sign supports. All Temporary River Warning Sign supports will be incidental to the work of furnishing, erecting, maintaining, and removal of the Temporary River Warning Signs.

Docusign Envelope ID: F16D87AC-313C-8D8C-827D-1F729EEAAD30

TC-4

U-6146/B-5857 Gaston County
9/18/2026

Payment will be made under:

Pay Item	**Pay Unit**
Temporary River Warning Sign	Each

Docusign Envelope ID: B499362C-3EAC-4F1E-A19D-FCCDB8A5F5A8

PROJECT SPECIAL PROVISIONS
Utility Construction

B. Chad Houser, PE, PLS | Project Manager
TGS Engineers
201 W. Marion St. | Shelby, NC 28150 | 704-476-0003 ex 311
chouser@tgsengineers.com

Utility Owner:
Two Rivers Utilities
1300 N. Broad St, Gastonia, NC 28054
(P.O. Box 1748, Gastonia, NC 28053-1748)

NORTH CAROLINA PROFESSIONAL
DocuSigned by:
Bobby Chad Houser
D642CC7988FB491...
30499
ENGINEER
BOBBY C HOUSER
8/26/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Where brand names and model numbers are specified in these Special Provisions or in the plans, the cited examples are used only to denote the quality standard of product desired and do not restrict bidders to a specific brand, make, or manufacturer. They are provided to set forth the general style, type, character, and quality of the product desired. Equivalent products will be acceptable.

The existing utilities belong to the City of Gastonia, Town of McAdenville, and Town of Cramerton. The contact for all these utility owners is Kyle butler, PE. His phone number is 704-866-6768 and his email is kyleb@tworiversutilities.com.

The provisions contained within these Utilities Construction Project Special Provisions modify the *Standard Specifications* only for materials used and work performed constructing water or sewer facilities owned by Two Rivers Utilities.

RELATION OF WATER MAINS TO NON POTABLE WATER LINES AND OTHER UTILITIES:

(3-18-25)

Revise the 2024 *Standard Specifications* as follows:

Page 15-1 and 15-2, Article 1500-5 RELATION OF WATER MAINS TO NON-POTABLE WATER LINES AND OTHER UTILITIES, lines 39-42 and lines 1-5, replace the article with the following:

Lay water mains at least 10 feet laterally from existing or proposed sanitary sewers or reclaimed water distribution lines. If local conditions or barriers prevent a 10-foot separation, lay the water

Docusign Envelope ID: B499362C-3EAC-4F1E-A19D-FCCDB8A5F5A8

main with at least 18 inches vertical separation above the top of the sanitary sewer or reclaimed water distribution pipe either in a separate trench or in the same trench on a bench of undisturbed earth.

For storm drain pipe or other utilities, lay the water main with at least 12 inches separation from the outside of the water main and the outside of the other facility.

One full length of water pipe at the point of crossing shall be located so that both joints will be as far from the sanitary sewer or reclaimed water distribution pipe as possible. If practicable, the water main shall be located above the sewer or reclaimed water distribution line.

Revise the NCDOT 2024 Standard Specifications as follows:

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service, paragraph 2, sentence 2: replace in its entirety with the following sentences:

The utility owner must be present for any testing or connections to the existing system including but not limited to all taps and temporary construction connections. A notice of 72 hours must be provided.

COMMENCEMENT OF WORK

A pre-construction meeting is required before work may begin. The Utility Owner shall be notified 72 hours prior to project mobilization.

MATERIALS APPROVAL

All utility materials shall be approved by the owner prior to delivery to the project per section 1500-7 of the Standard Specifications for Roads and Structures dated January 2024.

TESTING AND STERILIZATION

All waterline testing shall be in accordance with section 1510-3(B) of the 2024 NCDOT Standards and Specification and shall occur at the time of construction. A designated representative from the Utility Owner shall be notified to witness testing prior to their acceptance.

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WATER LINES

All water pipe 6" to 12" shall be Ductile Iron Pressure Class 350. Ductile Iron Pipe shall be manufactured and tested in the U.S.A. and shall conform to AWWA Specification C-151 and ANSI Standard #A21-51 or latest revision.

Cement linings with an asphaltic seal coat for ductile iron pipe shall conform to AWWA Specification C-104. Special linings shall be specified in the Special Provisions

Ductile iron pipe shall be mechanical joint or push-on joint type. All joints for ductile iron pipe shall conform to the applicable dimensions and weights shown in the tables in AWWA C-151 and to ANSI A-21.11 (AWWA C-111) or latest revision.

All pipe shall be clean and sound without defects that will impair their service. Repairing of defects by welding or other methods shall not be allowed.

Exterior coating of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m2 of pipe surface area. An asphaltic topcoat layer shall be applied over zinc to a minimum 2 mil thickness. Zinc coating system shall conform to ISO 8179-1 "Ductile iron pipes-External zinc based coating-Part 1. Second edition 2004-06-01 or latest revision.

The coating shall be applied to the outside of all pipe and the finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

Payment

No measurement or payment will be made for this work as the cost of such shall be included in the contract unit price bid per linear foot for "___*" Water Line".*

WATER VALVES

All valves 12" and under shall be resilient wedge gate valves, conforming to AWWA C509, latest revision. Sealing mechanism shall provide zero leakage at the water working pressure against the line flow from either direction and be designed such that no exposed metal seams, edges, screws, etc. are within the waterway in the closed position. The gate shall not be wedged into a pocket nor slide across the seating surface to obtain tight closure. All internal and external ferrous surfaces of the valve, including the interior of the gate, shall be coated with a protective coating conforming to AWWA C550, latest revision. Coating shall be applied to castings prior to assembly to assure all exposed areas will be covered. Valves shall be rated at 250 psi working pressure. Unless otherwise noted, underground valves shall have an operating nut and exposed valves shall have a hand wheel operator. Operating nut shall be 2"x2", open left.

Payment

No measurement or payment will be made for this work as the cost of such shall be included in the contract unit price bid per linear foot for "___*" Valve".*

Docusign Envelope ID: B499362C-3EAC-4F1E-A19D-FCCDB8A5F5A8

SEWER LINES

All sewer pipe shall be CL 350 Ductile Iron. Ductile Iron Pipe shall be manufactured and tested in the U.S.A. and shall conform to AWWA Specification C 151 and ANSI Standard #A21-51 or latest revision.

Cement linings for ductile iron pipe shall conform to AWWA Specification C 104.
Ductile iron pipe shall be mechanical joint or push-on joint type. All joints for ductile iron pipe shall conform to the applicable dimensions and weights shown in the tables in AWWA C151 and to ANSI A 21.11 (AWWA C111) or latest revision.

All pipe shall be clean and sound without defects that will impair their service. Repairing of defects by welding or other methods shall not be allowed.

Exterior coating of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m2 of pipe surface area. An asphaltic topcoat layer shall be applied over zinc to a minimum 2 mil thickness. Zinc coating system shall conform to ISO 8179-1 “Ductile iron pipes-External zinc based coating-Part 1. Second edition 2004-06-01 or latest revision.

The coating shall be applied to the outside of all pipe and the finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

Payment
No measurement or payment will be made for this work as the cost of such shall be included in the contract unit price bid per linear foot for “*8” Sanitary Gravity Sewer”.*

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POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be applied to any ductile iron pipe and fittings located within 10 feet of existing or proposed gas lines that do not have cathodic protection or as shown on the plans. Polyethylene encasement shall also be applied to any ductile iron pipe and fittings located in areas where contaminated soil is encountered or where directed by the Engineer.

Polyethylene material, thickness and width, shall conform to latest revision of AWWA/ANSI C-105/A21.5. Only tubes shall be used on the main pipeline. Minimum thickness shall be 8 mil. The inside surface of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a blend of anti-microbial biocide to mitigate microbiologically influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion.

Polyethylene encasement shall be installed, per AWWA C600 and ANSI/ C105/A21.5, where shown on the drawings on ductile iron pipe, fittings, and valves in accordance with AWWA C105. Method C, using polyethylene sheets, shall only be used when directed by the Engineer.

Payment will be under:

Pay Item	**Pay Unit**
Polyethylene Encasement	Linear Feet

CONDUIT

PVC Conduit: Conduit shall be Schedule 40 rigid polyvinyl chloride (PVC) conduit. All rigid PVC conduit and fittings must be Schedule 80 and listed by a Nationally Recognized Testing Laboratory (NRTL) as being compliant with the requirements of UL 514B and UL 651 for underground use. All nonmetallic conduit must be either red or gray in color.

Pay Item	**Pay Unit**
__” Conduit	Linear Feet

Docusign Envelope ID: BBD83CCB-BE43-4DD1-90E0-BCE45DBB08AC

PROJECT SPECIAL PROVISIONS
Utilities by Others

TELICS

1598 Westbrook Plaza Dr, Suite 202
Winston-Salem, NC 27103
Voice: (336) 705-8844
www.telics.com

General:

The following utility companies have facilities that will be in conflict with the construction of this project:

A) Duke Distribution – Power
B) Spectrum – Communications/ CATV
C) AT&T – Communications
D) Conterra – Communications
E) RST – Communications
F) Segra – Communications
G) Enbridge – Gas

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105-8 of the 2024 Standard Specifications.

Utilities Requiring Adjustment:

A) Duke Distribution – Power

1) Contact person for Duke Distribution is Thomas Douglass (919) 606-4659, thomas.douglass@duke-energy.com.

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PROJECT SPECIAL PROVISIONS
Utilities by Others

B) Spectrum – Communications/CATV

1) Contact person for Spectrum is Neal Barker (704) 671-6103, neal.barker@charter.com.

- Anticipated completion date is prior to Date of Availability.

2) AT&T – Communications

1) Contact person for AT&T is Janson Cassell (828) 693-9034, jc6701@att.com.

- Anticipated completion date is prior to Date of Availability.

2) Conterra – Communications

1) Contact person for Conterra is Kim Brown (704) 936-1814, kbrown@conterra.com.

E) RST – Communications

1) Contact person for RST is Matt Oelkers (984) 292-1949, moelkers@tepgroup.net.

F) Segra – Communications

1) Contact person for Segra is Robert Robinson (803) 726-4030, robert.robinson@segrafiber.com.

G) Enbridge – Gas

1) Contact person for Enbridge Gas is Ben Gaughan (330) 571-6711, benjamin.j.gaughan@dominionenergy.com.

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Project Special Provisions
Erosion Control

STABILIZATION REQUIREMENTS:
(4-30-2019)(Rev. 1-21-25)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit issued by the North Carolina Department of Environmental Quality Division of Energy, Mineral and Land Resources. Temporary or permanent ground cover stabilization shall occur within the following time frames from the last land-disturbing activity:

- Stabilize perimeter dikes, swales, ditches, and perimeter slopes within 7 calendar days.
- Stabilize high quality water (HQW) zones within 7 calendar days.
- Stabilize slopes steeper than 3:1 within 7 calendar days.
    - If slopes are 10 feet or less in length and are not steeper than 2:1, 14 calendar days are allowed.
- Stabilize slopes 3:1 to 4:1 within 14 calendar days.
    - 7 calendar days for slopes greater than 50 feet in length and with slopes steeper than 4:1.
    - 7 calendar days for perimeter dikes, swales, ditches, perimeter slopes, and HQW Zones.
- Stabilize areas with slopes flatter than 4:1 within 14 calendar days.
    - 7 calendar days for perimeter dikes, swales, ditches, perimeter slopes, and HQW Zones.

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: **(West)**

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.

Shoulder and Median Areas

August 1 - June 1		**May 1 - September 1**	
20#	Kentucky Bluegrass	20#	Kentucky Bluegrass
75#	Hard Fescue	75#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

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Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1		**May 1 - September 1**	
100#	Tall Fescue	100#	Tall Fescue
15#	Kentucky Bluegrass	15#	Kentucky Bluegrass
30#	Hard Fescue	30#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Tall Fescue Cultivars

06 Dust	Escalade	Kalahari	Serengeti
2nd Millennium	Essential	Kitty Hawk 2000	Shelby
3rd Millennium	Evergreen 2	Legitimate	Shenandoah III
Avenger	Faith	Lexington	Shenandoah Elite
Bar Fa	Falcon IV	LifeGuard	Sheridan
Barlexas	Falson NG	LSD	Sidewinder
Barlexas II	Falcon V	Magellan	Signia
Barrera	Fat Cat	Masterpiece	Silver Hawk
Barrington	Fesnova	Millennium SRP	Skyline
Barrobusto	Fidelity	Monet	Solara
Barvado	Finelawn Elite	Mustang 4	Southern Choice II
Biltmore	Finelawn Xpress	Naturally Green	Speedway
Bingo	Finesse II	Ninja 2	Spyder LS
Bizem	Firebird	Ol' Glory	Sunset Gold
Black Tail	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tahoe II
Blade Runner II	Five Point	Pedigree	Talladega
Bonsai	Focus	Picasso	Tanzania
Braveheart	Forte	Piedmont	Temple
Bravo	Garrison	Plantation	Terrano
Bullseye	Gazelle II	Proseeds 5301	Thor
Cannavaro	GLX Aced	Prospect	Thunderstruck
Catalyst	Gold Medallion	Quest	Titanium LS
Cayenne	Grande 3	RainDance	Titan LTD
Cezanne RZ	Greenbrooks	Raptor II	Tracer
Chipper	Greenkeeper	Rebel IV	Traverse SRP
Cochise IV	Gremlin	Rebel Exeda	Trio
Constitution	Greystone	Rebel Sentry	Tulsa Time
Corgi	Guardian 21	Regenerate	Turbo
Corona	Guardian 41	Regiment II	Turbo RZ
Coyote	Hemi	Rembrandt	Tuxedo
Cumberland	Honky Tonk	Rendition	Ultimate
Darlington	Hot Rod	Reunion	Umbrella
DaVinci	Hunter	Rhambler 2 SRP	Van Gogh
Desire	Inferno	Riverside	Venture

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Diablo	Integrity	RNP	Watchdog
Dominion	Jaguar 3	Rocket	Wolfpack II
Dynamic	Jamboree	Saltillo	Xtremegreen
Dynasty	Justice	Scorpion	

Approved Kentucky Bluegrass Cultivars:

4-Season	Blue Coat	Granite	Prosperity
Alexa II	Blue Note	Hampton	Quantum Leap
America	Blue Velvet	Harmonie	Rambo
Apollo	Boomerang	Impact	Rhapsody
Aramintha	Cabernet	Jackrabbit	Rhythm
Arcadia	Champagne	Jefferson	Royce
Aries	Champlain	Juliet	Rubicon
Armada	Chicago II	Keeneland	Rugby II
Arrow	Corsair	Langara	Rush
Arrowhead	Courtyard	Legend	Shariz
Aura	Dauntless	Liberator	Showcase
Avid	Delight	Lunar	Skye
Award	Diva	Madison	Solar Eclipse
Awesome	Dynamo	Mazama	Sonoma
Bandera	Eagleton	Mercury	Sorbonne
Barduke	Emblem	Merlot	Starburst
Barnique	Empire	Midnight	Sudden Impact
Baron	Envicta	Midnight II	Thermal Blue
Baroness	Everest	Moon Shadow	Total Eclipse
Barrister	Everglade	Mystere	Touche
Barvette HGT	Excursion	Nu Destiny	Tsunami
Bedazzled	Freedom II	NuChicago	Valor
Belissimo	Freedon III	NuGlade	Washington
Bewitched	Front Page	Oasis	Zedor
Beyond	Futurity	Odyssey	Zinfandel
Blackjack	Gaelic	Perfection	
Bluebank	Ginney II	Pinot	
Blueberry	Gladstone	Princeton 105	

Approved Hard Fescue Cultivars:

Aurora Gold	Firefly	Nordic	Rhino
Azay Blue	Gladiator	Oxford	Scaldis II
Beacon	Granite	Predator	Spartan II
Berkshire	Heron	Quatro	Stonehenge
Beudin	Jetty	Reliant II	Sword
Blueray	Minimus	Reliant IV	Warwick
Chariot	Miser	Rescue 911	
Eureka II	Nancock	Resolute	

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On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza 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.

Native Grass Seeding And Mulching (West)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream 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.

August 1 - June 1		**May 1 – September 1**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
8#	Big Bluestem	8#	Big Bluestem
6#	Indiangrass	6#	Indiangrass
4#	Switchgrass	4#	Switchgrass
35#	Rye Grain	25#	German or Browntop Millet
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.

Measurement and Payment

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

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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 on this project shall be six inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones ¾" and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

303(d) IMPAIRED WATERS LIST:

The South Fork Catawba River which has been identified on the 303(d) list of impaired waters as impaired for sedimentation and/or turbidity, is within one mile of the project and receives drainage from the project. The Contractor shall adhere to all conditions and/or regulations required for impacts to these waters.

ENVIRONMENTALLY SENSITIVE AREAS:

Description

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations

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within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50 foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

Construction Methods

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

(D) Seeding and Mulching

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.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut

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and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

CONSTRUCTION MATERIALS MANAGEMENT

(3-19-19) (rev. 04-27-20)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water+Quality/Environmental+Sciences/ATU/PAM8_30_18.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules

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governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 feet away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with *NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide* (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

WASTE AND BORROW SOURCES:
(2-16-11) (Rev. 3-17-22)

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

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All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/Contract%20Reclamation%20Procedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

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.

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(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. Posts shall be installed a minimum of 2 ft. into the ground. 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)(5) 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.

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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	**Pay Unit**
Safety Fence	Linear Foot

IMPERVIOUS DIKE:
(9-9-11)(Rev. 11-15-22)

Description

This work consists of furnishing, installing, maintaining, pumping and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed by the Engineer.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Construction Methods

Where impervious dikes are shown on the plans and used to dewater or lower the water elevation, construct in accordance with Article 410-4 and 410-5.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted by the Engineer. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, pumping and removal of the impervious dike.

Payment will be made under:

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Pay Item	Pay Unit
Impervious Dike	Linear Foot

CONCRETE WASHOUT:
(10-22-15)(Rev. 4-15-25)

Description

Concrete washouts are impermeable enclosures, above or below grade, to contain concrete wastewater and associated concrete mix from cleaning of ready-mix trucks, drums, pumps, tools or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with washout operations.

Acceptable concrete washouts may include constructed earthen structures, above or below ground, or commercially available devices designed specifically to capture concrete wash water.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Temporary Silt Fence	1605

Safety Fence shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall consist of a minimum 10 mil thick polypropylene or polyethylene geomembrane.

Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed by the Engineer near the project entrance(s) or at location(s) of concrete operations. Structures shall be constructed a minimum of 50 feet from drainage conveyances or jurisdictional streams or wetlands. Alternate structure designs or plans for management of concrete washout may be submitted for review and approval by the Engineer. Include in the alternate plan the method used to retain, treat and dispose of the concrete washout wastewater generated within the project limits and in accordance with the minimum setback requirements.

Install temporary silt fence around the perimeter of the structure enclosure in accordance with the details and as directed by the Engineer if the structure is not located in an area where existing erosion and sedimentation control devices are capable of containing stormwater runoff.

Post a sign with the words “Concrete Washout” in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed by the Engineer for visibility to construction traffic.

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Install prefabricated concrete washouts, designed specifically to capture concrete wash water, at locations of additional concrete pouring operations. Acceptable systems may include geotextile lined containers, vinyl or plastic containers or roll-off containers, with or without filter bags with a minimum functional holding capacity of 36 cubic feet (1.33 cubic yards). Submit prefabricated concrete washout system for approval by the Engineer prior to installation. Place prefabricated concrete washout devices to a minimum 50 foot setback from drainage conveyances and jurisdictional streams and wetlands. If the minimum setback cannot be achieved, provide secondary containment to prevent accidental release of wastewater from reaching drainage conveyances or streams.

Prefabricated concrete washouts must be clearly and visibly labeled as such, either by the manufacturer on the product itself, or by a sign with the words "Concrete Washout" in close proximity of the concrete washout area so it is clearly visible to site personnel.

Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity. Inspect concrete washout structures for damage to liner or structure to maintain functionality.

Maintain prefabricated concrete washout systems per manufacturer's recommendations. Inspect concrete washout structures for damage to linings or structure and repair or replace as necessary.

Remove the concrete washout structures and sign upon project completion. Grade the area to match the existing topography and permanently seed and mulch area. Dispose of prefabricated concrete washout structures according to state or local waste regulations.

Measurement and Payment

Concrete Washout Structure will be measured and paid per each enclosure installed in accordance with the details in the plans. If alternate plans or details are approved, those structures will also be paid for per each approved and installed structure. Such price and payment will be full compensation for all work including, but not limited to, furnishing all materials, labor, equipment, signage, slurry solidification and incidentals necessary to construct, maintain and remove *Concrete Washout Structure* and dispose of residual concrete washout wastewater and concrete solids.

Prefabricated Concrete Washout will be measured and paid per each system installed in accordance with the manufacturer's recommendations. Such price and payment will be full compensation for all work including, but not limited to, furnishing all materials, labor, equipment, signage, slurry solidification and incidentals necessary to install, maintain and remove *Prefabricated Concrete Washout*, and dispose of residual concrete washout wastewater and concrete solids.

Temporary Silt Fence will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

Safety Fence shall be measured and paid for as provided elsewhere in this contract.

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No measurement will be made for over excavation or stockpiling or other items necessary to complete this work.

Payment will be made under:

Pay Item	Pay Unit
Concrete Washout Structure	Each
Prefabricated Concrete Washout	Each

LITTER REMOVAL (MOWING AREAS ONLY):
(07-19-22) (Rev 8-25-25)

Description

This work consists of the pickup, removal, and disposal of litter from roadsides within the construction project prior to mowing operations.

Construction Methods

Provide labor, equipment and materials necessary for the pickup and removal of litter from non-construction sources and the disposal of same into state approved landfills. The Contractor shall abide by all ordinances, laws and regulations regarding disposal of litter and recycling of eligible materials. Wastes generated from construction activities shall be managed as provided elsewhere in the contract. Litter items may consist of any item not considered normal to the right-of-way, including but not limited to, varied sizes of bottles, cans, paper, tires, tire pieces, lumber, vehicle parts, building supplies, metals, household furnishings, cardboard, plastics, ladders, brush and other items not considered normal to the right of way. Litter removal shall be performed in designated areas within five days prior to any mowing operations and as directed. Designated areas shall include vegetated medians and shoulders within the project limits including all interchange ramps and other areas to be mown. Designated areas may be omitted for litter removal by the Engineer due to safety concerns.

The Contractor shall provide adequate personnel and materials to collect and remove litter. The Contractor shall be responsible for locating and utilizing approved local landfills and recycling facilities. Refer to Section 107-25 of the *Standard Specifications* for potential hazardous materials. All collected litter shall be containerized immediately and kept off the traveled portions of the roadway, shoulders, and rights-of-way (including paved shoulders). All collected litter that is small enough to be placed in a bag shall be bagged immediately. All collected litter that is too large for a bag shall be placed into a vehicle. Extended storage or stockpiling of collected litter and recyclables will not be permitted.

The Contractor's personnel shall dispose of any litter in a landfill approved by North Carolina Division of Waste Management. The Contractor will not be allowed to use NCDOT accounts at the landfills/recycling centers nor be allowed to dispose of the litter in NCDOT trash containers on any NCDOT property.

The Contractor shall report online the number of bags of litter and any recycling on the NCDOT Litter Management Website on the date of the pickup at the following website:

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https://apps.ncdot.gov/LM

An access code ('Pickup Key') for the online reporting portal may be obtained via emailing the Roadside Environmental Unit Litter Management Section at ncdot.clr@ncdot.gov. The Contractor shall request access to the litter removal reporting website prior to starting initial litter collection operations.

Measurement and Payment

The quantity of litter removal to be performed will be affected by the actual conditions that occur during construction of the project. The quantity of litter removal may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

Manual Litter Removal will be measured and paid as the actual number of man hours each worker spends picking up litter. Such price and payment will be full compensation for all litter removal work covered by *Litter Removal*, including, but not limited to, furnishing all materials, labor, equipment, transport, reporting, and incidentals necessary to accomplish the work.

Litter Disposal will be measured and paid for by the actual number of tons of litter collected and properly disposed of at a state approved landfill. Such price and payment will be full compensation for all fees, labor, transport, and incidentals necessary to dispose of collected litter associated with *Litter Removal*.

All traffic control necessary to provide a safe work area for *Litter Removal* shall be paid for as specified elsewhere in the contract.

Payment will be made under:

Pay Item	Pay Unit
Manual Litter Removal	MHR
Litter Disposal	TON

FABRIC INSERT INLET PROTECTION
(1-1-24)

Description

Install, maintain, and remove Fabric Insert Inlet Protection, of the type specified, in inlet structures (catch basins, drop inlets, etc.) in areas where asphalt or concrete may prevent the proper installation of a Rock Inlet Sediment Traps Type C, or as directed by the Engineer.

Materials

Provide a fabric inlet protection device composed of a fitted woven polypropylene geotextile double sewn with nylon thread suspended sack. The Fabric Insert Inlet Protection shall be manufactured to fit the opening of the catch basin or drop inlet or shall have a deflector to direct runoff from the curb opening into the fabric sack. The Fabric Insert Inlet Protection shall have a rigid frame or support

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system to support the loaded weight of the product. The product shall have lifting loops for removing the device from the basin and will have dump straps attached at the bottom to facilitate the emptying of the device. The Fabric Insert Inlet Protection shall have an overflow system to allow stormwater to enter the inlet structure and avoid ponding on the roadway when the device reaches capacity.

The fitted filter assembly shall have the following physical properties:

Type 1 (High Flow):

Physical	Test Method	English
Grab Tensile	ASTM D-4632	255 x 275 lbs
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	420 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	200 gal/min/ft^2
Apparent Opening	ASTM D-4751	20 US Sieve
Permittivity	ASTM D-4491	1.5 sec^{-1}

Type 2 (Low Flow):

Physical	Test Method	English
Grab Tensile	ASTM D-4632	315 x 300 lbs
Grab Elongation	ASTM D-4632	15 x 15 %
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	650 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	40 gal/min/ft^2
Apparent Opening	ASTM D-4751	40 US Sieve
Permittivity	ASTM D-4491	0.55 sec^{-1}

Construction Methods

Strictly adhere to the manufacturer's installation instructions and recommendations. Maintenance shall include regular daily inspections and after each qualifying rain event. The Fabric Insert Inlet Protection shall be emptied, cleaned and placed back into the basin when it reaches 50% capacity or as directed by the Engineer.

Measurement and Payment

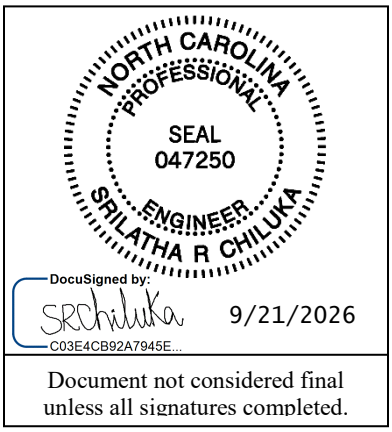
Fabric Insert Inlet Protection, Type __ will be measured and paid in units of each of the type specified, complete in place and accepted. Such payment shall be full compensation for furnishing and installing the *Fabric Insert Inlet Protection, Type* __ in accordance with this specification and for all required maintenance.

Fabric Insert Inlet Protection Cleanout will be measured and paid in units of each for the maintenance of the device, cleanout and disposal of accumulated sediments.

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Payment will be made under:

Pay Item	**Pay Unit**
Fabric Insert Inlet Protection, Type __	Each
Fabric Insert Inlet Protection Cleanout	Each



Document not considered final unless all signatures completed.

Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 24.2)

Prepared By: S. Chiluka
21-Sep-26

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1. 2024 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2024 Standard Specifications are revised as follows:

1.1. ELECTRICAL JUNCTION BOXES (1091-5)

Page 10-209, revise paragraphs beginning on line 26 to read "Provide electrical junction boxes with covers of the type and size indicated by the contract or plans for the termination of conduits. Boxes and covers shall meet all requirements and specifications of ANSI/SCTE 77. Structural load tests shall meet the Tier 15 application type.

Page 10-209, line 28, revise title of section 1091-5(B) from “Polymer Concrete (PC) Junction Boxes” to “Polymer Concrete (PC), Composite, and Thermoplastic Junction Boxes”.

Page 10-209, revise paragraphs beginning on line 29 through line 41 to read “For PC junction boxes, use polymer concrete material made of an aggregate consisting of sand and gravel bound together with a polymer and reinforced with glass strands to fabricate box and cover components.

Provide junction boxes which have bolted covers and open bottoms. Provide vertical extensions of 6 inches to 12 inches as required by project provisions.

Provide the required logo on the cover. Provide at least two size 3/8 inch diameter hex head stainless steel cover bolts to match inserts in the box. Provide pull slot(s) with stainless steel pin(s). Bodies of junction boxes shall be a single piece.

Polymer concrete, composite, and thermoplastic junction boxes are not required to be listed electrical devices.”

1.2. TRAFFIC SIGNAL ACTIVATION (1700-4)

Page 17-4, revise paragraph beginning on line 42 through line 46 to read “Prior to placing signal in the steady (stop-and-go) mode, the signal should be placed in yellow-red flashing mode for up to 7 days or as directed by the Engineer. Yellow-red flashing mode differs from the red-red flashing mode shown in the signal plan. Yellow-red flash mode includes flashing the yellow signal indications on all main street through movements while flashing the red signal indications on all side street signal heads and any left turn heads on the main street. The signal should not be placed in the steady (stop-and-go) mode on a Saturday or Sunday without prior approval from the Engineer. Do not place the signal in steady (stop-and-go) mode until inspected and without prior approval of the Engineer.”

2. SIGNAL HEADS

2.1. MATERIALS

A. General:

Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, wire outlet bodies, wire entrance fitting brackets and end caps when supplied as components of messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester

paint in highway **BLACK (Federal Standard 595C, Color Chip Number 37038)** a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware, rigid vehicle signal head mounting brackets for mast-arm attachments, messenger cable hanger components or balance adjuster components.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, "Enamel Heat Resisting, Instrument Black."

Where required, provide polycarbonate signal heads and visors that comply with the provisions pertaining to the aluminum signal heads listed on the QPL with the following exceptions:

Fabricate signal head housings, end caps, and visors from virgin polycarbonate material. Provide UV stabilized polycarbonate plastic with a minimum thickness of 0.1 ± 0.01 inches that is highway yellow (Federal Standard 595C, Color Chip 13538). Ensure the color is incorporated into the plastic material before molding the signal head housings and end caps. Ensure the plastic formulation provides the following physical properties in the assembly (tests may be performed on separately molded specimens):

Test	**Required**	**Method**
Specific Gravity	1.17 minimum	ASTM D 792
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength, yield, PSI	8500 minimum	ASTM D 638
Izod impact strength, ft-lb/in [notched, 1/8 inch]	12 minimum	ASTM D 256

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
   - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement

- Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
- Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

(Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,

3. Evidence of conformance with the requirements of these specifications,
4. A manufacturer's warranty statement in accordance with the required warranty, and
5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

Ensure LED traffic signal modules meet the performance requirements for the minimum period of 15 years, provide a written warranty against defects in materials and workmanship for the modules for a period of 15 years after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate messenger cable hanger components, wire outlet bodies and balance adjuster components from stainless steel or malleable iron galvanized in accordance with ASTM A153 (Class A) or ASTM A123. Provide serrated rings made of aluminum. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, hex-head bolts and associated nuts, clevis pins, cotter pins, U-bolt clamps and nuts from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 15 years and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules:

Provide modules in the following configurations: 12-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2024 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
12-inch green circular	15	15

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch circular module.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2024 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Pedestrian Signal Heads:

Provide pedestrian signal heads with international symbols that meet the MUTCD. Do not provide letter indications.

Comply with the ITE standard for "Pedestrian Traffic Control Signal Indications" and the following sections of the ITE standard for "Vehicle Traffic Control Signal Heads" in effect on the date of advertisement:

- Section 3.00 - "Physical and Mechanical Requirements"
- Section 4.01 - "Housing, Door, and Visor: General"
- Section 4.04 - "Housing, Door, and Visor: Materials and Fabrication"
- Section 7.00 - "Exterior Finish"

Provide a double-row termination block with three empty terminals and number 10 screws for field wiring. Provide barriers between the terminals that accommodate a spade lug sized for number 10 terminal screws. Mount the termination block in the hand section. Wire all signal sections to the terminal block.

Where required by the plans, provide 16-inch pedestrian signal heads with traditional three-sided, rectangular visors, 6 inches long.

Provide 2-inch diameter pedestrian push-buttons with weather-tight housings fabricated from die-cast aluminum and threading in compliance with the NEC for rigid metal conduit. Provide a weep hole in the housing bottom and ensure that the unit is vandal resistant.

Provide push-button housings that are suitable for mounting on flat or curved surfaces and that will accept 1/2-inch conduit installed in the top. Provide units that have a heavy duty push-button

assembly with a sturdy, momentary, normally-open switch. Have contacts that are electrically insulated from the housing and push-button. Ensure that the push-buttons are rated for a minimum of 5 mA at 24 volts DC and 250 mA at 12 volts AC.

Provide standard R10-3 signs with mounting hardware that comply with the MUTCD in effect on the date of advertisement. Provide R10-3E signs for countdown pedestrian heads and R10-3B for non-countdown pedestrian heads.

Design the LED pedestrian traffic signal modules (hereafter referred to as modules) for installation into standard pedestrian traffic signal sections that do not contain the incandescent signal section reflector, lens, eggcrate visor, gasket, or socket. Provide modules that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp. Use LEDs that are of the latest aluminum indium gallium phosphorus (AlInGaP) technology for the Portland Orange hand and countdown displays. Use LEDs that are of the latest indium gallium nitride (InGaN) technology for the Lunar White walking man displays. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

Design all modules to operate using a standard 3 - wire field installation. Provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard pedestrian signal housing. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Provide modules in the following configuration: 16-inch displays which have the solid hand/walking man overlay on the left and the countdown on the right, and 12-inch displays which have the solid hand/walking man module as an overlay. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2024 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all

exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

3. LED BLANKOUT SIGN

3.1. MATERIALS

Provide a message display that is a PCB matrix with a matte black solder mask with minimum thickness of 0.093 inches and a silk-screened component identifier. Mount LEDs on front of the PCB matrix. Mount all other components on the back of the black matrix. Ensure that a person with 20/20 vision can read a fully intensified, legible message from 500 feet in front of the sign under any light conditions. Ensure the message is not legible when the sign is off, even if in direct sunlight.

Depending on the color of the message, use LEDs that are the latest ALLnGaP and /or InGaN technology or better. Distribute the LEDs evenly. Connect the individual LED light sources so that failure of a single LED will result in a loss of no more than LEDs. Ensure the signal is still legible.

Protect and seal the rear side of the PCB with a molded polymeric back cover. Mount the display PCB with back cover into the front door, which consists of an aluminum frame and face lens. Provide a clear 0.25-inch, non-glare, matte finish polycarbonate lens with a UV resistant surface treatment. Ensure that the lens has light transmission properties equal to or greater than 80%.

Fabricate the weatherproof housing out of 0.125 inch aluminum with all corner seams welded their full length. Weld the full length of all corner seams using tungsten inert gas method. Install a terminal block that accommodates a spade lug sized for a number 10 terminal screw. Provide 4 terminals with each having 2 terminal screws that have a shorting bar between them. Fabricate an entrance for wires on top-center of the housing that is compatible to connect a standard traffic signal mounting gooseneck (wire entrance).

Provide a standard sun visor made of 1/16-inch aluminum. Paint the inside of the visor with 2 coats of dull black paint. Paint the exterior and interior of the sign case and the outside of the visor Federal Standard 595C yellow by the dry powder method. Apply the yellow finish by electrostatic spray and heat cure. Ensure the thickness of the finish is a minimum of 2.5 mils thick. Do not apply paint to the latching hardware.

Ensure that the LED current does not exceed the manufacturer's maximum current rating. Provide voltage surge protection to withstand high repetition noise transients and low repetition high energy transients as stated in section 2.1.6 of the NEMA Standard TS-2, 2021.

Ensure compatibility and proper triggering and operation with load switches and conflict monitors in signal controllers currently used by the Department. Ensure the on-board circuitry meets FCC title 47, sub-part B, section 15 regulations on the emission of electronic noise.

Design and certify the LED blank out sign to operate over a temperature range of –35ºF to 165ºF with an operating voltage range of 105 to 130 volts. Ensure that all electronic components are standard industry items that are available from wholesale electronics distributors. Provide components that are "solid state" type. Do not use electro-mechanical components.

4. CONTROLLERS

4.1. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS

Furnish detector sensor units that comply with Chapter 5 Section 1, "General Requirements," and Chapter 5 Section 2, "Model 222 & 224 Loop Detector Sensor Unit Requirements," of the CALTRANS "Transportation Electrical Equipment Specifications" dated March 12, 2009 with Erratum 1.

4.2. MATERIALS – TYPE 2070LX CONTROLLERS

Furnish model 2070LX controller units that conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010 and Errata 2 dated December 5, 2014) except as required herein.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070LX controllers with Linux kernel 2.6.18 or higher and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070-1C, CPU Module, Single Board, with 8Mb Datakey (blue in color)
- MODEL 2070-2E+, Field I/O Module (FI/O)
  - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is "off")
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP

Provide a Board Support Package (BSP) to the state and to any specified applications software manufacturer when requested by the state to facilitate the porting of application software.

4.3. ADDITIONAL CONSTRUCTION METHODS

In addition to the construction methods in the 2024 Standard Specifications, install new controller and/or conflict monitor in existing signal cabinet as directed by the plans.

4.4. MEASUREMENT AND PAYMENT

Payment will be made under:

2070LX Controller will be measured and paid for as the actual number of controllers furnished, installed, and accepted.

No separate payment will be made for the conflict monitor or other equipment related to the controller or cabinet as this will be considered incidental to furnishing and installing the 2070LX controller.

Pay Item Pay Unit
2070LX Controller .....Each

5. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS FOR TEMPORARY INSTALLATION

5.1. DESCRIPTION

Design, furnish, provide training, and install video imaging loop emulator detection systems with all necessary hardware for temporary traffic signals in accordance with the plans and specifications.

Unless otherwise specified in the contract, all loop emulator detection equipment will remain the property of the contractor.

5.2. MATERIALS

A. General:

Material and equipment furnished under this section must be pre-approved on the Department's QPL by the date of installation except miscellaneous hardware such as cables and mounting hardware do not need to be pre-approved.

Used equipment will be acceptable provided the following conditions have been met:

- Equipment is listed on the current QPL.
- Equipment is in good working condition.
- Equipment is to remain the property of the contractor.

Ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the loop emulation system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

Design and furnish video imaging loop emulator detection systems that detect vehicles at signalized intersections by processing video images and providing detection outputs to the signal controller in real time (within 112 milliseconds of vehicle arrival).

Furnish all required camera sensor units, loop emulator processor units, hardware and software packages, cabling, poles, mast arms, harnesses, camera mounting assemblies, surge protection panels, grounding systems, messenger cable and all necessary hardware. Furnish systems that allow the display of detection zones superimposed on an image of the roadway on a Department-furnished monitor or laptop computer screen. Ensure detection zones can be defined and data entered using a simple keyboard or mouse and monitor, or using a laptop PC with software.

Provide design drawings showing design details and camera sensor unit locations for review and acceptance before installation. Provide mounting height and location requirements for camera sensor units on the design based on site survey. Design video imaging loop emulator detection systems with all necessary hardware. Indicate all necessary poles, spans, mast arms, cables, camera mounting assemblies and hardware to achieve the required detection zones where Department owned poles are not adequate to locate the camera sensor units. Do not design for the installation of poles in medians.

Obtain the Engineer's approval before furnishing video imaging loop emulator detection systems. The contractor is responsible for the final design of video imaging loop emulator detection systems. Review and acceptance of the designs by the Department does not relieve the contractor from the responsibility to provide fully functional systems and to ensure that the required detection zones can be provided.

Provide the ability to program each detection call (input to the controller) with the following functions:

- Full Time Delay – Delay timer is active continuously,
- Normal Delay – Delay timer is inhibited when assigned phase is green (except when used with TS 2 and 170/2070L controllers),
- Extend – Call is extended for this amount of time after vehicle leaves detection area,
- Delay Call/Extend Call – This feature uses a combination of full time delay and extend time on the same detection call. Ensure operation is as follows: Vehicle calls are received after the delay timer times out. When a call is detected, it is held until the detection area is empty and

the programmed extend time expires. If another vehicle enters the detection area before the extend timer times out, the call is held and the extend time is reset. When the extend timer times out, the delay timer has to expire before another vehicle call can be received.

Provide the ability to program each detection zone as one of the following functions:

- Presence detector,
- Directional presence detector,
- Pulse detector,
- Directional pulse detector.

Ensure previously defined detector zones and configurations can be edited.

Provide each individual system with all the necessary equipment to focus and zoom the camera lenses without the need to enter the camera enclosure.

Provide systems that allow for the placement of at least 8 detection zones within the combined field of view of a single camera sensor unit. Provide a minimum of 8 detection outputs per camera.

Provide detection zones that can be overlapped. Ensure systems reliably detect vehicles when the horizontal distance from the camera sensor unit to the detection zone area is less than ten times the mounting height of the sensor. Ensure systems detect vehicles in multiple travel lanes.

Ensure systems can detect vehicle presence within a 98 to 102 percent accuracy (up to 2 percent of the vehicles missed and up to 2 percent of false detection) for clear, dry, daylight conditions, a 96 to 105 percent accuracy (up to 4 percent of the vehicles missed and up to 5 percent false detection) for dawn and dusk conditions, and a 96 percent accuracy (up to 4 percent of the vehicles missed) for night and adverse conditions (fog, snow, rain, etc.) using standard sensor optics and in the absence of occlusion.

Repair and replace all failed components within 72 hours.

The Department may conduct field-testing to ensure the accuracy of completed video imaging loop emulator detection systems.

B. Loop Emulator System:

Furnish loop emulator systems that receive and simultaneously process information from camera sensor units, and provides detector outputs to signal controllers.

Ensure systems provide the following:

- Operate in a typical roadside environment and meet the environmental specifications and are fully compatible with NEMA TS 1, NEMA TS 2, or Type 170/2070L controllers and cabinets,
- provide a “fail-safe” mode whereby failure of one or more of the camera sensor units or power failure of the loop emulator system will cause constant calls to be placed on the affected vehicle detection outputs to the signal controller,
- provide compensation for minor camera movement of up to 2 percent of the field of view at 400 feet without falsely detecting vehicles,
- process the video at a minimum rate of 30 times per second,
- provide separate wired connectors inside the controller cabinet for video recording each camera,
- provide remote video monitoring with a minimum refresh rate at 1 frame per second over a standard dial-up telephone line,

- provide remote video detection monitoring.

Furnish camera sensor units that comply with the following:

- have an output signal conforming to EIA RS-170 standard,
- have a nominal output impedance of 75 ohms,
- be immune to bright light sources, or have built in circuitry or protective devices to prevent damage to the sensor when pointed directly at strong light sources,
- be housed in a light colored environmental enclosure that is water proof and dust tight, and that conforms to NEMA-4 specifications or better,
- simultaneously monitor at least five travel lanes when placed at the proper mounting location with a zoom lens,
- have a sunshield attached to the environmental enclosure to minimize solar heating,
- meet FCC class B requirements for electromagnetic interference emissions,
- have a heater attached to the viewing window of the environmental enclosure to prevent ice and condensation in cold weather.

Where coaxial video cables and other cables are required between the camera sensor and other components located in the controller cabinet, furnish surge protection in the controller cabinet.

If furnishing coaxial communications cable comply with the following, as recommended by the approved loop emulator manufacturer:

- Number 20 AWG, solid bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor to the signal controller cabinet.
- Number 22 AWG, stranded bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor unit to the junction box, and within the signal controller cabinet.

Furnish power cable appropriately sized to meet the power requirements of the sensors. At a minimum, provide three conductor 120 VAC field power cable.

As determined during the site survey, furnish sensor junction boxes with nominal 6 x 10 x 6 inches dimensions at each sensor location. Provide terminal blocks and tie points for coaxial cable.

C. Video Imaging Loop Emulator System Support:

Furnish video imaging loop emulator systems with either a simple keyboard or a mouse with monitor and appropriate software, or with system software for use on department-owned laptop PCs. Ensure the system is Windows 2000 and Windows XP compatible.

Provide Windows 2000 and Windows XP compatible personal computer software, if needed, to provide remote video and video detection monitoring.

Ensure systems allow the user to edit previously defined detector configurations. When a vehicle is within a detection zone, provide for a change in color or intensity of the detection zone perimeter or other appropriate display changes on the Department-furnished monitor or laptop computer screen.

Provide cabling and interconnection hardware with 6-foot minimum length interconnection cable to interface with the system.

Provide all associated equipment manuals and documentation.

5.3. CONSTRUCTION METHODS

Arrange and conduct site surveys with the system manufacturer's representative and Department personnel to determine proper camera sensor unit selection and placement. Provide the Department at least 3 working days notice before conducting site surveys. Upon completion of the site surveys the Department will provide revised plans reflecting the findings of the site survey.

Before beginning work at locations requiring video imaging loop emulator detection systems, furnish system software. Upon activation of detection zones, provide detector configuration files. Ensure that up-to-date detection configuration files are furnished for various detection zone configurations that may be required for construction phasing.

Place into operation loop emulator detection systems. Configure loop emulator detection systems to achieve required detection in designated zones. Have a certified manufacturer's representative on site to supervise and assist with installation, set up, and testing of the system.

Install the necessary processing and communications equipment in the signal controller cabinet. Make all necessary modifications to install equipment, cabling harnesses, and camera sensor interface panels with surge suppression.

Perform modifications to camera sensor unit gain, sensitivity, and iris limits necessary to complete the installation.

Do not install camera sensor units on signal poles unless approved by the Engineer.

Install the necessary cables from each sensor to the signal controller cabinet along signal cabling routes. Install surge protection and terminate all cable conductors.

Relocate camera sensor units and reconfigure detection zones as necessary according to the plans for construction phases.

Provide at least 8 hours of training on the set up, operation, troubleshooting, and maintenance of the loop emulator detection system to a maximum of ten Department personnel. Arrange for training to be conducted by the manufacturer's representative at an approved site within the Division responsible for administration of the project. Thirty days before conducting training submit a detailed course curriculum, draft manuals and materials, and resumes. Obtain approval of the submittal before conducting the training. At least one week before beginning training, provide three sets of complete documentation necessary to maintain and operate the system. Do not perform training until installation of loop emulator detection systems is complete.

5.4. MEASUREMENT AND PAYMENT

Actual number of site surveys, arranged, conducted, and accepted.

Actual number of cameras without internal loop emulator processing units furnished, installed, and accepted.

Actual number of external loop emulator processing units furnished, installed, and accepted.

Actual number of camera sensor units relocated with detection zones reconfigured installed, and accepted.

No measurement will be made of video imaging loop emulator system support or training, power and video cables, and trenching as these items will be considered incidental to furnishing and installing video imaging loop emulator detection systems.

Payment will be made under:

Site Survey ..... Each

Camera without Internal Loop Emulator Processing Unit ..... Each

External Loop Emulator Processing Unit ..... Each
Relocate Camera Sensor Unit ..... Each

6. METAL POLE SUPPORTS

6.1. METAL POLES

A. General:

Furnish and install metal poles, grounding systems, and all necessary hardware. Work covered under this special provision includes requirements for design, fabrication, and installation of standard and custom/site-specific designed metal pole supports and associated foundations.

Comply with applicable sections of the *2024 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications*. Provide designs of completed assemblies with hardware equaling or exceeding AASHTO *LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 1st Edition, 2015 (hereinafter called 1st Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi-sided cross section with no less than six sides. The sides may be straight, convex, or concave.

For bid purposes, pole heights shown on plans are estimated from available data. Prior to furnishing metal poles, use field measurements and adjusted cross-sections to determine whether pole heights will meet required clearances. If pole heights do not meet required clearances, the Contractor should immediately notify the Engineer of the required revised pole heights.

Standard Drawings for Metal Poles are available that supplement these project special provisions. The drawings are located on the Department's website:

https://connect.ncdot.gov/resources/safety/Pages/TSMO-Design-Resources.aspx

Comply with article 1098-1(B) of the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide copies of detailed shop drawings for each type of structure as summarized below. Ensure shop drawings include material specifications for each component. Ensure shop drawings identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT**. Ensure shop drawings contain an itemized bill of materials for all structural components and associated connecting hardware.

Comply with article 1098-1(A) of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal or asset inventory number(s) and project number or work order number.

Summary of information required for metal pole review submittal:

Item	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal or ITS Plan/Loading Diagram	1 set	All structure design information needs to reflect the latest approved Signal or ITS plans
Custom Pole Shop Drawings	1 set	Submit drawings on 11" x 17" format media. Show NCDOT signal or asset inventory number(s), Contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project.
Standard Strain Pole Shop Drawings (from the QPL)	1 set	Submit drawings on 11" x 17" format media. Show NCDOT signal inventory number(s), Contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project.
Structure Calculations	1 set	Not required for Standard QPL Poles
Standard Strain Pole Foundation Drawings	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M8.
Custom Foundation Drawings	1 set	Submit drawings on 11" x 17" format media. Show NCDOT signal or asset inventory number(s), Contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1 set	**Submit copies of LPILE input, output, and pile tip deflection graph per Section titled Drilled Pier Foundations for Metal Poles of this specification for each foundation.** Not required for Standard Strain Poles (from the QPL)
Soil Boring Logs and Report	1 set	Report shall include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or Geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT signal or asset inventory number(s).

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Boring reports shall include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form. Incomplete submittals will be returned without review. The Reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials:

Fabricate metal pole from coil or plate steel that meet the requirements of ASTM A 572 Gr 55 or ASTM A 595 Grade A tubes. For structural steel shapes, plates, and bars use, as a minimum, ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent. Provide pole shafts of round or near round (18 sides or more) cross-section, or multi-sided tubular cross-section with no less than six sides, having a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single-ply plate or coil. For anchor base fabrication, conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Use the submerged arc process, or other NCDOT previously approved process suitable for shafts, to continuously weld pole shafts along their entire length. Finish the longitudinal seam weld flush with the outside contour of the base metal. Ensure shaft has no circumferential welds except at the lower end joining the shaft to the pole base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 1st Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications.* No field welding on any part of the pole will be permitted unless approved by a qualified Engineer.

After fabrication, hot-dip galvanize steel poles and all assembly components in accordance with section 1076-3 of the *Standard Specifications*. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Galvanize hardware in accordance with section 1076-4 of the *Standard Specifications*. Ensure threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing in accordance with section 1076-7 of the Standard *Specifications. Ensure* all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring the Designer/Fabricator specifies connecting hardware and/or materials that prevent a dissimilar metal corrosive reaction.

Ensure each anchor rod is 2-inch minimum diameter and 60-inch length. Provide 10-inch minimum thread projection at the top of the rod, and 8-inch minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials complying with SP09_R005, hereinafter referred to as *Foundations and Anchor Rod Assemblies for Metal Poles*.

Ensure anchor bolt hole diameters are ¼-inch larger than the anchor bolt diameters in the base plate.

Provide a circular anchor bolt lock plate securing the anchor bolts at the embedded end with two (2) washers and two (2) nuts. Provide a base plate template matching the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼-inch minimum thick steel with a minimum width of 4 inches. Hot-dip galvanizing is not required for both plates.

Provide four (4) heavy hex nuts and four (4) flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO

M293 or equivalent material. Ensure anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

For each pole, provide a grounding lug with a ½-inch minimum thread diameter, coarse thread stud and nut that will accommodate #4 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy stainless-steel chain that is long enough to permit cap to hang clear of the pole-top opening when cap is removed.

Where required by the plans, furnish couplings 42 inches above bottom of the pole base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1½-inch internally threaded half-couplings complying with the NEC, mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required hot-dip galvanizing. Provide a threaded plug in each mounting point. Ensure the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed slot that will accommodate a ½ "drive standard socket wrench.

Metal poles may be erected and fully loaded after concrete has attained a minimum allowable compressive strength of 3,000 psi.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

When field drilling is necessary for wire or cable entrances into the pole, comply with the following requirements:

- Do not drill holes within 2 inches of any welds.
- Do not drill any holes larger than 3 inches in diameter without checking with the ITS & Signals Structure Engineers.
- Avoid drilling multiple holes along the same cross section of tube shafts.
- Install rubber grommets in all field drilled holes that wire, or cable will directly enter unless holes are drilled for installation of weather heads or couplings.
- Treat the inside of the drilled holes and repair all galvanized surfaces in accordance with Section 1076-7 of the latest edition of the *Standard Specification prior to installing grommets, caps, or plugs.*
- Cap or plug any existing field drilled holes that are no longer used with rubber, aluminum, or stainless-steel hole plugs.

Install a ¼-inch thick plate for a concrete foundation tag to include the following information: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation. Install galvanized wire mesh to cover gap between the base plate and top of foundation for debris and pest control. Refer to standard drawing M7 for further details.

Immediately notify the Engineer of any structural deficiency that becomes apparent in any assembly, or member of any assembly, because of the design requirements imposed by these specifications, the plans, or the typical drawings.

C. Design:

Unless otherwise specified, design all metal pole support structures using the following 1st Edition AASHTO specifications:

- Use 700-Year MRI and 10-Year MRI wind pressure maps developed from 3-second gust speeds, as provided in Section 3.8.
- Ensure metal pole support structures include natural wind gust loading and truck-induced gust loading for fatigue design, as provided in Sections 11.7.1.2 and 11.7.1.3, respectively. Designs need not consider periodic galloping forces.
- Assume 11.2 mph natural wind gust speed in North Carolina. For natural wind fatigue stress calculations, utilize a drag coefficient (C_d) based on the yearly mean wind velocity of 11.2 mph.
- When selecting Fatigue Importance Factors, utilize Fatigue Importance Category II, as provided for in Table 11.6-1, unless otherwise specified.
- Calculate all forces using applicable equations from Section 5. The Maximum allowable force ratio for all metal pole support designs is 0.9.
- Conform to Sections 10.4.2 and 11.8 for deflection requirements.
- Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of the cable bundle is 1.3 inches.

Unless otherwise specified by special loading criteria, the following computed surface area for ice load on signal heads shall be used:

- 3-section, 12-inch, Surface area: 26.0 ft^2
- 4-section, 12-inch, Surface area: 32.0 ft^2
- 5-section, 12-inch, Surface area: 42.0 ft^2

Design a base plate for each pole. The minimum base plate thickness for all poles is determined by the following criteria:

Case 1 Circular or rectangular solid base plate with the upright pole welded to the top surface of base plate with full penetration butt weld, where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt is $M = (P \times D_1) / 2$, where

M = bending moment at the critical section of the base plate induced by one (1) anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two (2) adjacent critical sections is considered ineffective.

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two (2) lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two (2) adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For all metal poles, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M3 or M4.

The Professional Engineer is wholly responsible for the design of all poles. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his or her responsibility.

D. Strain Poles:

Refer to Metal Pole Standard Drawing Sheets M2 and M3 for fabrication details.

Provide two (2) messenger cable (span wire) clamps and associated hardware for attachment of messenger cable. Ensure diameter of the clamp is appropriate to its location on the pole and is appropriately designed for adjustment from 1'-6" below the top, down to 6'-6" below the top of the pole. Do not attach more than one (1) support cable to a messenger cable clamp.

Provide a minimum of three (3) 2-inch holes equipped with an associated coupling and weatherhead on the messenger cable load side of the pole to accommodate passage of signal cables from inside the pole. Provide galvanized threaded plugs for all unused couplings at pole entrance points. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Provide designs with a 6" x 12" hand hole with reinforcing frame for each pole.

Provide a terminal compartment with cover and screws in each pole encompassing the hand hole and containing a 12-terminal barrier type terminal block. Provide two (2) terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole base.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheets M2 and M3.

Provide grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Where required, use threaded leveling nuts to establish rake.

E. Mast Arm Poles:

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details.

Fabricate metal arm shaft from coil or plate steel that meet the requirements of ASTM A 595 Grade A tubes. Provide arm shafts of round or near round (18 sides or more) cross-section, or multi-sided tubular cross-section with no less than six sides, having a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single-ply plate or coil, eliminating circumferential weld splices.

Use the submerged arc process, or other NCDOT previously approved process suitable for arm shafts, to continuously weld arm shafts along their entire length. The longitudinal seam weld shall be finished flush to the outside contour of the base metal. Ensure arm shaft has no circumferential welds except at the lower end joining the shaft to the arm flange plate. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 1st Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except no field welding on any part of the arm shaft will be permitted unless approved by a qualified Engineer.

After fabrication, hot-dip galvanize steel arm shafts and all assembly components per section 1076 of the *Standard Specifications*. Design arm shafts with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on steel arm shafts that meets or exceeds ASTM Standard A-123, AASHTO M111, or an approved equivalent. Perform repair of damaged galvanizing that complies with the following *Standard Specifications* article:

Repair of Galvanizing.....Article 1076-7

Ensure metal arm shafts permit cables to be installed inside arm shafts. For holes in arm shafts used to accommodate cables, provide full-circumference grommets. Wire access holes for arm flange plates should be deburred, non-grommeted, and oversized to fit around 4-inch diameter grommeted wire access holes for shaft flange plates.

Provide a minimum of four (4) 1-1/2” diameter high strength bolts for connection between arm plate and pole plate. Increase number of bolts to a minimum of six (6) 1-1/2” diameter high strength bolts when arm lengths are greater than 50’-0” long.

Provide designs with a 6” x 12” hand hole with reinforcing frame for each pole.

Provide a terminal compartment with cover and screws in each pole encompassing the hand hole and containing a 12-terminal barrier type terminal block. Provide two (2) terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole base.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheets M2 and M4.

Provide a removable end cap with stainless steel attachment screws for the end of each mast arm. Ensure cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to arm with a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cap to hang clear of arm end opening when cap is removed.

Provide pole flange plates and associated gussets and fittings for attachment of required mast arms. As part of each mast arm attachment, provide a cable passage hole in pole to allow passage of cables

from pole to arm. Provide a grommeted 4-inch diameter cable passage hole on the shaft side of the connection to allow passage of cables from pole to arm.

Furnish all arm plates and necessary attachment hardware, including bolts and brackets.

Provide two (2) extra bolts for each arm.

Provide arms with weatherproof connections for attaching to the pole shaft.

Provide hardware that is galvanized steel, stainless steel, or corrosive-resistant aluminum.

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Where required, use threaded leveling nuts to establish rake.

Install horizontal-type arms with a manufactured rise preventing arm from deflecting below arm attachment height.

Ensure maximum angular rotation of the top of mast arm pole does not exceed 1 degree 40 minutes (1°40'). Ensure allowable mast arm deflection does not exceed that allowed per 1st Edition AASHTO. For all load combination limit states specified under Section 3 of 1st Edition AASHTO, restrict tip of fully loaded arm from going below arm attachment point with the pole.

6.2. DRILLED PIER FOUNDATIONS FOR METAL POLES

Analysis procedures and formulas shall be based on AASHTO 1st Edition, latest ACI-318 code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers must have prior approval from NCDOT. The Department reserves the right to accept or reject any method used for the analysis.

Ensure deflection at top of foundation does not exceed 1 inch for worst-case (Service Limit State) lateral load.

Use LPILE Plus V6.0 or later for lateral analysis. Submit inputs, results and corresponding graphs with the design calculations.

Calculate skin friction using the α-method for cohesive soils and the β-method for cohesion-less soils (**Broms method will not be accepted**). Detailed descriptions of the "α" and "β" methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5 feet for cohesive soils when calculating skin friction.

Assume a hammer efficiency of 0.70 unless value is provided.

Design custom foundations to carry maximum capacity of each metal pole. For standard case strain poles with custom design, use actual shear, axial and moment reactions from the Standard Strain Pole Foundation Selection Table shown on Standard Drawing No. M8.

When poor soil conditions are encountered, which could create an excessively large foundation design, consideration may be given to allow an exemption to the maximum capacity design. The Contractor must gain approval from the Engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, the Contractor should have foundation designs approved before releasing poles for fabrication.

Have the Contractor notify the Engineer if the proposed foundation is to be installed on a slope other than 8H: 1V or flatter.

A. Description:

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard strain pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard strain pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standard Drawings and Section B4 (Non-Standard Foundation Design) below. If non-standard site-specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheet M8. Failure to conform to this requirement will be grounds for rejection of the design.

If the Contractor chooses to design a non-standard foundation for a standard strain pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation. Any additional cost associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination:

1. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25-foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any two consecutive 6-inch intervals.
- A total of 50 blows have been applied with < 3-inch penetration.

Describe each pole location along the project corridor in a manner that is easily discernible to both the Contractor's Designer and NCDOT Reviewers. If the pole is at an intersection, label the boring the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*), *(Street Name)*, _____ County, Signal or Asset Inventory No. _____". Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection.

If the pole location is located between intersections, provide a coordinate location and offset, or milepost number and offset. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (hand-written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, hammer efficiency, depth of water table and a general description of the soil types encountered using the AASHTO Classification System.

Borings that cannot be easily correlated to their specific pole location will be returned to the Contractor for clarification; or if approved by the Engineer, the foundation may be designed using the worst-case soil condition obtained as part of this project.

3. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{N_{@1'} + N_{@2.5'} + \cdots + N_{@Deepest\ Boring\ Depth}}{Total\ Number\ of\ N\ values}$$

$$Y = (N_{@1'})^2 + (N_{@2.5'})^2 + \cdots + (N_{@Deepest\ Boring\ Depth})^2$$

$$Z = N_{@1'} + N_{@2.5'} + \cdots + N_{@Deeepest\ Boring\ Depth}$$

$$N_{STD\ DEV} = \sqrt{\left(\frac{(Total\ Number\ of\ N\ values\ \times Y) - Z^2}{(Total\ Number\ of\ N\ values) \times (Total\ Number\ of\ N\ values - 1)}\right)}$$

Design N-value equals lesser of the following two conditions:

$$N_{AVG} - (N_{STD\ DEV} \times 0.45)$$

OR

$$Average\ of\ First\ Four\ (4) N\ values = \frac{N_{@1'} + N_{@2.5'} + N_{@5'} + N_{@7.5'}}{4}$$

Note: If less than four (4) N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero (0) for weight of hammer or weight of rod. If N-value is greater than fifty (50), reduce N-value to fifty (50) for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Strain Pole Foundations Chart (sheet M8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) along with pole loading diagrams from the plans to the Contractor-selected pole Fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than four (4).

- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation Designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

https://connect.ncdot.gov/resources/safety/Pages/TSMO-Design-Resources.aspx

If assistance is needed, contact the Engineer.

4. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test). Design drilled piers for side resistance in accordance with Section 10.8 of the *2014 AASHTO LRFD Bridge Design Specifications, 7th Edition*. Use computer software LPILE version-6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use computer software gINT V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter resulting in horizontal lateral movement less than 1 inch at top of the pier, and horizontal rotational movement less than 1 inch at the edge of pier. Contact the Engineer for pole loading diagrams of standard poles used for non-standard foundation designs. Submit non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction:

Construct drilled pier foundation and Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Standard Special Provision SP09-R005 located at:

https://connect.ncdot.gov/resources/Specifications/Pages/2024-Specifications-and-Special-Provisions.aspx

6.3. POLE NUMBERING SYSTEM-NEW POLES

Attach an identification tag to each pole shaft section as shown on Metal Pole Standard Sheet M2 "Typical Fabrication Details for All Metal Poles."

6.4. MEASUREMENT AND PAYMENT

Actual number of metal strain signal poles (without regard to height or load capacity) furnished, installed and accepted.

Actual number of designs for metal strain poles furnished and accepted.

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of designs for mast arms with metal poles furnished and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing Traffic Signal , CCTV or MVD support structures.

Payment will be made under:

Metal Strain Signal Pole ..... Each
Metal Strain Pole Design ..... Each
Metal Pole with Single Mast Arm ..... Each
Mast Arm with Metal Pole Design ..... Each
Soil Test ..... Each
Drilled Pier Foundation ..... Cubic Yard

7. PROTECTIVE COATING FOR METAL POLES

7.1. GENERAL

This special provision is intended for use as an additional treatment to metal traffic signal structures installed in areas where maintaining an aesthetic appearance is important and specified in the project documents. The provision contains all of the requirements necessary to accomplish this additional treatment to galvanized steel traffic signal structures fabricated by a steel manufacturer using their local powder coating/paint facility and includes the material and shop certification requirements. The provision also contains pay items for protective coating treatment to aluminum signal and pedestrian pedestals that are Standard Specification items (See Section 1743 and associated Standard Drawings). These aluminum pedestals are on the Qualified Product List (QPL), and as such would not likely be powder coated at the same facility and thus not bound by the material certification requirements in this provision. In this case, the pedestal supplier should comply with Type 6 – Supplier's Certification as defined in Section 106-3 of the Standard Specification.

7.2. DESCRIPTION

Protective coating for metal poles is a supplemental durable color coating that is applied to galvanized steel and aluminum traffic signal structures. Powder Coating is the preferred supplemental protective coating process for coating galvanized steel and aluminum structures. However, for the purposes of this special provision, an Acrylic Primer and topcoat paint system is included as an acceptable alternative when protective color coating is required.

Provide protective coating over galvanization for all steel poles including all necessary hardware in accordance with the plans and specifications.

7.3. MATERIALS

With the exception of aluminum components, furnish all metal poles with galvanic protection along with a tough and durable application of protective coating. Aluminum components shall have a durable powder coating application. Galvanization is not required for aluminum components.

Furnish pole caps that have a low gloss powder finish applied over a hot-dipped galvanized surface. Comply with the applicable provisions of Section 442-10 and 442-13 of the 2024 Standard Specifications.

Ensure the selected color for protective coating has been verified and approved by the Engineer prior to fabrication.

7.4. FACILITY APPROVAL

The Department maintains an approved producer/supplier listing for various facility types associated with this work, which include powder applicator (PA), structural steel galvanizer (SSG), and structural steel shop coating facilities (SCF). A complete list of approved facilities can be found

at the following weblink: https://apps.ncdot.gov/vendor/ApprovedProducts/Producer.aspx Approve the coating shop facility prior to the application of any coating process. Submit all new facility requests, procedures, and documents electronically to:

Materials and Test
1801 Blue Ridge Road
Raleigh, NC 27607
Attn: Manufactured Products Engineer

Powder Coating Shop Approval

A) Submit a quality control procedure that the company has established to ensure a quality and durable coating. The quality control procedure shall contain at a minimum the following:
   - Qualified / Certified personnel to manage the QC Program and to conduct Quality Control tests
   - Qualified / certified coaters
   - Source and type of powder
   - How the powder will be stored
   - Powder application facility (heated or unheated)
   - Surface pre-treatment
   - Surface preparation including profile
   - Application methods
   - Curing conditions (conventional or infrared)
   - Curing Temperature
   - Adhesion & Holiday Detection
   - Repair Procedure
   - Storage and protection of coated items
   - Shipping and handling (packing, protection, and wrapping)

B) Submit a powder certification from the manufacturer

C) Submit the following to the Chemical Testing Engineer a minimum of four weeks prior to coating application.
   1. Two test panels of ASTM A36 steel, ¼ or greater in thickness measuring 8 inches by 11 inches using the proposed color of the final coat; a powder coated over galvanized test panel and a powder coated over un-galvanized test panel.
   2. In addition, provide two (2) samples of the same or comparable material and thickness as production pieces. Ensure production piece replicas do not exceed twelve inches (12”) in length and width nor 50 pounds in weight.
   3. Submit all test panels with inspection reports and records according to *Standard Specifications*, Section 442, Section 1072, Section 1076, and Section 1080.

4. Acceptance of the panels is determined by meeting the requirements of ASTM D-4541 of 800 psi for both galvanized and un-galvanized and production piece test panels.
5. Send all panels to:

   Materials and Tests Unit
   1801 Blue Ridge Road
   Raleigh, NC 27607
   Attn: Chemical Lab

7.5. POWDER COATING

A. Galvanizing

Galvanize steel products in accordance with Section 1076 of the Standard Specifications. Ensure the fabricator or designated representative(s) that is supplying the components to be galvanized communicates with the galvanizer to indicate that the galvanized pieces will be powder coated to avoid water or chromate quenching.

B. Surface Preparation

Comply with manufacturer's recommended surface coating specifications, Steel Structure Painting Council (SSPC) specifications and applicable articles of Section 442 (Painting Steel Structures) of the Standard Specifications. Ensure that surface preparations and treatments are performed and meet the requirements of the above referenced specifications.

Some pole components, specifically steel plates ¾ inches or more in thickness, may need blast cleaning prior to structure assembly to remove impurities and non-metallic foreign materials. Mechanically remove all weld flux after structure is assembled

Degrease and prepare steel structure for zinc coating after assembly using full immersion baths and pickling processes in heat controlled caustic and acid solutions. Rinse and clean structure to remove caustic or acid solutions by immersion in a circulating fresh water bath. Immerse structure in a heat controlled concentrated zinc ammonium chloride flux solution and air dry as a final prep before hot-dip galvanization.

Ensure that the surface preparation is no less than specified by the powder manufacturer's recommendations. Prepare all components to be coated in accordance with SSPC SP-2 (Hand Tool Cleaning) and/or SSPC SP-3 (Power Tool Cleaning). Remove all drainage spikes, high spots, protrusions or other surface defects using hand or power tools. Do not remove the galvanization below the limits set forth in AASHTO M111.

Remove grease, oils, moisture, scale, rust or any other foreign matter prior to powder coating to ensure ideal adhesion and coating performance. Prepare and coat the galvanized surface as soon as possible after the galvanization process.

C. Powder Coating Application and Curing

Prepare galvanized finish for powder coating by brush blasting in accordance with SSPC-SP7. Ensure all threaded components of the structure are protected from damage during blasting process.

Use thermosetting powder resin that meets 5A or 5B classifications of ASTM D3359. Apply powder coating electrostatically. Follow manufacturer's recommended preheating requirements. Ensure the topcoat finish is applied uniformly to all surfaces with a dry film thickness of between 3.0 to 5.0 mils. Cure the topcoat by heating the structure to manufacturer recommended temperatures at the duration required to ensure complete and uniform bond.

D. Quality Control

Ensure the applicator provides all test reports and documentation and inspects all coated material as outlined in the Standard Specifications, Section 442, Section 1072, Section 1076, and Section 1080. Ensure the quality control inspection is kept separate from the production functions.

E. Storage, Shipping, and Handling

Store all powder coated material inside or as directed by the Engineer.

Protect the product from incurring damage during all shipping, handling, and storing activities. Do not store the product directly on the ground or in areas where water may pool; the Engineer determines the effectiveness of all storage, shipping and handling methods.

F. Repair of Powder Coated Material

Repair all damage to the coating by the original method of application as outlined in the coating facility's repair procedure. Ensure all repair areas meet the original requirements for adhesion as stated in this Project Special Provision.

Photograph, document, and report all damages upon delivery to the project site prior to unloading. Provide documented damage notifications to the Engineer or to their authorized representative so the application firm can be notified. The Engineer has the authority to accept or reject the material as outlined in the Standard Specifications.

Submit to the Engineer a repair procedure for damaged coatings which occur during storage, transporting, handling and or installation. Utilize a liquid paint approved by the Department, compatible with the powder applied product. Ensure all repair areas demonstrate an adhesion rating of 400 psi in accordance with ASTM D-4541. Obtain Engineer's acceptance of the final finish.

7.6. ACRYLIC PRIMER AND TOPCOAT PAINT SYSTEM

A. Description

Follow NCDOT procedures for Powder Coating over Galvanizing. Provide an Acrylic Primer and topcoat when a substitute for powder coating is necessary.

Provide supplemental coating for all mast arms with metal signal poles and all necessary hardware for the signalized intersection in accordance with the Structural Steel Shop Coatings Program, NCDOT Standard specifications – sections 442 and 1080, as contained herein, and as shown on the plans. The Structural Steel Shop Coatings Program can be found at the following link: https://connect.ncdot.gov/resources/Materials/MaterialsResources/Structural%20Steel%20Shop%20Coatings%20Program.pdf

Ensure all painting work for new structures, except field touch-up and bolt painting is performed in the shop.

Coatings Shop Approval

Use only NCDOT approved shop coating facilities meeting the requirements outlined in the current edition of the Structural Steel Shop Coatings Program. This program is available on the Materials and Tests website. Structural Steel Shop Coatings Program.pdf (ncdot.gov)

Provide shop certification in accordance with the Structural Steel Shop Coatings Program (Shop facilities that are currently certified and in good standing with the American Institute Steel Construction (AISC) / Sophisticated Paint Endorsement (SPE) and/or the Society of Protective Coatings (SSPC) Qualification Procedure Three (QP-3).

B. Surface Preparation

Ensure all surface preparation is not less than that specified by the paint manufacturer's recommendations.

Clean galvanized surfaces to be painted with a 2,500-psi pressure washer. Allow surfaces to dry completely before beginning surface preparation.

Ensure all components to be coated are prepared in accordance with SSPC SP2 (Hand Tool Cleaning and or SSPC SP-3 (Power Tool Cleaning). Smooth high spots and rough edges, such as metal drip lines, of galvanized surfaces in accordance with ASTM D6386. Do not remove the galvanization below the limits set forth in AASHTO M111.

Perform abrasive sweep blasting in accordance with ASTM D6386. Refer to this section for a description of the abrasive blast material to be used. Use a material and technique capable of stripping action to remove corrosion products and to provide a rough surface profile while leaving base zinc layers intact.

Blow down all blasted surfaces with clean compressed air to provide a clean, dry surface.

Ensure all surfaces are free of visible zinc oxides or zinc hydroxides.

C. Materials

Use an approved/qualified waterborne paint meeting the requirements of NCDOT Standard specification section 1080. Do not apply paint until each batch has been tested by the Department. Provide color as specified in the contract documents.

Ensure all paint used on this contract is produced by the same manufacturer.

D. Painting

Apply paint in accordance with the requirements of the Structural Steel Shop Coatings Program, Section 442 and Section 1080 of the *Standard Specifications* as modified herein.

System for Paint over Galvanize
Acrylic Primer and Topcoats

Coat	Material	Mils Dry/Wet Film Thickness	Mils Dry/Wet Film Thickness
		Minimum	Maximum
Primer	1080-9 White	3.0 DFT	5.0 DFT
Stripe	1080-9 *	4.0 WFT	7.0 WFT
Topcoat	1080-9 *	2.0 DFT	4.0 DFT
Total		5.0 DFT	9.0 DFT

***Ensure the selected color for protective coating has been verified and approved by the Engineer prior to fabrication.**

The time between blast and coating application shall be in accordance with ASTM D6386 time requirements. In no case shall the prepared surface extend beyond 8 hours.

Mask off and do not paint all data plates and faying surfaces prior to application.

Spray apply all coatings except for the stripe coat. Brush apply the stripe coat to all plate edges, welds, bolt holes and bolts prior to applying the finish coat.

E. Curing

Follow manufacturer recommendations.

F. Inspection

Quality Control shall conduct the required quality control tests as outlined in the Structural Steel Shop Coatings Program and report the minimum information required by the appropriate ASTM test methods. At a minimum, quality control forms shall be on company letterhead with logo that provides a daily inspection report form equivalent to the information required on the M&T-611 Form. The M&T-611 Form can be found in the Structural Steel Shop Coatings Program. Dry Film Thickness (DFT) measurements shall be obtained on all coating layers, including the galvanized layer and shall incorporate the use of a Type 2 gauge as defined in SSPC PA-2.

Ensure all material is of a uniform appearance free of runs, drips, and sags.

G. Handling

Do not handle, ship, or erect coated members until paint is thoroughly dry.

Protect all shipping and handling either from the coating facility to project site and or storage site to area(s) to construction location from incurring damage to product. Wood blocks and nylon slings are recommended for securing, loading, hoisting or storing members.

H. Repair of Damaged Coating

Repair damage occurring to the galvanized portion of the coating during shipment or installation in accordance with Articles 1076-7 and 1080-7 of the *Standard Specifications*. Repair damage occurring to the painted portion of the coating during shipment or installation by applying 4.0-7.0 wet mils of topcoat with a brush or roller and feather or taper this to be level with the surrounding areas.

7.7. MEASUREMENT AND PAYMENT

Actual number of strain poles with protective coating applied furnished, installed, and accepted.

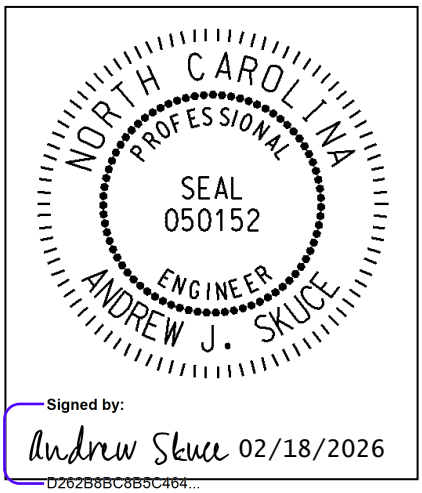
Actual number of single mast arm poles with protective coating applied furnished, installed, and accepted.

Actual number of signal TYPE I pedestals with protective coating applied furnished, installed, and accepted.

Actual number of signal TYPE II pedestals with protective coating applied furnished, installed, and accepted.

Payment will be made under:

Protective Coating for Strain Pole (BLACK) .....Each
Protective Coating for Single Mast Arm Pole (BLACK) .....Each
Protective Coating for TYPE I Pushbutton Post (BLACK).....Each
Protective Coating for TYPE II Signal Pedestal (BLACK).....Each



PORTABLE CCTV CAMERA AND TRAILER PROJECT SPECIAL PROVISIONS

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1. Portable CCTV Camera and Trailer

1.1 Description

Furnish, install, operate, maintain, relocate and remove a Portable CCTV Camera, designed to be towed by a ½ ton and ¾ ton pickup truck and erected in work zones and on roadside right of ways for remote video monitoring and incident management. Ensure the CCTV Camera equipment is fully compatible with all features of the existing video management software currently in use by NCDOT in this region and at the State Traffic Operations Center (STOC).

Furnish, deploy, install, test, integrate and make fully operational the new Portable CCTV Camera assembly at the location described or shown in the Plans and/or as directed by the Engineer. Contact the Engineer to confirm the Portable CCTV Camera assembly location prior to deploying in the field.

Each unit shall be new, and of the latest design of a model in current production or an update of an existing model. Prototype equipment will not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

The Department will provide a cellular modem to establish the communications link between the Portable CCTV Camera and the State Traffic Operations Center (STOC).

2. Trailer

The trailer shall be specifically designed to support and secure the Portable CCTV assembly, photovoltaic power source and other systems both in a deployed and travel position. It shall be capable of being towed at 65 miles per hour over extensive distances. Provide trailers that comply with Federal Motor Safety Regulations 393.

2.1 Trailer Construction

The frame including the trailer tongue shall be designed, constructed, and rated for the full capacity of the trailer. The frame shall be constructed of 3” x 3” and 3” x 5” square steel tubing (ASTM A36) with a minimum of 3/16 inch wall thickness and welded in accordance with applicable American Welding Society (AWS) standards. If counterweights are required, they shall be incorporated as an integral part of the frame. Provide a mast support assembly that will safely support the camera mount and CCTV Camera when they are not deployed, and the trailer is in travel mode and when the camera mount and CCTV Camera are deployed. Provide the trailer with heavy-duty fenders capable of supporting a

minimum of 200 lbs. Ensure the fenders are designed to minimize road surface water and debris from being thrown up on to the trailer equipment when being transported.

The towing tongue or drawbar shall be removable and and shall include a 2-inch ball hitch. The trailer shall tow level when attached to a 2-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Provide an electrical connector for separation of the trailer safety lighting system where the trailer tongue connects to the trailer. Ensure the trailer tongue is rated for 6,000 lbs. Provide a tongue jack stand will be heavy-duty; swivel mount castor wheel type design with a 1,200 lb. capacity (minimum). Ensure the tongue jack stand can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

Safety chains shall be provided, of adequate length, meeting SAE J-697 Standard, latest edition. Chain shall be a minimum of 5/16", and meet the National Association of Chain Manufacturer's (NACM) welded chain standard rating of Grade 70 with a Working Load Limit of 4700 lbs.

The trailer, springs and axels shall be rated for 2,500 lbs. and supplied with 15" (minimum) radial tires. Total combined load rating of the tires and wheels shall exceed the GVWR of the unit. Load ratings shall be determined by reference to the current yearbook of the Tire and Rim Association, Inc., or the manufacturer's published load rating. Tire ratings shall be calculated at 65 mph.

Trailer GVWR shall not exceed 2,500 lbs. so a trailer braking system shall not be required. The trailer must not require any special towing package, electric brakes or specialized heavy-duty truck to tow.

The trailer shall include a leveling system to allow for the trailer to be in a stable and level position when the jack legs are deployed. The trailer shall be equipped with (4) four crank style leveling jacks, one at each corner of the trailer that extend straight down with adequate lifting capacity and a large steel footpad to level and stabilize the trailer. Ensure the leveling jacks can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

2.2 Lights/Reflectors and Safety Markings

The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

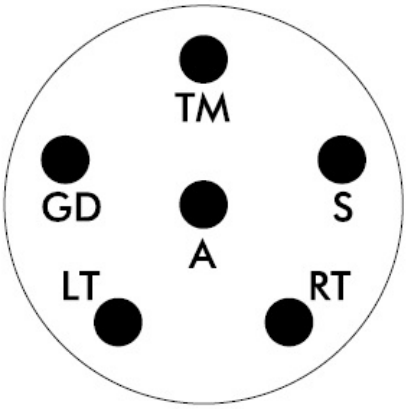
An illuminated license plate holder will be mounted so that a license plate is protected and does not extend past sides of fenders.

The trailer sides and rear shall be marked with continuous red/white striped retroreflective tape in a pattern meeting applicable NHTSA (DOT) regulations using certified retroreflective material meeting ASTM D4956. The tape must be 3 inches wide and installed in a repeating pattern of 11 inches long (red) followed by 7 inches long (white).

Provide a standard 6-way plug and receptacle connector, equal to and interchangeable with a Velvac 055049 assembly, and a heavy-duty jacketed multi-conductor cable shall be furnished for connecting the truck and trailer wiring system. All wiring shall be properly protected and secured. The receptacle shall be furnished loose, while the cable and plug shall be attached to the trailer in sufficient length to reach a

truck-mounted receptacle, additionally provide an intermediate electrical connector where the wiring harness leaves the removeable tongue and the trailer body. The plug shall be connected to the trailer wiring system in accordance with the following drawing:

6–Way Trailer Connection



Letter Code	Trailer Color Code
GD – Brake Wire Ground	WHITE
TM – Tail & Marker Lamp	BLACK
S – Stop Lamp	RED
RT – Right Turn Signal	GREEN
LT – Left Turn Signal	YELLOW
A – Live Brake Wire	BROWN

2.3 Solar Power System

The CCTV Camera shall be powered by a photovoltaic system consisting of photovoltaic panels, deep-cycle batteries, solar charge controller and ancillary equipment and wiring. Under normal conditions, the power system should automatically recharge the battery system with no manual intervention. A motorized power supply requiring fossil fuels (i.e. gas, diesel generators, etc.) is not acceptable, however the system shall be designed and supplied with a NEMA L6-20 locking receptacle in an outdoor rated enclosure to allow for use of a stand-by generator or land-power (120V, single phase) when necessary. Land-Power can be used to charge the batteries when the units are in storage.

The unit shall satisfactorily operate in all weather conditions between -40 degrees F and +165 degrees F.

A bank of batteries forming a 12 VDC system shall power the unit during standard operations. The battery bank shall consist of of 6 VDC deep cycle heavy duty lead/acid batteries wired in series/parallel as to form a 12 VDC system. Warranty service for the power source batteries shall be locally available on a nationwide basis.

The charging system for a trailer mounted device shall be solar, consisting of a photovoltaic array supplying electrical energy to the batteries through a solar regulator. The system shall provide “on demand” charging consistent with battery condition and with the ambient solar luminance at the photovoltaic array. The trailer shall also be equipped with a standard 120 VAC receptacle as well as a temperature-stable 120 VAC battery trickle charger and ammeter. The 120 VAC charging system shall initiate charging automatically when 120 VAC service is connected and shall be capable of completely charging the battery pack within a 24 to 48-hour time period. The actual charging time will vary depending upon conditions and state of charge/discharge of the batteries.

A Maximum Power Point Tracking (MPPT) solar charge controller shall be provided and solar charging circuitry shall include voltage regulators and automatic battery temperature compensation control circuitry components to prevent battery overcharging. Batteries shall be of the, deep-cycle golf cart type/acid batteries (BCI Group GC-2) type. Ensure the battery capacity is adequate to operate the

CCTV Camera continuously for at least 20 days with no external charging (no sunlight). Additionally, provide a trickle charger circuitry to allow for standby generator or Land-Power operation when necessary. The system shall have the ability to remotely disconnect the power to the camera load when the available operating power falls below a specified threshold voltage.

The photovoltaic panels shall be mounted to the trailer structure in a rigid steel frame. The photovoltaic panel assembly shall be designed with tilt and rotation capabilities. For travel, ensure that the photovoltaic panel assemble is mounted so as not to interfere with the mast and camera. The panels and panel assembly shall be attached using anti-theft fasteners. Panels must have tempered glass faces and be sealed.

The vendor, upon request, must provide solar panel specifications including dimensions, voltage, wattage and the number of panels and cells to be used. Additionally, the vendor must provide load calculations for the photovoltaic power system to operate the CCTV Camera and its supporting components in accordance with these specifications.

Loads for NCDOT furnished equipment are shown below. The solar and load calculations shall be performed and certified by a certified NABCEP Solar PV Installation Professional. The Manufacturer must specify the power requirements for each component of the system including the camera, digital cellular modem and any other electrical loads present during normal operation.

The trailer shall include a NEMA 4X hinged, lockable enclosure to contain the power system control components to operate the CCTV Camera system, unless these components are located in a separate compartment within the battery compartment. The battery enclosure shall be lockable to prevent unauthorized access to the battery(s) and control components. All locks shall be keyed to accept a Corbin #2 key.

Additionally, a separate 12 x 12 x 6 (minimum) NEMA 4X hinged, lockable enclosure shall be provided to install switches, cellular communications modules, and control equipment for the CCTV Camera assembly.

The power system including solar panels shall be mounted onto the trailer and shall exceed the dimensions of the trailer or cause the trailer GVWR (2,500 lb.) to be exceeded.

2.4 Equipment Variables (Typical) for Power Usage Calculations

1) Sierra Wireless Modem (Typical) – Provided by NCDOT
   Transmit/Receive (Typical/Max) – 230 mA/440mA @12 VDC
   Idle – 180 mA @ 12VDC

2.5 Camera Mast

The camera shall be mounted on a self-supporting mast allowing a camera to be raised to a height of 30 feet. The mast shall be made from galvanized steel and shall allow for telescoping action.

The unit shall satisfactorily operate in all weather conditions including up to a 100-MPH wind load with the vertical post fully extended per the ASHTO Wind Load Standard. The mast may be raised and lowered

by a single individual using a manual winch. In the raised position the camera mast shall be capable of being rotated 360 degrees. The mast shall mechanically lock in the raised position.

Once lowered, the mast may rotate down to be secured for transport. The mast shall mechanically lock in the lowered position for transport without removing the installed camera.

The vendor must provide a drawing that shows camera mounting provisions provided. Camera wiring shall spiral around the mast to allow the mast to raise and lower. A 2" diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

2.6 Data Plaques and Serial Number

Each unit shall be provided with data plaque containing the manufacturer's serial number, model number and other manufacturer's data unique to each unit, permanently attached and easily identified. The serial number shall be used by the Department and the manufacturer to identify units for recall, to aid in the recovery of stolen units, to establish ownership, and for other similar reasons. At a minimum the serial number shall contain 17 characters and shall conform to Federal Vehicle Identification Numbering Standards (49 CFR 565).

A permanent data plaque shall be attached to each unit indicating serial number and model number using block lettering. Decals are not permitted.

2.7 Safety Plaques or Details

Product safety plaques or decals shall be furnished and affixed at the operator's station and at any hazardous area. The safety plaques or decals shall describe the nature of the hazard, level of hazard seriousness, how to avoid the hazard, and the consequence of human interaction with the hazard. Permanent plaques mechanically attached are preferred to decals. Type, size and location of product safety plaques or decals shall be in accordance with current ANSIZ 535.4, or latest revision thereto.

2.8 Color

Each unit shall be thoroughly cleaned and prime coated with a rust preventative paint with a final coat that is either painted or powder coated meeting Federal Standard 595C Color Chip ID #12473 with a minimum paint thickness of 2.5 mils. Paint and primers used shall be leadfree. All data data plaques and safety decals/plaques shall be protected from being painted over.

3. CCTV Camera

Furnish and install CCTV assemblies described in these Project Special Provisions. All new CCTV cameras shall be fully compatible with the video management software currently in use by NCDOT at the STOC.

3.1 Materials

Furnish and install a new CCTV camera assembly per portable trailer. Each assembly consists of the following:

- One dome CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories in a single enclosed unit

- A NEMA-rated enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing.
- Motorized pan, tilt, and zoom
- Built-in video encoder capable of H.264/MPEG-4 compression for video-over IP transmission
- Pole-mount camera attachment assembly
- A lightning arrestor installed in-line between the CCTV camera and the equipment cabinet components.
- All necessary cable, connectors and incidental hardware to make a complete and operable system.

3.2 Camera

Furnish new 1/3-inch charged-coupled device (CCD) color cameras. The sensors shall use Complementary Metal-Oxide-Semiconductor (CMOS) technology. The camera must meet the following minimum requirements:

- Sensor size: 2 megapixels
- Video Resolution: 1920x1080 (HDTV 1080p)
- Aspect Ratio: 16:9
- Overexposure protection: The camera shall have built-in circuitry or a protection device to prevent any damage to the camera when pointed at strong light sources, including the sun
- Low light condition imaging
- Wide Dynamic Range (WDR) operation
- Electronic image stabilization
- Automatic focus with manual override
- Incoming session IP logging allows the monitoring of excess data usage.

3.3 Lens

Furnish each camera with a motorized zoom lens that is high performance integrated dome system or approved equivalent with automatic iris control with manual override and neutral density spot filter. Furnish lenses that meet the following optical specifications:

- 30X optical zoom, and 12X electronic zoom
- Preset positioning: 64 Presets

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical means must be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

3.4 Communications Standards

The CCTV camera shall support the appropriate NTCIP 1205 communication protocol (version 1.08 or higher), ONVIF, or approved equal.

3.5 Networking Standards

- Network Connection: 10/100 Mbps auto-negotiate
- Frame Rate: 30 to 60 fps
- Data Rate: scalable
- Built-in Web Server
- Unicast & multicast support
- Two simultaneous video streams (Dual H.264 and MJPEG):
    - Video 1: H.264 (Main Profile, at minimum)
    - Video 2: H.264 or MJPEG
- Supported Protocols: DNS, IGMPv2, NTP, RTSP, RTP, TCP, UDP, DHCP, HTTP, IPv4

The video camera shall allow for the simultaneous encoding and transmission of the two digital video streams, one in H.264 format (high-resolution) and one in H.264 or MJPEG format (low- resolution).

Initially use UDP/IP for video transport and TCP/IP for camera control transport unless otherwise approved by the Engineer.

The 10/100 BaseTX port shall support half-duplex or full-duplex and provide auto negotiation and shall be initially configured for full-duplex.

The camera unit shall be remotely manageable using standard network applications via web browser interface administration. Telnet or SNMP monitors shall be provided.

3.6 Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. Equip each housing with mounting assembly for attachment to the CCTV camera telescoping pole. The enclosures must be equipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must meet or exceed NEMA 4X ratings. The viewing area of the enclosure must be tempered glass.

3.7 Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit must be integral to the high-performance integrated dome system. The pan and tilt unit must be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units must meet or exceed the following specifications:

- Pan: continuous 360 Degrees
- Tilt: up/down +2 to -90 degrees minimum
- Motors: Two-phase induction type, continuous duty, instantaneous reversing
- Preset Positioning: 64 PTZ presets per camera

3.8 Video Ethernet Encoder

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units must be built into the camera housing and require no additional equipment to transmit encoded video over IP Networks.

Encoders must have the following minimum features:

- Network Interface: Ethernet 10/100 Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP
- Security: SSL, SSH, 802.1x, HTTPS encryption with password-controlled browser interface
- Video Streams: Minimum 2 simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9 aspect ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth 30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

3.9 Central Receiver/Driver

Provide each new camera unit with a control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit, camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide the following functions:

- Zoom in/out
- Automatic focus with manual override
- Tilt up/down
- Automatic iris with manual override
- Pan right/left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver must accept status information from the pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver/driver must accept “goto” preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

3.10 Surge Protection

Protect all equipment with metal oxide varistors connecting each power conductor to ground.

Protect the electrical and Ethernet cables from the CCTV unit entering the equipment equipment cabinet with surge protection. Provide an integrated unit that accepts unprotected electrical and Ethernet connections and outputs protected electrical and Ethernet connections. Ethernet connections shall be RJ45 with full gigabit Ethernet transmission speeds and electrical connections shall be #22-#14 AWG screw terminals. The surge protection unit shall comply with EIA/TIA568A and EIA/TIA568B standards for data transmission and automatically reset.

3.11 Wiring Diagrams

Provide a wiring diagram for each Portable CCTV assembly detailing the power system, including but not limited to, Solar charge controller, photovoltaic panels, batteries, standby-by generator/land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram references connections for CCTV Camera and controller and all other supporting devices and systems that comprise the whole system.

3.12 Routine Operations

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a total list of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set-up, test, and calibration procedures.

4. Training

A minimum one day of on-site training shall be conducted at the time of delivery or at a time as approved by the Engineer by representatives of the manufacturer's technical service personnel or factory trained authorized representative.

4.1 Training Materials

In conjunction with the delivery of each unit, contractor shall supply one complete set of video operator training materials (DVD format preferred). This material shall adequately cover the safe and correct operation of the equipment.

5. Construction Methods

5.1 Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Portable CCTV camera and trailers and auxiliary equipment. Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable.

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

Mount the camera to the pole mount camera attachment assembly and secure to the assembly to the camera mast. Ensure camera wiring spirals around the mast to allow mast to raise and lower. A 2" diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

5.2 Deployment

The Engineer will establish the actual location of each Portable CCTV camera trailer assembly to be deployed. It is the Contractor's responsibility to ensure proper elevation, leveling, offset, and orientation of all Portable CCTV camera trailer assemblies.

5.3 Construction Submittal

When the work is complete, submit "as built" plans, inventory sheets, and any other data required by the Engineer to show the details of actual location and any modifications made during installation.

The "as built" plans will show each Portable CCTV camera trailer assembly location on a map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

6. Warranty

Units shall be warranted against defects in materials and workmanship for a period of not less than twelve (12) months. The warranty period start date shall begin on the date of deployment and acceptance by the Engineer.

The unit shall be furnished with a copy of the warranty statement and any necessary cards, booklets, or certificates needed to receive warranty repairs at a dealership. Provide a list of approved factory-authorized part, service and warranty facilities.

7. Measurement and Payment

Portable CCTV Camera Assembly will be measured and paid as the actual number of Portable CCTV assemblies furnished, delivered, and accepted. Portable CCTV Camera assembly shall include camera, mounting assembly, solar power system, trailer, and all other parts and components necessary to provide a fully function portable CCTV Camera assembly as described in this document. No separate measurement will be made for relocating the device throughout the life of the project, set-up and take downs, transporting and storage as these items of work will be considered incidental.

Payment will be made under:

Pay Item	**Pay Unit**
Portable CCTV Camera Assembly	Each

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Project Special Provisions
Structures

Construction, Maintenance and Removal of
Temporary Access at Station 32 + 93.00 -L- (12-12-13) ST-2
Thermal Sprayed Coating (Metallization) (12-1-17) ST-2
Strip Seal Expansion Joints (6-25-20) ST-4
Falsework and Formwork (11-30-23) ST-8
Submittal of Working Drawings (1-31-25) ST-13
Crane Safety (12-05-25) ST-18
Grout for Structures (12-1-17) ST-19
Asbestos Assessment (11-30-23) ST-20
Securing of Vessels (10-12-01) ST-22
Structure Drainage System (SPECIAL) ST-22
Anodized Two Bar Metal Rail (SPECIAL) ST-23
Anodized Double Faced Two Bar Metal Rail (SPECIAL) ST-23
Maintenance and Protection of Waterway Traffic
Beneath Proposed Structure at Station 32 + 93.00 -L- (SPECIAL) ST-24
Electrical Conduit System (SPECIAL) ST-24
Work In, Over or Adjacent to Navigable Waters (11-30-23) ST-27

NORTH CAROLINA PROFESSIONAL SEAL 020125 ENGINEER MARSHALL G. CHEEK, JR

Signed by:
Marshall G. Cheek, Jr.
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10/7/2026

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CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 32 + 93.00 -L- (12-12-13)

GENERAL

Construct, maintain, and remove the temporary access required to provide the working area necessary for construction of the new bridge, construction of the temporary detour structure, or for the removal of an existing bridge, as applicable. Temporary access may involve the use of a work bridge or other methods; however, all types of temporary access are required to meet the requirements of all permits, the *Standard Specifications*, and this Special Provision.

TEMPORARY WORK BRIDGE

At the contractor's option, construction of a temporary work bridge within the limits shown on the plans is permitted. The temporary work bridge shall have a minimum span length of 20 feet. Submit details of the temporary work bridge to the Engineer prior to constructing the work bridge to ensure conformance with the plans and all permits. Completely remove the temporary bridge prior to final acceptance or as otherwise required by the permits.

MEASUREMENT AND PAYMENT

Construction, Maintenance and Removal of Temporary Access at Station 32 + 93.00 -L- will be paid under the lump sum price bid for the above work, or other methods of access, including all material, work bridge components, equipment, tools, labor, disposal, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Construction, Maintenance and Removal of Temporary Access at Sta. 32 + 93.00 -L-	Lump Sum

THERMAL SPRAYED COATINGS (METALLIZATION) (12-1-17)

DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

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MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

    1. Minor localized areas less than or equal to 0.1 ft^2 with exposed substrate shall be repaired as outlined above for marine and non-marine environments.

    2. Large localized areas greater than 0.1 ft^2 with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.

- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

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BASIS OF PAYMENT

The contract price bid for the metal component to which the TSC is applied will be full compensation for the thermal sprayed coating.

STRIP SEAL EXPANSION JOINTS (06-25-20)

GENERAL

This Special Provision covers furnishing and installing strip seal expansion joints as shown on the contract drawings and in accordance with this Special Provision, the Standard Specifications and the manufacturer's recommendation. All materials, labor, equipment, and incidentals necessary for proper installation of the strip seal expansion joints are included.

MATERIALS

Provide strip seal expansion joints capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans. The components of the expansion joint include steel retainer rails and a neoprene seal gland.

The steel retainer rails shall consist of a "P" shape profile configuration with anchor studs welded to the concrete face. The rails shall have a minimum height of 8 inches, a minimum thickness of ½ inch and a maximum top surface (at the riding surface) width of 2 inches. Use AASHTO M270 Grade 36 or Grade 50 steel for the steel retainer rails.

The neoprene gland shall be extruded synthetic rubber with virgin polychloroprene as the only polymer. The gland manufacturer shall provide a Type 4 certification, in accordance with the Standard Specifications, attesting the gland has been tested and meets the following minimum properties:

PHYSICAL PROPERTY	TEST METHOD	REQUIREMENTS
nsile Strength, psi (min.)	ASTM D412	2000
ongation at break, % (min.)	ASTM D412	250
Hardness, Type A durometer, points	ASTM D2240 Modified	60 ± 10
Oven aging, 70h @ 212°F Tensile strength, % change (max.) Elongation, % change (max.) Hardness, points change (max.)	ASTM D573	 –20 –20 0 to +10
Oil Swell, ASTM Oil No. 3, 70h @ 212°F Weight change, % (max.)	ASTM D471	45
Ozone resistance 20% strain, 300 pphm in air 70h @ 104°F	ASTM D1149 Modified	No cracks
Low temperature stiffening, 7 days @ 14°F Hardness, Type A durometer, points change	ASTM D2240	0 to +15

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Compression Set, 70h @ 212°F (max.)	ASTM D395 Method B (modified)	40%

SHOP DRAWINGS

Submit a set of complete shop drawings to the Engineer via email for review, comments and acceptance and carbon copy (cc) the Structures Management Unit Working Drawing Review Group (SMU-wdr@ncdot.gov). Send the drawings well in advance of the scheduled installation time for the strip seal expansion joint rail. Prior to submitting the shop drawings, have someone, other than the draftsman who prepares the drawings, check all detailed drawings and include the signatures of both the draftsman and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor.

Steel retainer rails shall consist of one-piece construction including upturns. Welding two or more components to obtain the required cross-sectional shape is not permitted. Show all dimensions, anchor stud locations, welded splice details, splice locations and any other details or data necessary to fabricate the joint on the shop drawings. Include the joint model number and joint movement range. Draw all details to scale. Identify, in detail, welding procedures to be performed in fabricating the joint. As a minimum, also show the following on the drawings:

- All field splice locations. Steel retainer rail field splices are only permitted at crown points, locations with abrupt changes in the deck slab cross slope, and at travel lane lines. Splices within travel lanes are not permitted and splicing on edge lines is not required. For the location of travel lane markings at the strip seal expansion joint, see the structure plans. At the field splice locations, locate the horizontal stud anchors 3 inches from the centerline of the splice.
- Details of the shipping device for the steel retainer rail assemblies. Ensure the device is capable of resisting shipping and handling forces without causing damage to the steel retainer rail assemblies or metallized coating.
- The method of supporting steel retainer rails horizontally and vertically during joint installation and placement of concrete to ensure stability and proper alignment. Ensure the method is capable of resisting construction forces without causing damage to the steel retainer rail assemblies or metalized coating and are adjustable to account for variable temperature settings. Place supports near field splices of steel retainer rails to ensure that splices are straight and even.
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening.
- The proposed installation procedure including the sequence and suggested direction of the concrete pour(s).
- The proposed mechanism to allow joint translation after the deck pour.
- A section through the joint detail showing horizontal offset dimensions of the steel retainer rails from the centerline of the joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

FABRICATION

Fabricate the strip seal joint components in accordance with the approved shop drawings and the plans.

Splice sections of steel retainer rail in the shop to obtain required lengths. Do not use short pieces of steel retainer rail less than 6 feet 0 inches long unless required at curbs, sidewalks or staged construction locations. Splices in an individual steel retainer rail are only permitted where a

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construction joint is specifically required by the plans, joint segment length exceeds 50 feet, or approved by the Engineer in writing.

At splice locations where changes in deck slab cross slope occur, cut the ends of steel retainer rails parallel to the bridge centerline for skews less than 80^o and greater than 100^o.

Provide a neoprene gland that is compatible with the steel retainer rail. Produce a single continuous neoprene gland for the entire length of the joint. When necessary, only vulcanized splicing of the gland in the shop is permitted. Ensure the convolution(s) of the gland does not project above the top of the steel retainer rails when the ambient temperature results in the minimum joint opening.

SHIPMENT

Bolt the steel retainer rails together in the shop to form matching pairs. Clearly mark each pair to identify where they are to be placed. Ship the neoprene gland(s) together with the steel retainer rail(s) and clearly mark them to identify where they are to be placed.

INSTALLATION

Install the strip seal expansion joint in accordance with the plan details, this Special Provision, the Standard Specifications, and the manufacturer's recommended installation procedures. Have a manufacturer's representative present during installation of the joint.

Install the steel retainer rail assemblies at proper grade and alignment. See contract drawings for width of joint opening.

Bolt, weld or clamp steel retainer rail assemblies in position using temporary or sacrificial brackets as required. Do not use temporary or sacrificial support brackets, bolts, clamps, etc. between the faces of the steel retainer rails. Do not weld within 2 inches of steel retainer rail surfaces exposed in the completed structure. Do not weld strip seal expansion joint components to reinforcing steel or structural steel.

For staged construction, install steel retainer rail assemblies in a given subsequent stage to align with those installed in an adjacent prior stage after deflection and rotation due to deck casting of adjoining spans has occurred.

Protect metalized steel retainer rail assemblies during screeding operations per the manufacturer's recommendations. Provide temporary blocking material in the steel retainer rail seal cavities to prevent concrete intrusion during deck pour and finishing.

Loosen any temporary or sacrificial support brackets, bolts, clamps, etc. that span across the joint after initial set of concrete, but not more than two hours after conclusion of concrete placement.

Install the neoprene gland after completion of deck casting. Use a single continuous neoprene gland for the entire length of the joint. Field splicing of the neoprene gland is not permitted. Remove all joint form material and blocking material prior to installing the gland. Field install the gland in accordance with manufacturer's recommendations. Thoroughly coat all contact surfaces between the gland and the steel retainer rail seal cavities with an adhesive lubricant before setting the gland in place. Use lubricant adhesive that conforms to ASTM D4070 and is compatible with manufacture's strip seal expansion joint to attach neoprene gland to the steel retainer rails.

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INSPECTION

The Engineer inspects the joint system for proper alignment and proper stud placement and attachment. If any aspect of the strip seal expansion joint is deemed unacceptable, make the necessary corrections.

When concrete is cast, use a non-aluminum, 10 foot, true-to-line straight-edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of each strip seal expansion joint, perform a watertight integrity test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The strip seal expansion joint is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent watertight integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

MEASUREMENT AND PAYMENT

Strip Seal Expansion Joints will be paid for at the lump sum contract price. Payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the strip seal expansion joint in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

Payment will be made under:

Pay Item	**Pay Unit**
Strip Seal Expansion Joints	Lump Sum

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FALSEWORK AND FORMWORK (11-30-23)

GENERAL

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.

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.

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.

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:

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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 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

For link slabs, the top of girders directly beneath the link slab shall be free of overhang falsework attachments or other hardware. Submit calculations and working drawings for overhang falsework in the link slab region.

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 ¾".

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.

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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 current edition of 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 surface damage.

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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.

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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.

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

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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.

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.

MEASUREMENT AND PAYMENT

Unless otherwise specified, *Falsework and Formwork* will not be directly measured.

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

SUBMITTAL OF WORKING DRAWINGS (1-31-25)

GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this Special Provision. For this Special Provision, "submittals" refers to only those listed in this Special 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 Engineer. Either the Structures Management 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 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 Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

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.

ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via Email: SMU-wdr@ncdot.gov (do not cc SMU Working Drawings staff)

Via US mail:	Via other delivery service:
Mr. D. N. Snoke, P. E.	Mr. D. N. Snoke, P. E.

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State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

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

For projects in Divisions 1-7 (Eastern Regional Office):

Via Email: EastGeotechnicalSubmittal@ncdot.gov

Via US mail:

Mr. Thomas Santee, P. E.
Assistant State Geotechnical
Engineer – Eastern Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. Thomas Santee, P. E.
Assistant State Geotechnical
Engineer – Eastern Region
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 (Western Regional Office):

Via Email: WestGeotechnicalSubmittal@ncdot.gov

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Assistant State Geotechnical
Engineer – Western Region
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 Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

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

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Primary Structures Contact: James Bolden (919) 707 – 6408
jlbolden@ncdot.gov

Secondary Structures Contacts: Madonna Rorie (919) 707 – 6508
mlrorie@ncdot.gov

Eastern Regional Geotechnical Contact (Divisions 1-7):
Thomas Santee (984) 920-8901
EastGeotechnicalSubmittal@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
Eric Williams (980)258-6400
WestGeotechnicalSubmittal@ncdot.gov

SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit a copy of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit as specified in the tables below.

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

STRUCTURE SUBMITTALS

Submittal	Submittal Required by Structures Management Unit?	Submittal Required by Geotechnical Engineering Unit?	Contract Reference Requiring Submittal [1]
Arch Culvert Falsework	Y	N	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework [7]	Y	N	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	Y	Y	Article 410-4
Foam Joint Seals [6]	Y	N	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	Y	N	"Expansion Joint Seals"

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Expansion Joint Seals (modular)	Y	N	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	Y	N	"Strip Seal Expansion Joints"
Falsework & Forms [2] (substructure)	Y	N	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	Y	N	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	Y	N	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	Y	N	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___"
Metal Bridge Railing	Y	N	Plan Note
Metal Stay-in-Place Forms	Y	N	Article 420-3
Metalwork for Elastomeric Bearings [4,5]	Y	N	Article 1072-8
Miscellaneous Metalwork [4,5]	Y	N	Article 1072-8
Disc Bearings [4]	Y	N	"Disc Bearings"
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	Y	N	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	Y	N	Article 420-20
Prestressed Concrete Box Beam (detensioning sequences) [3]	Y	N	Article 1078-11
Precast Concrete Box Culverts	Y	N	"Optional Precast Reinforced Concrete Box Culvert at Station ___"
Prestressed Concrete Cored Slab (detensioning sequences) [3]	Y	N	Article 1078-11
Prestressed Concrete Deck Panels	Y	N	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	Y	N	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	Y	N	Railroad Provisions
	Y	N	Article 420-3

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Revised Bridge Deck Plans (adaptation to prestressed deck panels)			
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	Y	N	"Modular Expansion Joint Seals"
Sound Barrier Wall (precast items)	Y	N	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans [5]	Y	N	Article 1072-8 & "Sound Barrier Wall"
Structural Steel [4]	Y	N	Article 1072-8
Temporary Detour Structures	Y	Y	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings [4]	Y	N	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 Structures Management 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.

GEOTECHNICAL SUBMITTALS

Submittal	Submittals Required by Geotechnical Engineering Unit	Submittals Required by Structures Management Unit	Contract Reference Requiring Submittal [1]

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Drilled Pier Construction Plans [2]	Y	N	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports [2]	Y	N	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms [2,3]	Y	N	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports [2]	Y	N	Subarticle 450-3(F)(3)
Retaining Walls [4]	Y; drawings and calculations	Y; drawings	Applicable Provisions
Temporary Shoring [4]	Y; drawings and calculations	Y; 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 Engineer. Submit a second copy of submittal electronically (PDF via email), 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/projects/construction/ConstManRefDocs/PILE%20DRIVING%20EQUIPMENT%20DATA%20FORM.pdf
See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY (12-5-25)

GENERAL

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 (OSHA) regulations.

Submit all items listed below to the Engineer prior to beginning crane operations. 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.

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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: Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

MEASUREMENT AND PAYMENT

No direct payment will be made for providing information, certifications and documentation required for *Crane Safety*.

GROUT FOR STRUCTURES (12-01-17)

GENERAL

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

MATERIAL REQUIREMENT

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the *Standard Specifications*.

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

Construction loading and traffic loading shall not be allowed until the 3-day compressive strength is achieved.

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.

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MEASUREMENT AND 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.

ASBESTOS ASSESSMENT (11-30-23)

INSPECTION FOR ASBESTOS CONTAINING MATERIAL

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

___ ACM was found
___ ACM was not found

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the *Standard Specifications*.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

DEMOLITION NOTIFICATION

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

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Contact Information
Health Hazards Control Unit (HHCU)
N.C. Department of Health and Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

SPECIAL CONSIDERATIONS

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCU) must be notified.

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
49 Mt. Carmel Road
Asheville, NC 28806
(828) 250-6777

Forsyth County
Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101
(336) 703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
700 N. Tryon Street
Charlotte, NC 28202
(704) 336-5430

ADDITIONAL INFORMATION

Additional information may be found on N.C. asbestos rules, regulations, procedures, and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

https://epi.dph.ncdhhs.gov/asbestos/ahmp.html

MEASUREMENT AND PAYMENT

Asbestos Assessment Payment will be paid at the lump sum contract unit price and will be full compensation for all asbestos inspections, reports, permitting and notifications.
Payment will be made under:

Pay Item	**Pay Unit**
Asbestos Assessment	Lump Sum

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SECURING OF VESSELS (10-12-01)

GENERAL

Secure vessels in accordance with Section 107 of the *Standard Specifications* and the following provision.

When utilizing barges, tugboats or other vessels, take all necessary precautions to ensure that such vessels are securely anchored or moored when not in active operation. Take all necessary measures to ensure that the vessels are operated in a manner that avoids damage to or unnecessary contact with bridges and other highway structures and attachments. If severe weather conditions are anticipated or should be anticipated through reasonable monitoring of weather forecasts, take additional measures to protect bridges and other highway structures and attachments from extreme conditions. The Contractor is strictly liable for damages to any bridge or other highway structures or attachments caused by a vessel owned or controlled by the Contractor. The Contractor is also liable to third parties for property damages and loss of revenue caused by vessels under the Contractor's control.

MEASUREMENT AND PAYMENT

No separate payment will be made for *Securing of Vessels*.

STRUCTURE DRAINAGE SYSTEM AT STA. 32 + 93.00 -L- (SPECIAL)

GENERAL

The work covered by this special provision covers the furnishing of materials and installation of the structure drainage system and all its appurtenances as shown on the plans to the lines and grades shown. This work shall also include the construction of joints or connections to other drainage structures to complete the system as shown on the plans. The Contractor shall submit a plan for the drainage system, including, but not limited to attachments to the bridge, pipe alignment and pipe lengths, and all necessary fittings, elbow, wyes, adapters, guides and joints.

The pipe, pipe anchors, pipe hangers, inserts and components of each shall be manufactured in accordance with the details as indicated on the plans. All metallic components in the drainage system, except stainless steel and malleable iron parts are required to be hot dipped galvanized.

Structure drainage system installation shall be in accordance with the drawings and manufacturer's recommendations and as directed by the Engineer.

MEASUREMENT AND PAYMENT

Payment will be made at the contract lump sum price for "Structure Drainage System at Station 32+93.00 -L-". Such payment will include full compensation for all work, but not limited to providing materials and labor to install the structure drainage system as detailed in the plans.

Pay Item	Pay Unit
Structure Drainage System at Sta. 32 + 93.00 -L-	Lump Sum

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ANODIZED TWO BAR METAL RAIL (SPECIAL)

GENERAL

Provide anodized two bar metal rails, black in color, in accordance with the Standard Specifications, the details shown in the plans, and this Special Provision.

MEASUREMENT

Quantity paid for will be the actual linear feet of anodized two bar metal rail, complete in place and accepted, as measured along the rails.

BASIS OF PAYMENT

The quantity for which payment is made is shown in linear feet in the plans as "Anodized Two Bar Metal Rail". The unit bid per linear foot shall be full compensation for all materials, painting, tools, labor, equipment, and incidentals necessary to complete this item.

Pay Item	Pay Unit
Anodized Two Bar Metal Rail	Linear Feet

ANODIZED DOUBLE FACED TWO BAR METAL RAIL (SPECIAL)

GENERAL

Provide anodized double-faced two bar metal rail, black in color, in accordance with the Standard Specifications, the details shown in the plans, and this Special Provision.

MEASUREMENT

Quantity paid for will be the actual linear feet of anodized double face two bar metal rail, complete in place and accepted, as measured along the rails.

BASIS OF PAYMENT

The quantity for which payment is made is shown in linear feet in the plans as "Anodized Double Faced Two Bar Metal Rail". The unit bid per linear foot shall be full compensation for all materials, painting, tools, labor, equipment, and incidentals necessary to complete this item.

Pay Item	Pay Unit
Anodized Double Faced Two Bar Metal Rail	Linear Feet

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MAINTENANCE AND PROTECTION OF WATERWAY TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 32 + 93.00 -L- (SPECIAL)

GENERAL

Maintain waterway traffic on the South Fork Catawba River as directed by the Engineer.

Submit plans and calculations for review and approval for protecting waterway traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

PROTECTION OF TRAFFIC

Protect waterway traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc., to be dropped into the path of waterway traffic beneath the structure. Based on Contractor means and methods, determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between girders over the open river where waterway traffic is maintained. Install the protective system before beginning any construction operations over waterway traffic. In addition, for these same areas, keep overhang falsework in place until after the parapets have been poured.

BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

ELECTRICAL CONDUIT SYSTEM (SPECIAL)

GENERAL

The work covered by this special provision consists of furnishing and installing a conduit system embedded in the bridge parapet for connection to light poles on light pedestals a detailed on the plans. Perform all work in accordance with these special provisions, the plans, the National Electrical Code (NEC), and Section 14 of the Standard Specifications.

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The Contractor actually performing the work described in these special provisions is required to have a license of the proper classification from the North Carolina State Board of Examiners of Electrical Contractors.

The licensed Electrical Contractor is required to be available on the job site when the work is being performed or when requested by the Engineer. The licensed Electrical Contractor is required to have a set of plans and special provisions in his possession on the job site and must maintain accurate "as built" plans.

A pre-construction meeting shall be held between the Contractor and Duke Energy representation prior to beginning the conduit installation.

MATERIALS

Submit electronic copies of catalog cuts and/or drawings for all proposed materials for the Engineer's review and approval. Include the brand name, stock number, description, size, rating, manufacturing specification, and applicable contract item number(s) on each submittal. The Engineer will advise the Contractor of reasons for rejected submittals and will return approved submittals to the Contractor. Do not deliver material to the project prior to submittal approval.

Non-metallic conduit shall be rigid PVC (Polyvinyl chloride) heavy wall approved for underground use with concrete encasement per UL 651 "Rigid Non-Metallic Conduit". Use terminations designed for PVC conduit, to seal and stub out each PVC conduit, and to provide watertight protection.

Provide UL listed combination expansion/deflection couplings that are weatherproof, do not require the use of an external bonding jumper and provide a 4" minimum of conduit movement and a deflection of up to 30 degrees.

Use plywood and foam board, or other similar materials to construct formed openings in the parapet. Provide dual 1/8" stainless steel cover plates as shown in the plans to cover the formed opening. Attach a grounding lug to the inside of the bottom plate via a blind tapped hole. Use concrete inserts and stainless steel or brass bolts to attach the checkered plate.

Provide jute that is a burlap-like material used for filling voids and protecting components from waterproofing and adhesive compounds.
Use mastic that is a permanent, non-hardening, water sealing compound that adheres to metal, plastic, and concrete.

Include stainless steel U-bolts for locking the bottom plate to the parapet.

Coordinate with Duke Energy to acquire the correct anchor bolt pattern for light pedestals installed on the structure.

CONSTRUCTION METHODS

Securely fasten all conduit and formed opening frames prior to placing any concrete. Each conduit run between termination points should be as straight as possible. The total angular deflection of all bends in a conduit run should not exceed 180 degrees. Total deflection greater than 180 degrees requires advanced approval by the Engineer and the Duke Energy Project Engineer. After the conduit is encased in concrete, the Contractor shall clean each conduit by snaking with a steel band with an approved tube cleaner equipped with a mandrel of a diameter not less than 85% of the nominal inside

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diameter of the conduit. Coordinate conduit cleaning of the bridge lighting conduit system with Duke Energy personnel and have Duke Energy personnel on hand to witness cleaning.

Construct the formed opening with a frame built of plywood, or similar material, encased with rigid foam insulation board, or similar material, that can easily be chiseled away and the frame removed once the concrete has hardened. The frame shall be constructed so that the outer frame matches the formed opening dimensions shown in the plans. Position the formed opening frame near the ends of the bridge parapet, but do not conflict with guardrail attachment points. Center the formed opening frame between the vertical "S" bars to cut as few "S" bars as possible. The bridge designer must approve "S" bar cuts and will determine if additional reinforcement is required. Longitudinal "B" bars may be cut to allow the formed opening frame to fit in the barrier.

All conduit and formed opening frame work must be inspected and approved by the Engineer and Duke Energy Project Engineer before concealment.

The formed opening shall be constructed with a 2" recessed flange at depth of 2" so that the bottom and top steel plates recess flush with the parapet when installed. Install 2" x ¼" threaded inserts as shown in the plans. Threaded inserts shall be placed with a minimum of 1-½" of concrete cover between the outer edge of the insert and the inside of the formed opening. Locate and field drill mounting holes in the bottom and top plates which align with the location of the concrete inserts. During forming of the parapet, cast stainless steel U-bolts into the parapet at the cut out locations of the bottom plate.

Extend conduits to an adequate length inside the formed opening frame and securely terminate. Provide a minimum of 2" concrete cover between the face of the parapet and the conduit. After the formed opening frame is removed, trim conduit as needed to fit inside the formed opening. Use bushings at all conduit termination points within the formed opening.

Provide and install a bonding jumper to connect the grounding lug on the inside of the bottom plate to the feeder circuit ground. The bonding jumper shall be of sufficient length to allow the bottom plate to be removed and placed on the bridge deck without disconnection.

Provide and install expansion/deflection couplings at all construction joints and expansion joints. Use PVC to RGC transition adapters as required to connect conduit system to expansion/deflection couplings.

Install anchor bolts according to pattern provided by Duke Energy. Protect exposed threaded portion of anchor bolts, to guard against damage from concrete installation.

Seal and cap all conduits exposed in the light pedestals on the structure.

Coordinate electrical conduit system work with work by others as directed by the Engineer.

BASIS OF PAYMENT

The Electrical Conduit System measured as provided above will be paid for at the contract lump sum price for "Electrical Conduit System". Such price and payment will be considered full compensation for all materials, equipment and labor necessary to complete the conduit installation for the bridge in accordance with the plans and these Special Provisions.

Payment will be made under:

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Pay Item	**Pay Unit**
Electrical Conduit System	Lump Sum

WORK IN, OVER OR ADJACENT TO NAVIGABLE WATERS (11-30-23)

GENERAL

All work in, over, or adjacent to navigable waters shall be in accordance with Article 107-10 of the *Standard Specifications*, the Special Provisions and conditions contained in the permits obtained by the Department from the U.S. Coast Guard, U.S. Army Corps of Engineers, or other authority having jurisdiction. The work shall have no adverse effect on navigation of the waterway including traffic flow, navigational depths, and horizontal and vertical clearances without approval from the authorities granting the permits.

The Contractor shall prepare drawings necessary to obtain any permits which may be required for his operations which are not included in the Department's permit including but not limited to excavation and dumping, constructing wharves, piers, ramps, and other structures connecting to bank or shore, and drawings for constructing falsework, cofferdams, sheeting, temporary bridges, and any other construction within the waterway. Submittals shall show locations of such work with respect to the navigational opening. The Contractor shall coordinate the submittal of drawings with the Engineer.

All construction shall progress and be maintained in a safe and timely manner. Temporary construction facilities shall be removed completely and promptly upon discontinuation of their useful purpose. Navigational lights, signals, or facilities shall be provided and maintained by the Contractor on temporary or permanent construction or vessels until such facilities are no longer needed as determined by the Engineer or permitting agency.

The Contractor shall immediately notify the appropriate authorities and take corrective measures as needed when any situation occurs that imposes a threat to the public. The Contractor shall also immediately correct any acts or occurrences that contradict or violate any requirements in the plans, special provisions, or permits when corrective measures can be performed in a safe manner. The Contractor shall notify the appropriate authorities when such corrective measures cannot be performed in a safe manner.

MEASUREMENT AND PAYMENT

All costs incurred by the Contractor in complying with the above requirements for *Work In, Over or Adjacent to Navigable Waters* shall be included in the prices bid for the various pay items and no additional payment will be made.

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 10-15-24) Z-1

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 Water Resources, DEQ State of North Carolina
Buffer Certification	Division of Water Resources, DEQ State of North Carolina
FERC	Federal Energy Regulatory Commission

The Contractor shall comply with all applicable permit conditions during construction of this project.

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 *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 restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

P-2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

DANIEL H. JOHNSON
SECRETARY

September 4th, 2026

MEMORANDUM TO: Division Construction Units
Contract Standards and Development Unit

FROM: M. Caleb BrabbleRose, Environmental Officer
Division 12 Environmental Unit

SUBJECT: Environmental Permits for the US 29/US 74 (Wilkinson Boulevard) and replacement of Bridge 82 over South Fork Catawba River in the Town of Cramerton, Gaston County,
TIP: U-6146, WBS 48392.1.1

Please find enclosed the following permits for this project:

Agency	Permit Type	Permit Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Regional General Permit 50 Action ID: SAW-2022-01717 dated July 21st, 2026	May 25, 2030
NC Division of Water Resources Section 401 Water Quality Certification	Individual Water Quality Certification General Certification WQC009022 Project ID: 20230787 v3 dated July 20, 2026	*expires with above permit*
NC Division of Water Resources Buffer Certification	Catawba River Riparian Buffer Certification	*expires with above permit*
Duke Energy Lake Services	Catawba-Wateree FERC Authorization	December 8, 2026

Work is authorized by the above referenced permit provided it is accomplished in strict accordance with the permitted plans.

The Environmental Coordination and Permitting Group or the Division Environmental Office must be consulted if any deviation from the permit(s) is required.

The General Conditions and Certifications for Nationwide and Regional Permits can be referenced at:
https://xfer.services.ncdot.gov/pdea/EnvironmentalPermits/_General_Conditions_and_Certifications/

If the project greensheet is only found in on the Commitment Tracker in SharePoint:

The Project Commitments "Greensheet" is located on the Preconstruction SharePoint Dashboard at:
https://connect.ncdot.gov/site/preconstruction

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION ENVIRONMENTAL UNIT
P O BOX 47
SHELBY NC, 28151-0047

Telephone: (980) 552-4200
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1710 E. MARION ST. (US 74 BUSINESS)
SHELBY NC, 28151-0047

P-3

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2022-01717** County: **Gaston County** U.S.G.S. Quad: **Belmont**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **N.C. Department of Transportation**
Attn: Mr. Jeffrey Wyatt
Address: **PO Box 47**
Shelby NC, 28151

Nearest Town **Cramerton** Nearest Waterway **South Fork Catawba River**
River Basin **Santee** USGS HUC **03050102**
Coordinates Latitude: **35.2490161;**
Longitude: **-81.0729737**

Location description: **The US29/US 74 Improvement project (TIP U-6146) begins at the intersection of Wesleyan Dr/Market St and Andrew Jackson Hwy (US 29/74) and extends approximately 1.25 miles east along Andrew Jackson Hwy to terminate at the intersection of Andrew Jackson Hwy and George Belle Avenue in Cramerton, Gaston County, North Carolina.**

Description of projects area and activity: **This permit verification authorizes improvements to traffic operations and pedestrian safety and replace a functionally obsolete bridge along US 29/US 74 from SR 2209 to SR 2016. The project will result in the impact to 0.09 acres of wetland (0.01 acres of permanent fill, 0.02 acres of mechanized clearing and 0.06 acres of hand clearing), 37 lf of stream channel (temporary stabilization) and 0.02 acres of temporary stream channel fill (for construction of temporary barge access). This verification additionally authorizes the placement of water line, via directional boring, underneath and across the South Fork Catawba River, a Section 10 water and impact for the temporary barge access.**

A permit verification was issued for this project on July 6, 2023, and reissued on March 19, 2024, to authorize minor project change. By email dated March 24, 2026, NCDOT requested reissue of the project due to the upcoming expiration of the previously authorized permit. This permit verification hereby replaces the previously authorized permits.

This project has been evaluated in concert with a Dominion Energy gas project that involves the relocation of a gas line under the South Fork Catawba River due to the construction associated with the U6146 project.

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344);
☒ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number and/or Nationwide Permit Number: **GP 50 - NCDOT - Bridge, Road Widenings and Interchanges**
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND/OR SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application dated May 22, 2023, renewal request dated March 24, 2026 and ensuing record. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide and/or regional general permit authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide and/or regional general permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide and/or regional general permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide and/or regional general permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide and/or regional general permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Crystal Amschler at (828) 271-7980 X 4231 or Crystal.C.Amschler@usace.army.mil**.

Corps Regulatory Official: M. Scott Jarvis Date: **July 21, 2026**
Expiration Date of Verification: **May 25, 2030**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at https://regulatory.ops.usace.army.mil/customer-service-survey/

P-5

Action ID Number: SAW-2022-01717 **County:** Gaston County

Permittee: NC Department of Transportation

Project Name: NCDOT U-6146 B-5857 US29-US74

Date Verification Issued: July 21, 2026

Project Manager: Crystal Amschler

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Crystal Amschler, Project Manager
Asheville Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, North Carolina 28801

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

Docusign Envelope ID: EEF22CF6-63E7-80B6-83B5-7504D69F29E3

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

July 20, 2026

DWR #20230787 v3
Gaston County

Mr. Jeffery Wyatt
NCDOT Division 12
1710 E. Marion St
Shelby, 28151
jlwyatt@ncdot.gov

Subject: **Modification of Individual 401 Water Quality Certification for the US 29-US 74 Improvement Project TIP U-6146 in Gaston County**
USACE Action ID. No. SAW-2022-01717

Location: Lat: 35.2490161 Long: -81.0729737

Dear Mr. Wyatt:

Attached hereto is a copy of Certification No. WQC009022 issued to Mr. Wyatt and North Carolina Department of Transportation (NCDOT) Division 12 dated July 20, 2026. **This Certification replaces the Certification issued on March 4, 2024.** This Certification is being issued pursuant to a modification request submitted on June 15, 2026 with fee received June 16, 2026 to address the additional 42 LF of additional temporary impacts for barge access on South Fork Catawba River and the additional 0.02 acre of temporary impacts for hand clearing, 0.02 acre of permanent impacts from mechanized clearing and 0.01 acre of permanent fill to Wetland B. All of the authorized activities and conditions of certification associated with the Water Quality Certification No. WQC009022 dated May 18, 2023, and subsequent modifications dated March 4, 2024, and Jul 20, 2026, still apply except where superseded by this certification.

This Water Quality Certification does not relieve the recipient of the certificate (or the Permittee) of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations

Upon the presentation of proper credentials, the Division of Water Resources (Division or DWR) may inspect the property.

Docusign Envelope ID: EEF22CF6-63E7-80B6-83B5-7504D69F29E3

This Water Quality Certification shall expire on the same day as the expiration date of the corresponding Section 404 Permit that is current at the time this Certification is issued. The conditions shall remain in effect for the life of the project, regardless of the expiration date of this Water Quality Certification.

Non-compliance with or violation of the conditions herein set forth may result in revocation of this Water Quality Certification for the project and may also result in criminal and/or civil penalties.

Notice regarding the right to contest this 401 Water Quality Certification decision is attached to this letter.

This letter completes the Division's review under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Chris Sheldon at 704-235-2193 or chris.sheldon@deq.nc.gov if you have any questions or concerns.

Sincerely,

Signed by:
Faith Hardin
3185423002EA45E...

Faith Hardin, Supervisor
401 & Buffer Transportation Permitting Branch
Division of Water Resources, NCDEQ

Electronic cc:

Crystal Amschler, (crystal.c.amschler@usace.army.mil) US Army Corps of Engineers, Asheville Field Office
Holland Youngman, (holland_youngman@fws.gov) US Fish and Wildlife Service
David McHenry, (david.mchenry@ncwildlife.gov) NC Wildlife Resources Commission
DWR 401 & Buffer Permitting Branch Electronic file

Docusign Envelope ID: EEF22CF6-63E7-80B6-83B5-7504D69F29E3

NOTICE REGARDING THE RIGHT TO CONTEST A DWR 401 WATER QUALITY CERTIFICATION AND/OR BUFFER AUTHORIZATION

Right of Persons Aggrieved to File a Contested Case for the Decision on a 401 Water Quality Certification and/or Buffer Authorization:
The Division's decision is subject to review under NCGS 150B-23.

Rights of Persons Aggrieved to File a Contested Case: Pursuant to NCGS 150B, Article 3, a party or person aggrieved may commence a contested case by filing a petition under NCGS 150B-23 in the Office of Administrative Hearings within 60 days after the Division provides notice of its decision on an application, as provided in NCGS 150B-23(f). If no contested case is commenced within the required time, the Division's decision is final and is not subject to review.

General Filing Instructions: A petition for contested case hearing must be in the form of a written petition, conforming to NCGS 150B-23, and filed with the Office of Administrative Hearings, 1711 New Hope Church Road, Raleigh NC, 27609, along with a fee in an amount provided in NCGS 150B-23.2. A petition for contested case hearing form may be obtained upon request from the Office of Administrative Hearings or on its website at https://www.oah.nc.gov/hearings-division/filing/hearing-forms. Additional specific instructions for filing a petition are set forth at 26 NCAC Chapter 03.

Service Instructions: A party filing a contested case is required to serve a copy of the petition, by any means authorized under 26 NCAC 03 .0102, on the process agent for the Department of Environmental Quality:

Daniel Hirschman, General Counsel
North Carolina Department of Environmental Quality
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

If the party filing the petition is a person aggrieved other than the recipient of the certificate (the "Permittee"), the party must also serve the Permittee in accordance with NCGS 150B-23(a).

Be aware that other rules or laws may apply to the filing of a petition for a contested case. Additional information is available at https://www.oah.nc.gov/hearings-division/hearing-process/filing-contested-case. Please contact the Office of Administrative Hearings at (984) 236-1850 with all questions regarding the filing fee and/or the details of the filing process.

Docusign Envelope ID: EEF22CF6-63E7-80B6-83B5-7504D69F29E3

NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

CERTIFICATION #WQC009022 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to North Carolina's Regulations in 15 NCAC 02H .0500 and 15A NCAC 02B .0200, to Mr. Wyatt and NCDOT Division 12, who have authorization for the impacts listed below, as described within your modification request received by the Division of Water Resources (Division or DWR) on June 15, 2026 with fee received on June 16, 2026 and by Public Notice issued by the Division on June 16, 2026, and within the *Reasonable Period of Time* pursuant to 40 CFR Part 121.6.

The State of North Carolina certifies that this activity will comply with water quality requirements and the applicable portions of Sections 301, 302, 303, 306, 307 of the Public Laws 92-500 and PL 95-217 if conducted in accordance with the application, the supporting documentation, and conditions hereinafter set forth.

The following impacts are hereby approved. Impacts added or removed pursuant to this modification are underlined within the impact table. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b)]

Type of Impact	Amount Approved Permanent	Amount Approved Temporary
Perennial Streams		
Site 1 Rip rap	0 linear feet	12 linear feet
Modification Site 2 Barge Access	0 linear feet	42 linear feet
Site 3 Culvert Extension	0 linear feet	25 linear feet
Totals:	***0 linear feet***	***79 linear feet***
Riparian Wetlands		
Site 4 Hand Clearing	0 acres	0.02 acres
Modification Site 5 Hand Clearing	0.03 acres	0.02 acres
Totals:	***0.03 acres***	***0.04 acres***

This approval requires you to follow the conditions listed in the certification below.

CONDITIONS OF CERTIFICATION [15A NCAC 02H .0507(c)]:

1. All work in or adjacent to stream waters shall be conducted per approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual.

   Citation: 15A NCAC 02H.0506(b)(3) and (c)(3)

2. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities.

   Citation: 15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)

3. Stormwater shall be directed to vegetated buffer areas, grass-lined ditches or other means appropriate within the project area for the purpose of pre-treating storm water runoff prior to discharging directly into streams.

   Citation: 15A NCAC 02B.0224 and .0225

4. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

   Citation: 15A NCAC 02H. 0506(b)(2)

5. The post -construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.

   Citation: 15A NCAC 02H. 0506(b)(2)

6. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank, or during the removal of bents from an old bridge. This condition can be waived with prior approval from the NCDWR.

   Citation: 15A NCAC 02H0506(b)(3)

7. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. Any final construction plans for a project must include or reference the application and plans submitted to the DWR. The Permittee must evaluate all other acquired permits to ensure that they are consistent with the plans submitted to the DWR, and all relative impacts are accounted for and shown on the final construction plans. Any modifications or additional impacts to streams and/or wetlands and/or waters within the project require the permittee to notify the DWR and may require submission of a new application package with the appropriate fee.

   Citation: 15A NCAC 02H .0506(b)(2) and (3); 15A NCAC 02H .0507(c)

8. If the property is sold, the Permittee shall provide the new owner with a copy of this Certification and all plans and specifications incorporated by reference. The Permittee may transfer a Certification to the new owner by submitting a letter to the Division with the following statement: *"At the time the property is transferred, the terms and conditions of this 401 Individual Water Quality Certification, including the responsibility to ensure compliance, are binding on the new owner(s) of the property."* The letter shall be signed and dated by both the transferee and the new owner. *Citation: 15A NCAC 02H .0507(d)(2)*

9. The Permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Director), upon the presentation of credentials and other documents as may be required by law, to: *Citation: 15A NCAC 02H .0502(e); 15A NCAC 02H .0507(c)*

   a. Enter, at reasonable times, upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this certificate;
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this certificate;
   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this certificate; and
   d. Sample or monitor at reasonable times, for the purposes of assuring certificate compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location

10. For all projects that include multiple parcels and/or lots, including transportation and/or utility-related projects installed as infrastructure for multiple parcels and/or lots, deed notifications or similar mechanisms shall be placed on all lots/parcels that include jurisdictional wetlands, streams, open waters, and state-regulated riparian buffers within the overall project boundaries. These mechanisms shall be put in place at the time of recording of the property or individual parcels, whichever is appropriate.

    Citation: 15A NCAC 02H .0502(a); 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

11. All wetlands, streams, and surface waters located within the limits of disturbance and within 50 feet of the limits of disturbance/construction area on the project site shall be clearly marked (example- orange fabric fencing) prior to any land disturbing activities. The marking/fencing shall be maintained until the project or project phase is completed. Impacts to areas within the marked area/fencing are prohibited unless otherwise authorized by this certification.

    Citation: 15A NCAC 02H .0506(b)(2); 15A NCAC 02H .0507(c)

12. When requested by DWR, the Permittee and/or authorized agent shall schedule a pre-construction meeting with DWR, shall contact the appropriate DWR Regional Office upon project commencement of construction, shall submit a Certificate of Completion and/or shall provide as-built documentation.

    Citation: 15A NCAC 02H .0502(e); 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

13. The permittee shall report to the appropriate DWR Regional Office any noncompliance with, and/or any violation of, stream or wetland standards [15A NCAC 02B .0200], including but not limited to sediment impacts to streams or wetlands. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the permittee became aware of the non-compliance circumstances.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

14. No additional temporary or permanent impacts from waste, spoil, solids, fill, excavation, or staging of equipment, shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) identified in this Certification.

    Citation: 15A NCAC 02H .0506; 15A NCAC 02H .0507(c)

15. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2B of Title 15A in the North Carolina Administrative Code.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

16. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sedimentation Pollution Control Act of 1973). Regardless of applicability of the Sedimentation Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur.

    Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Erosion and Sediment Control Planning and Design Manual*, or the *North Carolina Department of Transportation Erosion and Sediment Control Design and Construction Manual*.

Appropriate measures should be installed prior to any land clearing activities to protect wetlands, streams, and/or buffers from turbidity and/or sedimentation. These measures should be routinely inspected and properly maintained, and excavated materials should be contained outside wetland, stream, and/or buffer boundaries.

For installation of bridges that involve driving or drilling activities within stream channels, open waters, or along streambanks turbidity curtains shall be installed within the surface water.

All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

Citation: 15A NCAC 02H .0506(b)(2); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

17. Sediment and Erosion Control Measures (S&EC) in wetlands or waters should be avoided to the maximum extent possible and any S&EC occurring in wetlands or waters shall be restored to pre-existing conditions upon completion of the project. The Permittee shall utilize sediment and erosion control measures that avoid and minimize the need for the placement of silt fence along streams at the normal water level. Where measures are placed within authorized impact areas then placement of such measures shall not be conducted in a manner that results in a loss of function of any wetlands, streambeds, or streambanks. Any erosion control measures, including silt fence, installed within wetlands shall be removed from wetlands and the natural grade restored and revegetated within two (2) months of the date the appropriate sediment and erosion control program has released the specific area within the project to ensure wetland standards are maintained upon completion of the project.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

18. Erosion control matting shall not be placed within a stream bed. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

19. If the project is covered by NPDES Construction Stormwater Permit Number NCG010000 or NPDES Construction Stormwater Permit Number NCG250000, full compliance with permit conditions including the erosion and sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required.

Citation: 15A NCAC 02H .0506(b) and (c); 15A NCAC 02H .0507(c)

20. The North Carolina Department of Transportation (NCDOT) shall maintain full compliance with the conditions related to construction activities and post construction stormwater design, construction and maintenance, within the most recent version of their Individual NPDES Stormwater Permit Number NCS000250.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

21. All work in or adjacent to streams, ponds, lakes, and reservoirs shall be conducted so that the work area is isolated from surface waters. Approved best management practices from the most current version of the DEMLR *NC Erosion and Sediment Control Planning and Design Manual*, or the *NC Department of Transportation Best Management Practices For Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, pump-arounds, and other diversion structures shall be used to minimize excavation in flowing water. Water that comes in contact with the work area shall be treated through an appropriate sediment/erosion control measure (sediment basin, filter bag, etc) prior to discharging to a surface water. All temporarily disturbed areas for the purpose of isolation/dewatering shall be restored to original grade, including each stream's original cross-sectional dimensions, planform pattern, and longitudinal bed profile. All temporarily impacted sites shall be restored and stabilized with native vegetation as practicable. *Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200*

22. Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited under this Certification.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200

23. Unless already approved by an NPDES permit, bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. This condition may be waived with prior written approval from the NCDWR.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

24. Demolition of existing structures, such as culvert or bridge removal, shall be conducted to ensure water quality standards are maintained. NCDOT activities shall adhere to NCDOT's *Best Management Practices for Construction and Maintenance Activities*.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200

25. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allows for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. If the width of the culvert is wider than the stream channel, the culvert shall include multiple boxes/pipes, baffles, benches and/or sills to maintain the natural width of the stream channel. If multiple culverts/pipes/barrels are used, low flows shall be accommodated in one culvert/pipe and additional culverts/pipes shall be installed such that they receive only flows above bankfull.

    Placement of culverts and other structures in streams shall also meet one of the following requirements:

    a. For structures less than 72” in diameter/width and in area where topographic constraints dictate culvert slopes will be greater than 2.5%, culverts shall be installed “at grade” such that low flow conditions in the stream are maintained provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross-vanes, sills, baffles etc.); or
    b. When bedrock is present in culvert locations, culvert burial is not required, provided that there is documentation of the presence of bedrock.
    c. For all other culverts:
        i. Culverts with a diameter greater than 48 inches shall be below the elevation of the streambed by one foot
        ii. Culverts with diameter less than or equal to 48 inches shall be below the streambed by 20% of the culvert diameter

    If a culvert outlet is submerged within a pool or scour hole and designed to provide for aquatic passage, then culvert burial into the streambed is not required.

    Documentation such as a location map of the culvert, culvert profile drawings, slope calculations, geotechnical reports, photographs, etc. shall be provided to DWR upon written request.

    For culvert replacements within the same location/footprint, and of similar length, culverts shall be designed and installed to meet the above requirements of this Condition unless prohibited by existing conditions on site, such as existing infrastructure or topographic constraints.

    Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

    The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

26. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0231

27. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in, or adjacent to, surface waters is prohibited.

    Citation: 15A NCAC 02H.0506(b)

28. If concrete is used during construction (including bulkhead components, such as deadman anchors, tie-back systems and concrete caps), then all necessary measures shall be taken to isolate the concrete from waters of the state by maintaining a dry work area to prevent direct contact between curing concrete and surface waters. Drill slurry and water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. Any water that contacts uncured concrete shall be captured, treated, and disposed of properly.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

29. All temporary pipes, culverts, rip-rap pads etc. in streams shall be installed so as not to restrict stream flow or installed in such a manner that restricts aquatic life movement during low flow conditions. All temporary pipes and/or culverts shall be installed as outlined in the most recent edition of the *North Carolina Erosion and Sediment Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities*.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

30. All temporary fill and temporary culverts shall be removed, and the impacted area shall be returned to natural conditions, within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross-sectional dimensions, planform pattern, and longitudinal bed profile. All temporarily impacted sites shall be restored and stabilized with native vegetation when practicable. For all areas where wetlands are impacted by temporary roads constructed by temporary fill material, the Permittee shall remove the fill material and conduct activities necessary to restore preconstruction hydrology by addressing soil compaction. When temporary fill has been added to wetlands, or heavy equipment has been placed within a wetland, the Permittee shall ensure restoration of preconstruction soil conditions when restoring wetland areas. Upon restoration of the wetland, the Permittee shall inspect the area quarterly for a minimum of two years to document successful restoration. The Permittee shall provide documentation of inspections to DWR when requested. The monitoring requirement can be relieved with review and written approval by DWR. If the area is not restored to preconstruction conditions the impacts shall be considered permanent, and the Permittee shall request a modified Certification from DWR. With prior written approval from DWR, removal of temporary fill and temporary culverts and restoration of the impacted area may be postponed to accommodate moratorium periods.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

31. Any rip-rap or other armoring materials required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the construction activity covered by this Certification. All rip-rap or other non-natural armoring material placed in streams shall be placed such that the original streambed elevation and streambank contours are restored, and that the finished elevation of the rip rap shall not exceed that of the original stream bed. All rip-rap or other armoring materials shall consist of clean rock or masonry material free of debris or toxic pollutants. Placement of rip-rap or other armoring materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or be installed in a manner that precludes aquatic life passage.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

32. Any rip-rap or other non-natural armoring material (i.e. gabion baskets, revetments, bulkheads, seawalls, retaining walls) used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows, and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap or other armoring materials shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. Any rip-rap or other armoring materials placed in the streambed shall be such that the finished elevation of the rip rap or other armoring materials shall not exceed that of the original stream bed.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0201

33. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication, and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

34. Heavy equipment working in wetlands shall be placed on mats or non-impact equipment shall be used to ensure no disturbance and/or compaction of soil from equipment except within the footprint of the impacts covered by this Certification. Heavy equipment necessary for in stream activities shall be operated from the banks to the maximum extent practical and in no cases shall cause unstable stream banks or a violation of water quality standards.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0231

35. In accordance with G.S. 143-215.85(b), the Permittee shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

    Citation: 15A NCAC 02H .0507(c); N.C.G.S 143-215.85(b)

36. The Permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

37. A copy of this Certification shall be retained on site during the construction and maintenance of this project, or with the project manager, and be available for inspection at all times. The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this Certification in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. If the Permittee becomes aware of any inability to comply with any of the conditions of this Certification, they must notify the appropriate Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the Permittee becomes aware of the circumstances.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

38. This Water Quality Certification neither grants nor affirms any property right, license, or privilege in any lands or waters, or any right of use in any waters. This Water Quality

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Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and does not create any prescriptive right or any right of priority regarding any usage of water. This Water Quality Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Water Quality Certification to possess any prescriptive or other right of priority with respect to any other consumptive user.

Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

This Water Quality Certification shall expire on the same day as the expiration date of the corresponding Section 404 Permit that is current at the time this Certification is issued. The conditions shall remain in effect for the life of the project, regardless of the expiration date of this Water Quality Certification.

Upon completion of the proposed project, the applicant shall submit a Certificate of Completion and/or shall provide as-built documentation. Certificates of Completion and/or as-built documentation can be submitted via the DWR website: https://edocs.deq.nc.gov/Forms/Certificate-of-Completion.

This, the 20th day of July 2026

Signed by:
Faith Hardin
3185423002EA45E...

Faith Hardin, Supervisor
401 & Buffer Transportation Permitting Branch
Division of Water Resources, NCDEQ

Docusign Envelope ID: E8BC246D-4876-80BC-81FE-05670082D661

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

July 20, 2026

DWR # 20230787 v3
Gaston County

Mr. Jeffery Wyatt
NCDOT Division 12
1710 E. Marion St
Shelby, 28151
jlwyatt@ncdot.gov

Subject: **APPROVAL of CATAWBA RIPARIAN BUFFER AUTHORIZATION CERTIFICATE WITH ADDITIONAL CONDITIONS**

Project: **US 29-US 74 Improvement Project TIP U-6146,** Lat: 35.2490161 Long: -81.0729737

Dear Mr. Wyatt:

You have our approval for the impacts listed below for the purpose described in your application dated and received by the Division of Water Resources (Division) May 18, 2023 with subsequent information on July 17, 2023. These impacts are covered by the Catawba Buffer Rules and the conditions listed below. This Buffer Authorization does not relieve the permittee of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and/or Stormwater regulations.

The following impacts are hereby approved, provided that all of the Conditions listed below, and all of the conditions of the Catawba Buffer Rules are met. No other impacts are approved, including incidental impacts. [15A NCAC 02B Catawba, .0611(b)(2)]

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Type of Impact	Amount Approved (units) Permanent	Amount Approved (units) Temporary
Buffers – Zone 1		
Site 2 Bridge Construction	10,429 (square feet)	0 (square feet)
Buffers – Zone 2		
Site 2 Bridge Construction	7,423 (square feet)	0 (square feet)

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Authorization Certificate. If you change your project, you must notify the Division and you may be required to submit a new application package. If the property is sold, the new owner must be given a copy of this Authorization Certificate and is responsible for complying with all conditions. [15A NCAC 02B Catawba .0611(b)(2)]

If you are unable to comply with any of the conditions below, you must notify the Mooresville Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.

The permittee shall report to the Mooresville Regional Office any noncompliance with the conditions of this Authorization Certificate and/or any violation of state regulated riparian buffer rules [15A NCAC 02B Catawba .0614]. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the applicant became aware of the circumstances.

Additional Conditions:

1. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification. [15A NCAC 02B. 0614].
2. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. [15A NCAC 02B. 0614].
3. Pursuant to 15A NCAC 2B. 0614, sediment and erosion control devices shall not be placed in Zone 1 of any Buffer without prior approval by the NCDWR. At this time, the NCDWR has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised, and that discharge is released as diffuse flow.

Docusign Envelope ID: E8BC246D-4876-80BC-81FE-05670082D661

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5] Upon the presentation of proper credentials, the Division may inspect the property.

Notice regarding the right to contest this buffer authorization decision is attached to this letter.

This Authorization Certificate neither grants nor affirms any property right, license, or privilege in any lands or waters, or any right of use in any waters. This Authorization Certificate does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person, nor does it create any prescriptive right or any right of priority regarding any usage of water. This Authorization Certificate shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Authorization Certificate to possess any prescriptive or other right of priority with respect to any other consumptive user.

This Authorization shall expire when the corresponding 401 Water Quality Certification Approval DWR#20230787 expires.

This letter completes the Division's review under the Mooresville Riparian Buffer Rules as described in 15A NCAC 02B Catawba .0614. Please contact RO staff at 704-235-2193 or chris.sheldon@deq.nc.gov if you have any questions or concerns.

Sincerely,

Signed by:
Faith Hardin
3185423002EA45E...

Faith Hardin, Supervisor
401 & Buffer Transportation Permitting Branch
Division of Water Resources, NCDEQ

Electronic cc:
Crystal Amschler, (crystal.c.amschler@usace.army.mil) US Army Corps of Engineers, Asheville Field Office
Holland Youngman, (holland_youngman@fws.gov) US Fish and Wildlife Service
David McHenry, (david.mchenry@ncwildlife.gov) NC Wildlife Resources Commission
DWR 401 & Buffer Permitting Branch Electronic file

Filename: Buffer_Approval_Letter-NO MITIGATION REQUIRED_20230787.docx

Docusign Envelope ID: E8BC246D-4876-80BC-81FE-05670082D661

NOTICE REGARDING THE RIGHT TO CONTEST A DWR DECISION ON A 401 WATER QUALITY CERTIFICATION AND/OR BUFFER AUTHORIZATION

Right of Persons Aggrieved to File a Contested Case for the Decision on a 401 Water Quality Certification and/or Buffer Authorization:
The Division's decision is subject to review under NCGS 150B-23.

Rights of Persons Aggrieved to File a Contested Case: Pursuant to NCGS 150B, Article 3, a party or person aggrieved may commence a contested case by filing a petition under NCGS 150B-23 in the Office of Administrative Hearings within 60 days after the Division provides notice of its decision on an application, as provided in NCGS 150B-23(f). If no contested case is commenced within the required time, the Division's decision is final and is not subject to review.

General Filing Instructions: A petition for contested case hearing must be in the form of a written petition, conforming to NCGS 150B-23, and filed with the Office of Administrative Hearings, 1711 New Hope Church Road, Raleigh NC, 27609, along with a fee in an amount provided in NCGS 150B-23.2. A petition for contested case hearing form may be obtained upon request from the Office of Administrative Hearings or on its website at https://www.oah.nc.gov/hearings-division/filing/hearing-forms. Additional specific instructions for filing a petition are set forth at 26 NCAC Chapter 03.

Service Instructions: A party filing a contested case is required to serve a copy of the petition, by any means authorized under 26 NCAC 03 .0102, on the process agent for the Department of Environmental Quality:

Daniel Hirschman, General Counsel
North Carolina Department of Environmental Quality
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

If the party filing the petition is a person aggrieved other than the recipient of the certificate (the "Permittee"), the party **must also** serve the Permittee in accordance with NCGS 150B-23(a).

Be aware that other rules or laws may apply to the filing of a petition for a contested case. Additional information is available at https://www.oah.nc.gov/hearings-division/hearing-process/filing-contested-case. Please contact the Office of Administrative Hearings at (984) 236-1850 with all questions regarding the filing fee and/or the details of the filing process.

DUKE ENERGY

Water Strategy, Hydro Licensing, and Lake Services

Duke Energy 525 S. Tryon
Street Mail Code DEP – 35B
Charlotte, NC 28202

May 14, 2025

North Carolina Department of Transportation
% Bryan Sowell
PO Box 47
Shelby, NC 28151

Subject: Replacement of Bridge No. 350082 over the South Fork of Lake Wylie

Dear Mr. Sowell:

This letter will serve as your authorization to begin construction on Bridge No. 350082 over the South Fork of Lake Wylie. Please post a copy of this letter in a weather-proof plastic bag along the shoreline at the job site, visible from the water's edge. All safety plans, agency comments, and recommendations included in your application must be implemented.

All work must be complete within eighteen (18) months from the date of this letter. A one (1) year extension may be considered if you file a written request with Lake Services prior to the eighteen (18) month deadline. That request must set forth the reasons why the facilities will not be completed within the allotted time frame.

If you have questions, please contact me at Brett.Garrison@Duke-Energy.com or 864.624.6141.

Sincerely,

Brett Garrison
Lake Representative
Duke Energy

Prepared By: Karol P. Mack, Deputy General Counsel, Duke Energy
Return To: Duke Energy Carolinas, LLC
c/o Bambi M. Lohr (DEP-09A)
525 South Tryon Street
Charlotte, North Carolina 28202

Property No.: 007312
Land Unit: 0046337
Project No.: 007312-863666

STATE OF NORTH CAROLINA **BRIDGE EASEMENT**

COUNTY OF GASTON **AGREEMENT**

BRIDGE EASEMENT OVER LAKE WYLIE

CATAWBA-WATEREE HYDROELECTRIC PROJECT (FERC Project Number 2232)

THIS BRIDGE EASEMENT AGREEMENT ("Agreement") is made and entered into as of the 15 day of MAY, 2025 ("Effective Date"), by and between **DUKE ENERGY CAROLINAS, LLC**, a North Carolina limited liability company ("Grantor"), and **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**, an agency of the State of North Carolina ("Grantee"), each of which may be referred to herein singularly as "Party" and collectively, as "Parties;"

W I T N E S S E T H:

WHEREAS, Grantee owns, leases or otherwise controls substantial equity interests in lands in Gaston County, North Carolina, adjacent to Lake Wylie (the "Lake") which is part of Grantor's Catawba-Wateree Hydroelectric Project (FERC No. 2232) ("Project") and which Project is subject to regulatory oversight of, and is operated pursuant to a license issued by, the Federal Energy Regulatory Commission ("FERC"); and

WHEREAS, Grantee desires to use a portion of Project lands for the purpose of constructing, maintaining and operating a public bridge (the "Bridge") on Wilkinson Boulevard over the South Fork Catawba River to provide access for the public, to replace an existing bridge that will be demolished, as more fully described herein; and

WHEREAS, Grantor desires to accommodate Grantee's request for the construction, maintenance, and operation of the Bridge while at the same time not interfering with Grantor's ability to operate and maintain the Project in accordance with its license and other FERC requirements; and

WHEREAS, Article 411(c) of the FERC license for the Project allows the licensee of the Project to convey easements or rights-of-way across, or leases of, Project lands for the construction, maintenance, and operation of the Bridge for which all necessary state and federal approvals have been obtained without prior FERC approval; and

WHEREAS, Grantee has obtained all necessary state and federal approvals for the construction, maintenance, and operation of the Bridge.

NOW, THEREFORE, upon the terms and conditions hereafter set out, the covenants and agreements hereafter expressed to be kept and performed by Grantee, and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable considerations to Grantor paid, the receipt of which is hereby acknowledged, Grantor has bargained and sold and by these presents does hereby bargain, sell, grant and convey to said Grantee, its successors and assigns, an easement over a portion of the lands of Grantor acquired by deed recorded in Deed Book 259 at Page 559 in the Office of the Clerk of Court for Gaston County, North Carolina for the purpose of Grantee's construction, maintenance and operation of the Bridge over a portion of the Project lands on Wilkinson Boulevard, North Carolina, more particularly described as follows:

> That area or parcel of land shown as "AREA IN PROPOSED EASEMENT 0.790 Acres," on the survey entitled "The NCDOT over DUKE ENERGY LAKE WYLIE PROJECT BOUNDARY," prepared by TGS Engineers, dated December 30, 2024, attached hereto as **Exhibit A** and incorporated herein by reference (the "Easement Area").

TERMS AND CONDITIONS:

1. Term: This Agreement shall begin on the Effective Date and runs in perpetuity; provided, however, Grantor may terminate this Agreement as provided herein or require its modification at any time if directed to do so by FERC or its successor agency.

2. Improvements: Grantee shall construct, maintain and operate the Bridge in accordance with the specifications and clearance measurements shown on **Exhibit A**. Grantee agrees that it will obtain written approval from Grantor before initiating any replacement or major repair to the Bridge within the Easement Area, and that any future modifications will still provide navigable bridge spans with at least the clearance heights noted on **Exhibit A**. Grantee also agrees to advise any other party that it may become aware of who desires to place improvements within the Easement Area that said party must first obtain written approval from Grantor.

3. Maintenance: Grantee recognizes that it has the continuing responsibility to ensure that the constructed facilities are maintained in good repair, including but not limited to the maintenance and operation of the Bridge, any required navigation safety devices, and proper erosion control within the Easement Area, and agrees to take all reasonable steps necessary to meet this responsibility. Grantee shall maintain and operate all

structures within the Easement Area in a safe and sound condition and in a neat appearance and pay all costs for said maintenance and operation.

4. Protection of Environment: Grantee's use of the Easement Area shall not endanger public health, create a nuisance or otherwise be incompatible with the overall recreational use of the Project. Grantee shall take all necessary precautions to ensure that the construction, operation, and maintenance of the Bridge will occur in a manner that will protect the scenic, recreational, cultural and environmental values of the Project.

5. Access: It is understood by and between Grantor and Grantee that Grantee shall have such right of ingress, egress and regress over and upon lands of Grantor adjacent to or in the vicinity of the Easement Area as may be essential to the use thereof for the construction and operation of the Bridge.

6. Compliance with Federal, State and Local Laws: Grantee agrees that its use of the Easement Area as herein provided shall be consistent with all FERC orders, regulations and requirements regarding recreational opportunities and development at licensed projects and use of Project lands and facilities, and all other applicable federal, state and local laws as well as all ordinances, rules, regulations and sanctions of any regulatory body or governmental agency (federal, state or local) having jurisdiction in the Easement Area.

7. Reservation of Use: The right to use the Easement Area which is the subject of this Agreement for all Project purposes is hereby reserved to the FERC Project licensee and its successors and assigns.

8. Reservation of Authority: No terms or conditions herein contained shall be construed as limiting or affecting in any way the authority of Grantor in connection with its exercise of proper protection and administration of its FERC license.

9. Transfer or Assignment: Grantee may not transfer or assign this Agreement without the prior written consent of Grantor.

10. Archaeological Resources: Grantee shall comply with the cultural resources consultation requirements specified in Grantor's Historic Properties Management Plan for the Project regarding any ground-disturbing activities, inadvertent discoveries, treatment of human remains and funerary objects or significant modifications to the Easement Area. If previously unidentified archeological or historical properties are discovered during the course of excavation/construction/demolition within the Easement Area, Grantee shall stop all land clearing or land disturbing activity in the vicinity of the excavation/construction/demolition area and notify Grantor immediately. Grantor shall initiate the required consultation process with the State Department of Archives and History, and the State Historic Preservation Office. Grantor may be required to prepare a cultural resources management plan for approval by the FERC that includes but is not limited to the following: (i) a description of each discovered property indicating whether it is listed on, or eligible for listing on the National Register of Historic Places, (ii) a description of the potential effect, and (iii) the proposed measures for avoiding or mitigating the impacts. Grantee shall be responsible for implementing any required cultural resource management plan and Grantee shall reimburse Grantor for Grantor's cost to prepare any cultural resource management plan and gain FERC approval for the same. No land clearing or land disturbing activities within the Easement Area shall resume until authorized in writing by Grantor.

11. Flooding and Drawdown: Grantor reserves the right to back, flood, or draw down the waters of the Catawba River and its tributaries from time to time and at any and all times over and upon the Easement Area or any portion of the same, to such extent the flooding or drawdown may be reasonably necessary or convenient in connection with the practical operation of its hydroelectric power plants or other electric generation operations located or to be located in the future upon the Catawba River or its tributaries and to the extent such flooding or drawdown is consistent with Grantor's obligations under its License, other applicable easements and agreements, and applicable law. Grantee agrees that any damage it may suffer as a result of such flooding or drawdown shall not be claimed or charged against Grantor.

12. FERC Project Restoration: Grantor shall be under no obligation to Grantee to maintain or continue to operate the Project or Lake and should said Project or Lake be damaged, destroyed or removed, Grantor shall be under no obligation to restore or rebuild same, and Grantee hereby waives all claims against Grantor for damages to or destruction or removal of the Project or Lake.

13. Parties Bound: The covenants and conditions herein contained shall apply to and bind the successors and assigns of the Parties hereto; provided, however, that neither this Agreement nor any interest therein may be assigned or transferred by Grantee except as provided in Paragraph 9.

14. Indemnity: To the extent permitted by law, Grantee shall indemnify and save harmless Grantor from and against any and all claims, liability, loss or damage, including reasonable attorneys' fees, arising from any conduct, work or thing done under the terms of this Agreement, to include injury or damage however caused, to any person or persons, including Grantor, or to the property of any person, or persons or corporations, occurring on or near the Easement Area as the result of any activity of Grantee, its agents, employees, or any other person or entity using or crossing the Bridge, including members of the general public, and protection, mitigation and enhancement measures or activities required by FERC or its successor agency in connection with the activities conducted by Grantee hereunder.

15. Limitation of Liability: Grantor and Grantee agree to warrant that any and all work performed within the Easement Area will be performed with professional thoroughness and using acceptable standard business practices. Grantor's total cumulative liability to Grantee for claims of any kind whether based on contract, tort (including strict liability and negligence except for gross negligence or willful misconduct on part of Grantor), under any warranty or otherwise, for any loss or damage relating to this Agreement, shall in no case exceed the cost of completing the work in accordance with acceptable business practice, and Grantee releases Grantor from all further liability in excess of this amount for any work performed under this Agreement. Grantee further releases Grantor from any and all liability resulting from any injury of any employee of Grantee or anyone performing any service at the direction of Grantee on the Easement Area, excluding any acts of willful misconduct of Grantor.

Neither Party shall be liable, whether based on contract, tort (including negligence and strict liability), under any services or work performed relating to this Agreement, for any consequential, indirect, special, or incidental loss or damage, any damage (except to the extent damage resulted from willful misconduct) to or loss of any property or equipment.

This limitation of, or protection against liability shall also protect directors, officers, employees, agents, consultants, suppliers, subcontractors, and affiliated entities and their directors, officers, employees, agents,

consultants, suppliers, subcontractors, parents, subsidiaries and affiliates of Grantor and shall apply regardless of the fault (excluding willful misconduct), gross negligence or strict liability of the respective party.

Grantee waives and will require its insurers to waive all rights to recovery and claims of any kind, including rights and claims to which its insurers or another may be subrogated, against Grantor arising out of damage to, loss of or loss of use of any of Grantee's property, located on the Lake, whether based on contract, tort (including strict liability and negligence except for gross negligence or willful misconduct on part of Grantor), under any warranty or otherwise. These waivers are effective as to all damages to or losses of use of property arising out of or relating to this Agreement or deficiencies in the services provided hereunder and Grantee hereby covenants that no such action or claim shall be brought by or through Grantee on any theory whatsoever. In the event Grantee or its insurers recover damages from a third party for losses or damages to which the foregoing waivers apply, Grantee shall indemnify and hold Grantor harmless against any liability for any such losses or damages which said third party recovers from Grantee and any expenses (including attorney fees and other cost of investigation and defense) related hereto.

The limitation of liability in this provision shall apply notwithstanding any other provision of this Agreement.

16. Termination & Waiver: It is expressly agreed and understood that the violation of any of the covenants, conditions, terms, or provisions of this Agreement by Grantee, including but not limited to noncompliance with applicable federal or state regulations, or health and sanitation laws, shall terminate this Agreement at the option of Grantor. This Agreement may also be terminated by Grantor if at any time during the duration of this Agreement (or any renewal thereof) Grantee should be adjudged bankrupt or insolvent by any federal or state court or Grantee shall allow a final judgment obtained against it to remain unpaid for a period of sixty (60) days. Failure of Grantor to exercise any of said rights relating to the termination of this Agreement or any other rights of Grantor under this Agreement shall not be construed as a waiver or abandonment of the right thereafter to exercise any or all of same. In the event Grantor terminates this Agreement under any of the above written conditions, Grantor may enter the Easement Area and expel Grantee therefrom; or Grantor may, in lieu thereof or in conjunction therewith, pursue any other lawful right or remedy incident to the relationships created by this Agreement. Grantor shall give sixty (60) days' notice in writing to Grantee of its intent to terminate. Grantee shall have the right to cure any violation during said sixty-day notice period, during which notice period Grantor may not terminate this Agreement.

17. Non-warranty, As Is: Grantor makes no warranty, express or implied, with respect to the title to the Easement Area. Grantee accepts the Easement Area in "AS IS" condition.

18. Utility Easement: Grantor reserves an easement to build, construct, maintain and operate electric distribution/transmission lines on, over, along and above the Easement Area. Grantor also reserves the right, privilege and easement to erect, construct, reconstruct, replace, maintain and use towers, poles, wires, crossarms and other appliances and fixtures for the purpose of transmitting or distributing electric power, for said Grantor's communication purposes, and for any other purpose that is, in Grantor's sole discretion, consistent with its business operations, together with the right to keep said lines, appliances, and fixtures free of structures, trees and other objects that may endanger or interfere with same.

19. Notices: Wherever in this Agreement it shall be required or permitted that notice be given by either Party to this Agreement to the other, such notice must be in writing and must be given personally or forwarded by certified mail addressed as follows:

To Grantor: Duke Energy Carolinas, LLC
Attn: Lake Services (DEP-35B) B. Garrison
525 South Tryon Street
Charlotte, North Carolina 28202

To Grantee: North Carolina Department of Transportation
c/o Bryan Sowell
Post Office Box 47
Shelby, North Carolina 28151

Such addresses may be changed from time to time by notice given hereunder. Each Party shall provide timely notice to the other Party of any address changes or name changes.

20. Existing Agreements Amended and Superseded; Removal of Existing Bridge: Upon the completion of construction of the Bridge, Grantee shall demolish and completely remove the existing bridge and associated facilities from the Project Boundary and restore the area to its natural condition, to the extent reasonably possible. Grantee agrees to provide Grantor with an as-built/bathymetric survey showing existing bridge facilities have been removed. Beginning on the date the Bridge has been constructed and the existing bridge has been demolished and completely removed from within the Project Boundary and the Project Boundary restored, this Agreement shall amend, restate, replace and supersede all previous easements or other agreements between Grantor and Grantee, or their respective predecessors in interest, for the use of the area where the existing bridge is located, and such prior leases or other agreements are of no further force or effect.

(Remainder of page intentionally blank. Signature pages follow.)

IN WITNESS WHEREOF, the Parties hereto have caused this instrument to be executed this the day and year first above written.

GRANTOR:

DUKE ENERGY CAROLINAS, LLC
a North Carolina limited liability company

By: _____
Print Name: KEVIN L. LEE
Title: MANAGER, REAL ESTATE II

STATE OF NORTH CAROLINA

COUNTY OF ~~MECKLENBURG~~ JOHNSTON

I certify that KEVIN L. LEE personally appeared before me this day, acknowledging to me that he or she signed the foregoing Bridge Easement document, on behalf of the company, in the capacity stated.

Date: May 15, 2025

_____
Notary Public

Dawn Callahan
Notary Name Typed/Printed

My Commission Expires: 12-8-2026

[Notary Seal]
DAWN CALLAHAN
NOTARY PUBLIC
Johnston County
North Carolina
My Commission Expires December 8, 2026

[Signatures Continue on Following Page]

IN WITNESS WHEREOF, the Parties hereto have caused this instrument to be executed this the day and year first above written.

GRANTEE:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
an agency of the State of North Carolina

By: Bryan K. Sowell
Print Name: Bryan K. Sowell
Title: Dep. Project Development Engineer

STATE OF NORTH CAROLINA

COUNTY OF Gaston

The foregoing instrument was acknowledged before me this 23rd day of January, 2025, by Anthony C. Smith Right of Way (name of officer), as Right of Way (title of officer) on behalf of NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, an agency of the State of North Carolina, in the capacity stated.

Notary Public

Anthony C. Smith
Notary Name Typed/Printed

My Commission Expires: 1-23-25

[Notary Seal]

ANTHONY C SMITH NOTARY PUBLIC GASTON COUNTY, NC

BASIS:

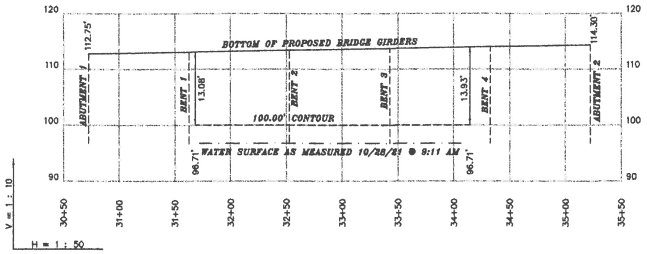
- All distances are horizontal ground feet unless otherwise noted.
- Bearings were determined by coordinate computations.
- All coordinates and distances are in US Survey Feet.
- This survey does not certify to title or ownership.
- No title search was provided for this survey.
- The survey that resulted in the preparation of this plat used only the information of record as noted hereon.
- The property is subject to any and all easements, rights of way, and restrictive covenants of record.
- The Lake Wylie Project Boundary is Elevation 100.0' as measured from the full pond elevation. Reference is made to DB 259 PG 559.
- All elevations shown hereon based on Lake Wylie Project Datum at full pond. Water surface at time of survey was 96.71'.

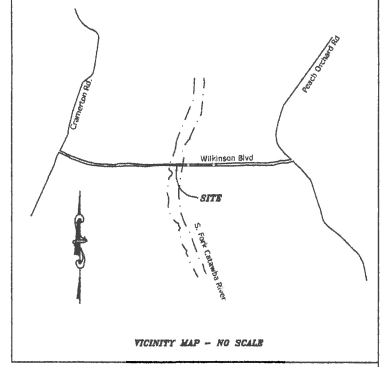
CALLS ALONG LAKE WYLIE FERC PROJECT BOUNDARY (LEASE LIMITS)

LINE	BEARING	DISTANCE
L1	N 24°39'05" E	22.73'
L2	N 14°25'54" E	20.48'
L3	N 27°33'33" E	30.59'
L4	N 45°40'27" E	22.93'
L5	N 41°09'43" E	58.07'
L6	S 27°27'30" W	19.22'
L7	S 26°52'37" W	23.57'
L8	S 23°14'05" W	27.69'
L9	S 22°58'10" W	31.40'
L10	S 28°50'41" W	44.55'

CALLS ALONG LAKE WYLIE FERC PROJECT BOUNDARY (TIE LINES)

LINE	BEARING	DISTANCE
T1	N 21°18'23" E	31.21'
T2	S 29°17'42" W	13.09'
T3	S 28°43'01" W	21.86'
T4	S 30°57'33" W	30.69'
T5	N 27°21'00" E	18.68'
T6	N 31°30'45" E	13.40'

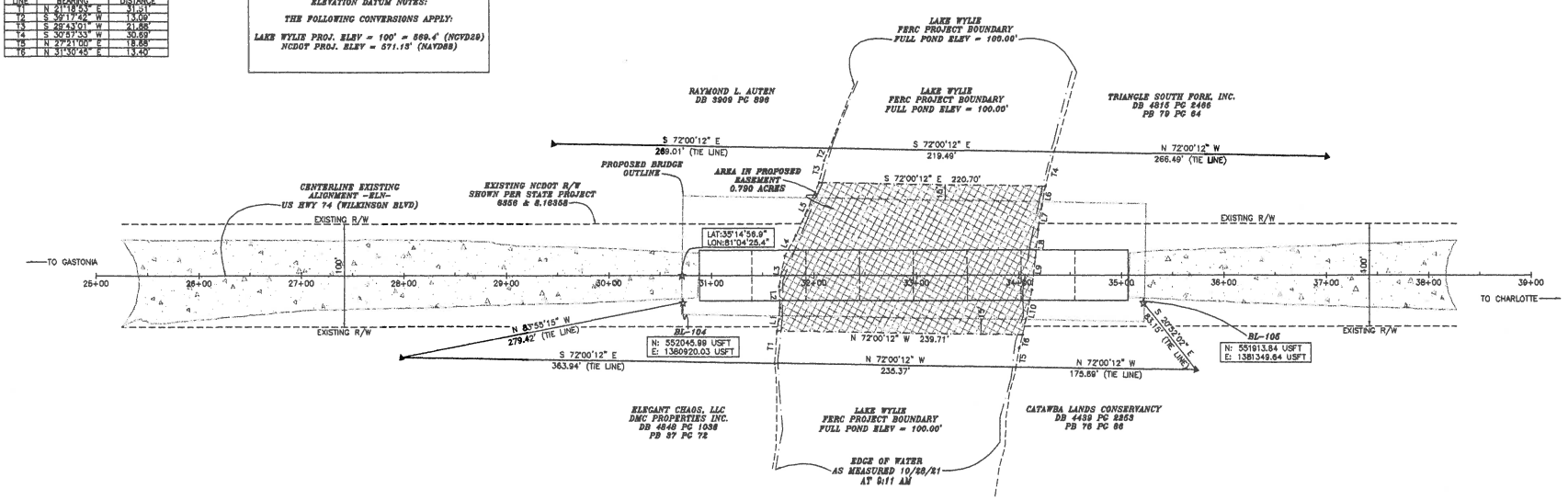


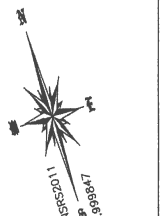


ELEVATION DATUM NOTES:

THE FOLLOWING CONVERSIONS APPLY:

LAKE WYLIE PROJ. ELEV = 100' = 569.4' (NGVD29)
NCDOT PROJ. ELEV = 571.15' (NAVD88)





LEGEND

- ☆ PROJECT CONTROL MONUMENT
- ◦ UNMARKED POINT
- ▲ REBAR WITH ALUMINUM R/W CAP
- PROPOSED NCDOT R/W LINE (SURVEYED)
- PROPOSED EASEMENT LINE (SURVEYED)
- TIE LINE (SURVEYED)
- EXISTING R/W LINE (SURVEYED)
- FERC PROJECT BOUNDARY (SURVEYED)
- WATER SURFACE (SURVEYED)
- CONCRETE BRIDGE OUTLINE (SURVEYED)
- BRIDGE PIER LOCATIONS (SURVEYED)
- ROAD EDGE OF PAVING (SURVEYED)

SURVEYOR'S CERTIFICATION

I, Matthew T. Cornwell certify that this plat was drawn under my supervision from an actual survey performed under my supervision (deed description recorded in Book 259, Page 559, Gaston County Registry); that the boundaries not surveyed are clearly indicated as dashed lines drawn from information found as shown hereon; that the ratio of precision as calculated exceeds 1: 10,000; and that this plat was prepared in accordance with G.S. 47-30 as amended. This plat meets the requirements of G.S. 47-30 Section f-11-d. That the survey is of another category, such as the recombination of existing parcels, a court-ordered survey, or other exemption to the definition of subdivision.

Witness my original signature and seal this the 30th day of December, A.D., 2024.

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

12/30/2024

Digitally signed by Matthew Cornwell

SURVEYOR

L-4775

N.C. P.L.S. LICENSE NUMBER

NORTH CAROLINA SHOCK ENGINEERING INCORPORATED SEAL 1978 N.C.

STATE OF NORTH CAROLINA COUNTY OF GASTON

I, _____, Review officer of Gaston County, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

Review Officer _____ Date _____

REVISED 10/11/23 TO SHOW PROPOSED BRIDGE HEIGHT IN PROFILE
REVISED 12/30/24 PER DUKE COMMENTS TO SHOW 569.4' AS FULL POND ELEVATION

0' 50' 100' 150'

SCALE 1"=50'

SHEET 1 OF 1

TGS ENGINEERS

FIRM LICENSE NUMBER C-0275

SURVEY OF RIGHT OF WAY, LEASE LIMITS & FERC MAP FOR:

The NCDOT over Duke Energy Lake Wylie Project Boundary

Location: Wilkinson Boulevard over S. Fork Catawba River
Deed Reference: DB 259 PG 559
PID NO: None
Map/Blk/Lot: None
Cramerton, Southpoint Township., Gaston County, NC

TGS Engineers
201 WEST MARION STREET – SUITE 200
SHELBY, NC 28150
PH. (704) 476-0003

DRAWN BY: M. T. Cornwell, PLS, PE		SURVEYED BY: MTC & BGH
Date of Survey: October 28, 2021	Map Date: 12/30/2024	CHECKED BY: M.T. Cornwell, PE, PLS

U-6146 / B-5857 Lake Facility Navigational Safety Plan (Boater Safety Plan):
Proposed Widening of US 29 / US 74 (Wilkinson Blvd) and Replacement of Bridge #350082 over South Fork Catawba River

Introduction

TIP project B-5857 involves the replacement of existing bridge No. 350082 over South Fork Catawba River in the Town of Cramerton, Gaston County. This bridge project is part of a larger road widening TIP project U-6146: US 29 / US 74 (Wilkinson Blvd) for SR 2209 (Wesleyan Drive / Market Street) to SR 2016 (Georgia Bell Avenue) / SR 2017 (Hubbard Street).

Bridge No. 350082 was built in 1926, with an overall length of 419' and consists of 8 spans with 5 piers in the water. The existing bridge is comprised of a reinforced concrete deck on reinforced concrete girders. Bridge No. 350082 will be replaced with a 450' long prestressed concrete girder bridge consisting of 5 spans with 2 piers in the water. The proposed bridge will be built at the existing location while maintaining 4 lanes of traffic on US 29 / US 74 utilizing phased construction techniques.

The proposed bridge will not reduce navigational clearance once completed, but there will be temporary impacts during construction to boater traffic. The section of South Fork Catawba River the project crosses is part of Gaston County's 11 Mills Blueway Trail, with several canoe / kayak launches up and downstream of the bridge. Navigation for boater traffic will need to be left open during bridge construction.

Scope of Construction Activities

The scope of construction activities on Bridge No. 350082 that affect boater access and safety are:

- Removal of the existing deck slab, railing, and girders.
- Removal of the existing interior bent piers, interior bent caps, approach / end bent piers, and approach / end bent caps.
- Installation of the proposed interior bent piers, interior bent caps, approach / end bent piers, and approach / end bent caps.
- Installation of the proposed Class "II" Rip-Rap end bent slope protection.
- Installation of the proposed concrete girders and concrete deck.

Access

Access to the bridge for construction workers, equipment, and construction activity will be by barges situated on South Fork Catawba River or from the existing bridge. All barge activity will be reviewed by NCDOT and must be approved prior to beginning construction. Barge access to South Fork Catawba River may be made via work bridges on the banks of the river within the right-of-way or permanent / temporary easement. Work skiffs will shuttle construction workers to the barge as needed.

Bridge Construction Items

- All debris generated by construction will be contained and at no time will it be dropped into the water.
- The contractor will protect all utility lines which may be supported on, under, or adjacent to bridge work sites from damage.

Operational Safety Methods

- All parts of the existing bridge, and the traveling public including boaters, will be protected from new bridge construction activities.
- Work Plan – No work will begin until the Contractor furnishes the (NCDOT) Engineer with a work plan for construction and the Engineer has accepted the plan.
- All activities will follow OSHA requirements (OSHA 29-CFR 1910-1926).

Mooring Requirements

When utilizing barges, tugboats or other vessels, the Contractor will take all necessary precautions to ensure that such vessels are securely anchored or moored when not in active operation and to contain the vessels withing the encapsulated work area. Red solar powered LED marine safety lights shall also be attached to the vessel to mark its location at night. The contractor will also take all necessary measures to ensure that the vessels are operated in a manner that avoids damage to or unnecessary contact with bridges, boaters, and other highway structures and attachments within the containment area. If severe weather conditions are anticipated, or should be anticipated through reasonable monitoring of weather forecasts, the contractor shall take additional measures to adequately moor the vessel within the containment area during the extreme conditions. Vessels will be secured per section 107 of the 2024 NCDOT Standard Specifications.

Boater Notifications

The impact to boaters will be noted within information provided on placards at all public boat launches along the South Fork Catawba River portion of the 11 Mills Blueway Trail. At each boat launch, such placards shall be displayed at the loading areas informing boaters of the impacts to the waterway access under the bridge. The placards will be displayed a minimum of two weeks prior to the installation of the floating barricade system and the associated work to be performed on the structure. The placards will provide contact numbers for the Contractor, NCDOT, North Carolina Wildlife Resource Commission, and the US Fish and Wildlife Service so that the public can make inquiries or report damage, vandalism, or operational problems with the system. The placards will remain in-place until construction is completed. Placards shall be updated and maintained as needed. A minimum of two placards shall be posted at each of the following locations:

- Spencer Mountain Boat Launch: 261 Stanley Spencer Mtn. Rd., Spencer Mountain, NC 28056
- South Fork Blueway Boat Launch: 199 Willow Rd., McAdenville, NC 28056
- Adam Springs Portage Trail: Portage around the McAdenville Dam
- South Fork Village Boat Launch: 2000 Rivers Edge Dr., Belmont, NC 28012
- Goat Island & Goat Island Park: 137 & 141 8th Ave., Cramerton, NC 28032
- Riverside Park and Greenway: 75 Riverside Dr., Cramerton, NC 28032

Prior to installing the placards, the Contractor shall coordinate with the boat access owners.

Boater Safety System

- Lighting: Red solar powered LED marine safety lights will be place atop the "keep out" buoys (see image to the right) and moored barge / boating equipment. Green solar lights will be installed on the existing / proposed bridge piers to delineate safe boater access through the site. The lights will be placed a minimum of 2 feet above the water line to provide a visual barrier both day and night. These solar marine lights help protect boaters during the early morning and late afternoon / early evening hours or when cloud cover reduces visibility for boaters. The marine safety lights provide visibility in flashing mode up to one nautical mile, according to the distributor. They can be set for 'steady on' or 'in flash' mode at a rate of one flash per second. They can be seen no matter the boater's position, if not mounted perfectly level, or if the buoy is bobbing or swaying.



- Navigational buoys for boaters: No buoys currently exist upstream or downstream of Bridge No. 350082. Coast Guard-approved "Keep Out" buoys (see image to the right) shall be installed at the locations shown on Figures 1 through 6 (approximately 50 ft upstream and downstream of the bridge). Buoys shall conform to US Coast Guard "U.S. Aids to Navigation System".



- All routine maintenance activity for the boater safety system is restricted to occur only between 6:00 am and 7:00 pm. Emergency repairs to the boater safety system will be made as needed, anytime 24 hours per day / any day of the week.

Deployment of the Boater Safety System

The lighted buoys and green solar lights will be put into place prior to the commencement of any work on the structure and moved periodically, as need, to protect boaters from the construction activities. Due to the nature of the boater traffic, law enforcement is not anticipated to be required during the deployment of the boater safety system. Deployment and redeployment will occur during daylight hours. The operation will occur from a barge and or work skiff. The lights will be inspected daily, and non-functioning lights repaired immediately.

Staging Plan

Figure 1 shows the first stage of activity. While US 29 / US 74 traffic is maintained on the existing bridge, partial construction of proposed spans 1 through 3 will take place with boater traffic directed through span 6 of the existing bridge along the eastern riverbank. Keep out buoys with red solar lights will be deployed upstream and down downstream as shown to delineate the construction area. Green solar lights will be installed on the existing bridge piers as shown to identify safe boater access.

Figure 2 shows the second stage of activity. While US 29 / US 74 traffic is maintained on the existing bridge, partial construction of proposed spans 4 and 5 will take place with boater traffic directed through span 2 of the proposed bridge and span 3 of the existing bridge along the western riverbank. Keep out buoys with red solar lights will be shifted east to cover the construction area. Green solar lights will be installed on the existing and proposed bridge piers as shown to identify safe boater access.

Figure 3 shows the third stage of activity. With US 29 / US 74 traffic shifted as shown (westbound on the partial proposed bridge, eastbound on the existing bridge) and the boater safety system at the same configuration as Stage 2, remove partial sections of spans 5 through 8 of the existing bridge, with partial construction of proposed spans 4 & 5.

Figure 4 shows the fourth stage of activity. With US 29 / US 74 traffic maintained from Stage 3, the boater safety system will be adjusted as shown shifting the safe boater access to span 4 of the proposed bridge and span 6 of the existing bridge. Partial removal of existing spans 1 through 4 will take place, with partial construction of proposed spans 1 through 3.

Figure 5 shows the fifth stage of activity. With US 29 / US 74 traffic shifted as shown (westbound and eastbound on the partial proposed bridge) and the boater safety system at the same configuration as Stage 4, remove the remainder of existing spans 1 though 4 and construct remainder of proposed spans 1 & 2.

Figure 6 shows the sixth stage of activity. With US 29 / US 74 traffic maintained from Stage 5, the boater safety system will be adjusted as shown shifting the safe boater access to span 2 of the proposed bridge. Removal of the remainder of existing spans 5 through 8 will take place, with construction of the remainder of proposed spans 3 through 5.

Schedule – (tentative)

A phased approach is described below, dates to be determined:

Stage	Likely Start Date	Anticipated End Date	Activity
0			Mobilize/Procure Materials (6 Months)
1			Stage 1 (4 Months, See Figure 1)
2			Stage 2 (4 Months, See Figure 2)
3			Stage 3 (4 Months, See Figure 3)
4			Stage 4 (4 Months, See Figure 4)
5			Stage 5 (4 Months, See Figure 5)
6			Stage 6 (4 Months, See Figure 6)
End			De-mobilize (6 Months)

Notes:

- Time restrictions:
  - On top of the bridge deck: 7:00 pm – 6:00 am / 7 days per week
  - Under the bridge deck: None (operations can occur 24 hours per day / 7 days per week)
  - Boater Safety System: Operational throughout the project
  - Repairs to Boater Safety System: As needed, anytime 24 hours per day / 7 days per week
  - All routine maintenance of boater safety system to occur between 6:00 am and 7:00 pm

Staging Area for Contractor's Equipment / Materials

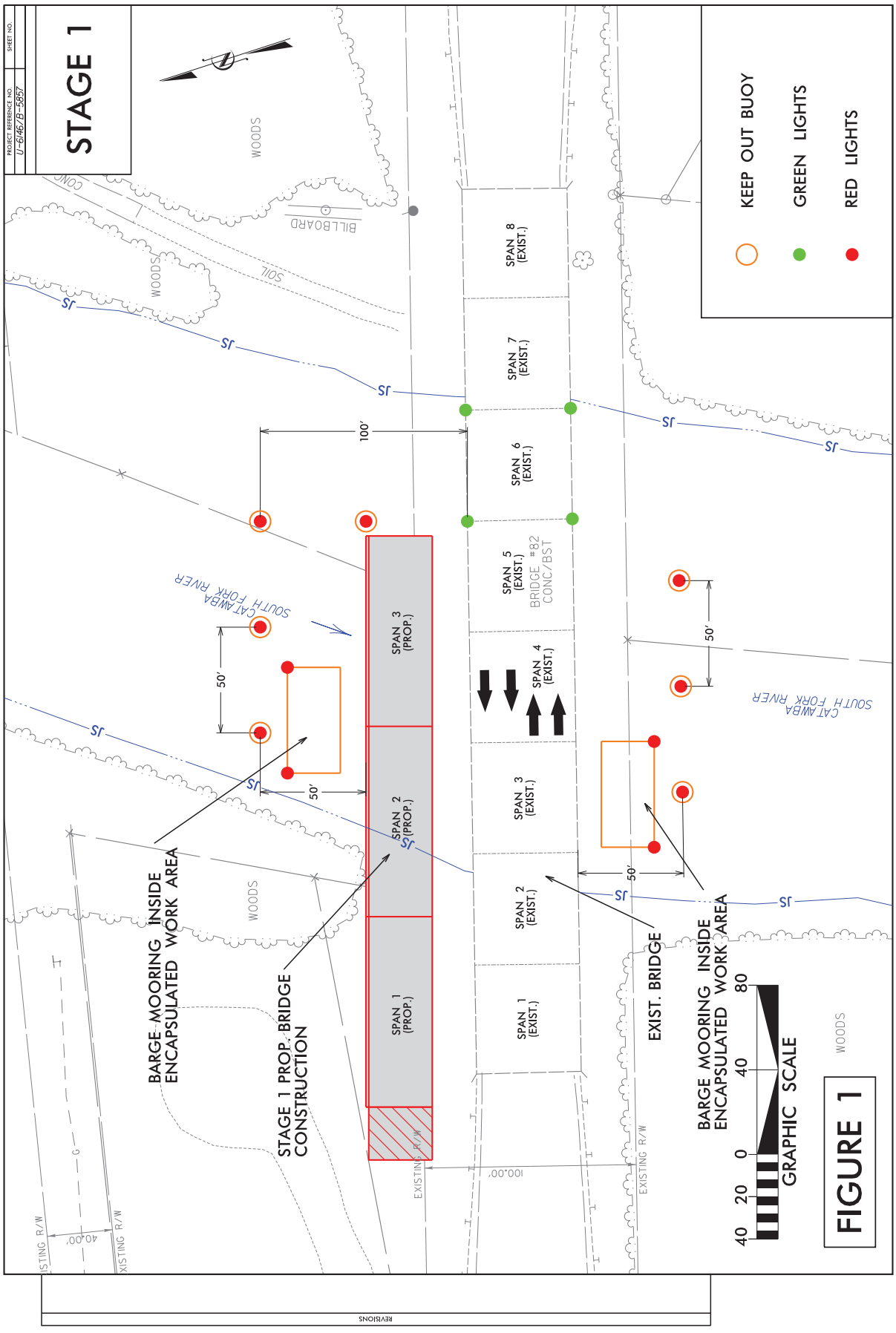
The Contractor is responsible for procuring any offsite staging location and meeting all requirements of the respective property owner(s).

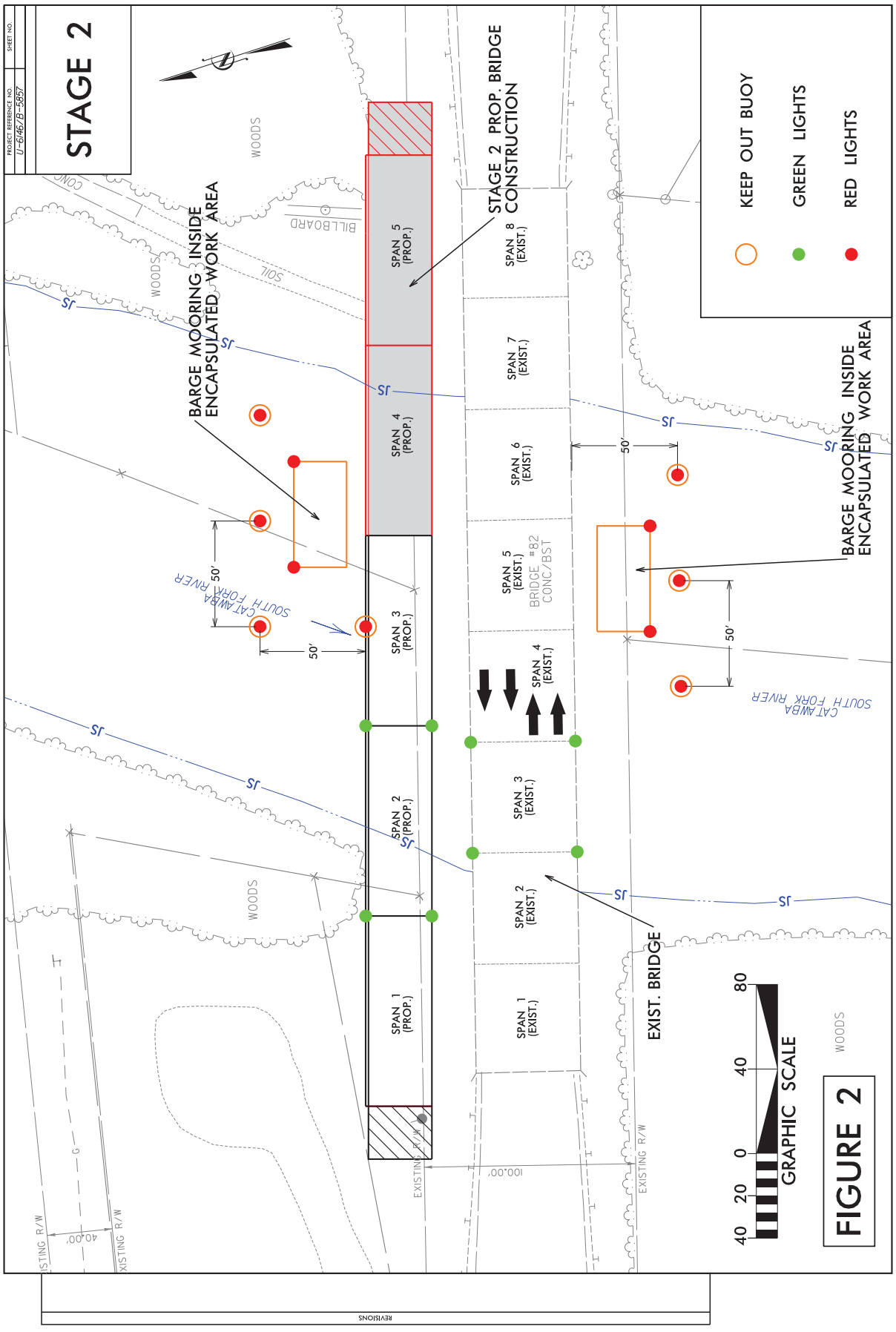
Standards

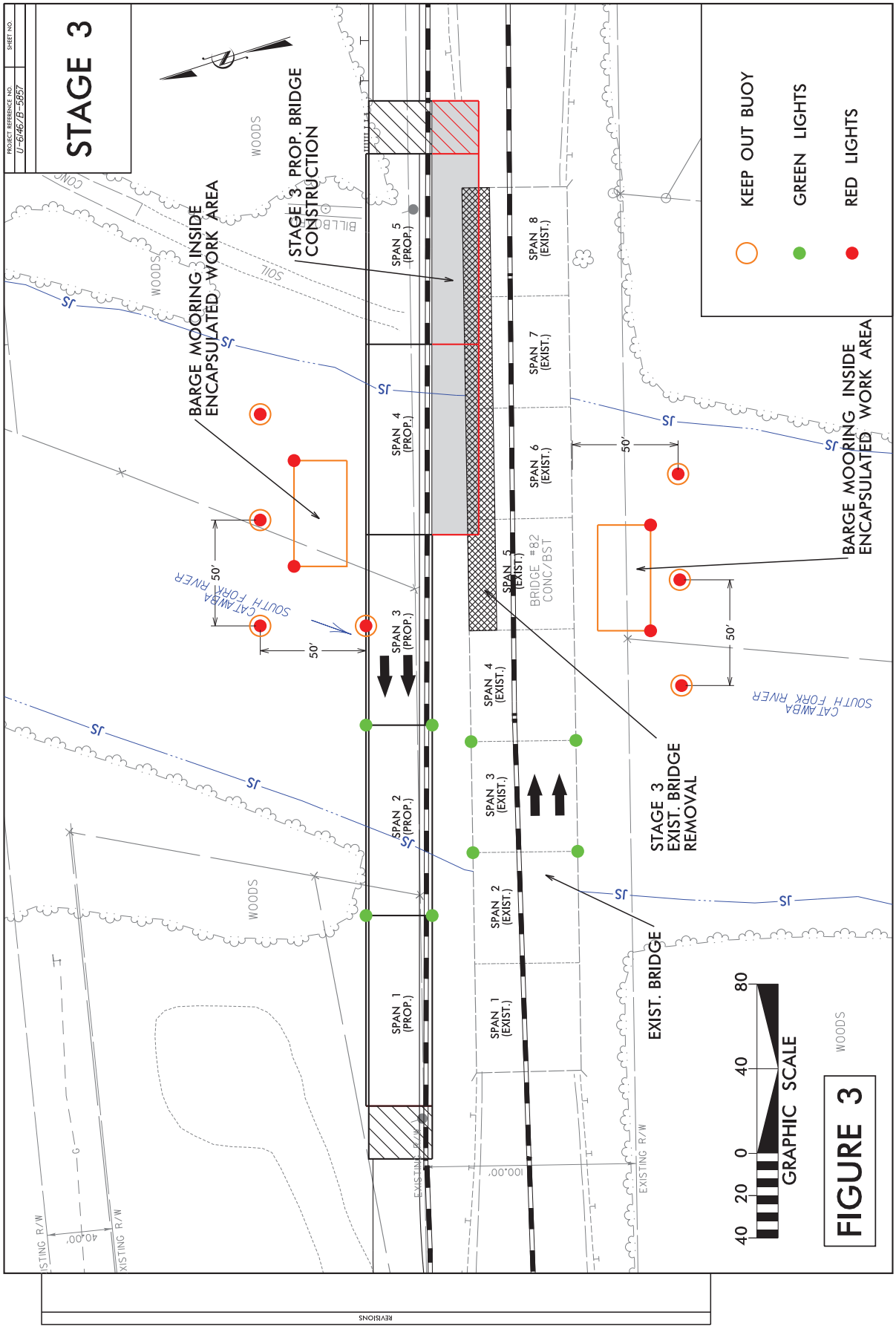
- NCDOT Standard Specifications for Roads and Structures, January 2024
- Occupational Safety and Health Act (OSHA 29-CFR 1910-1926)

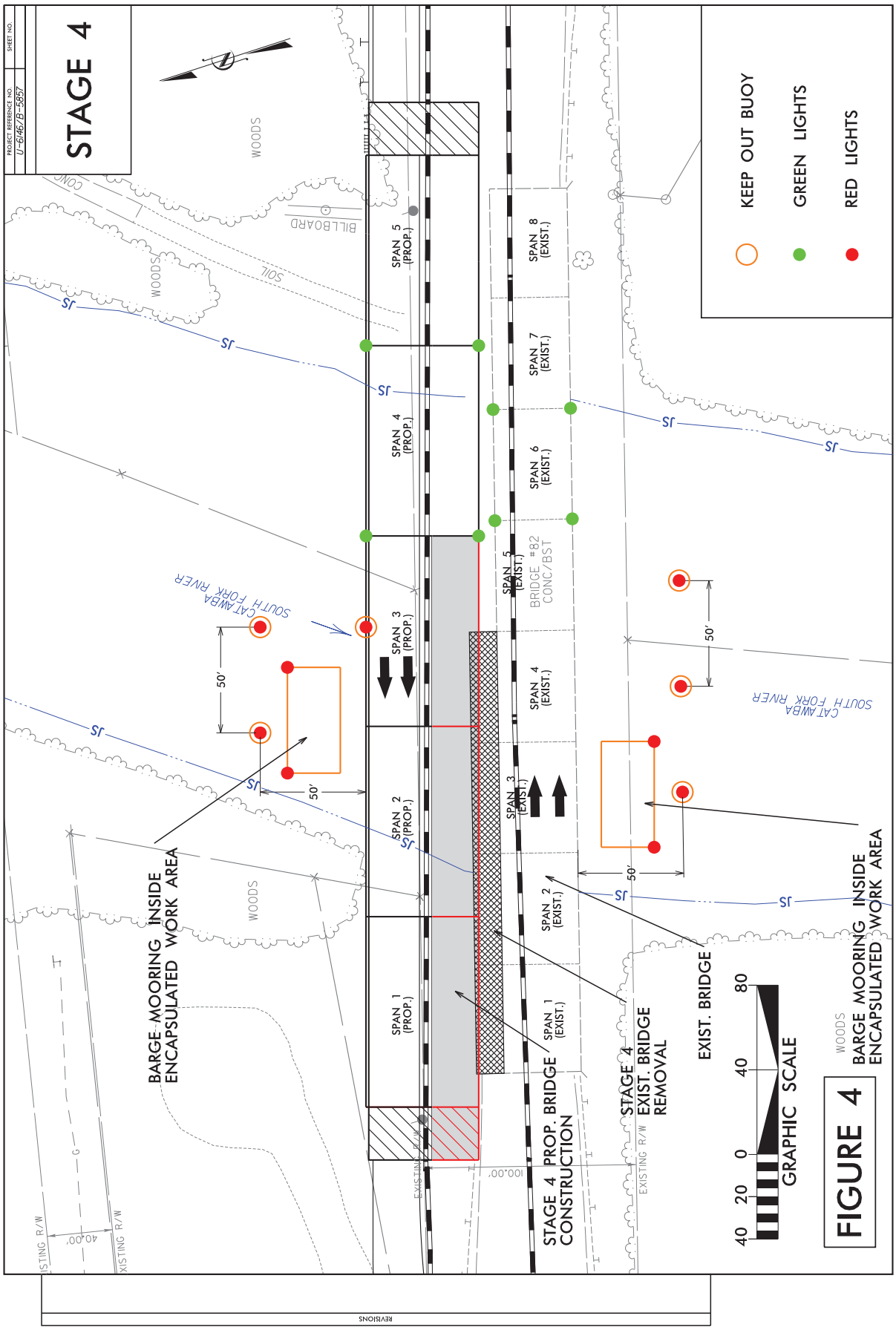
Conclusion

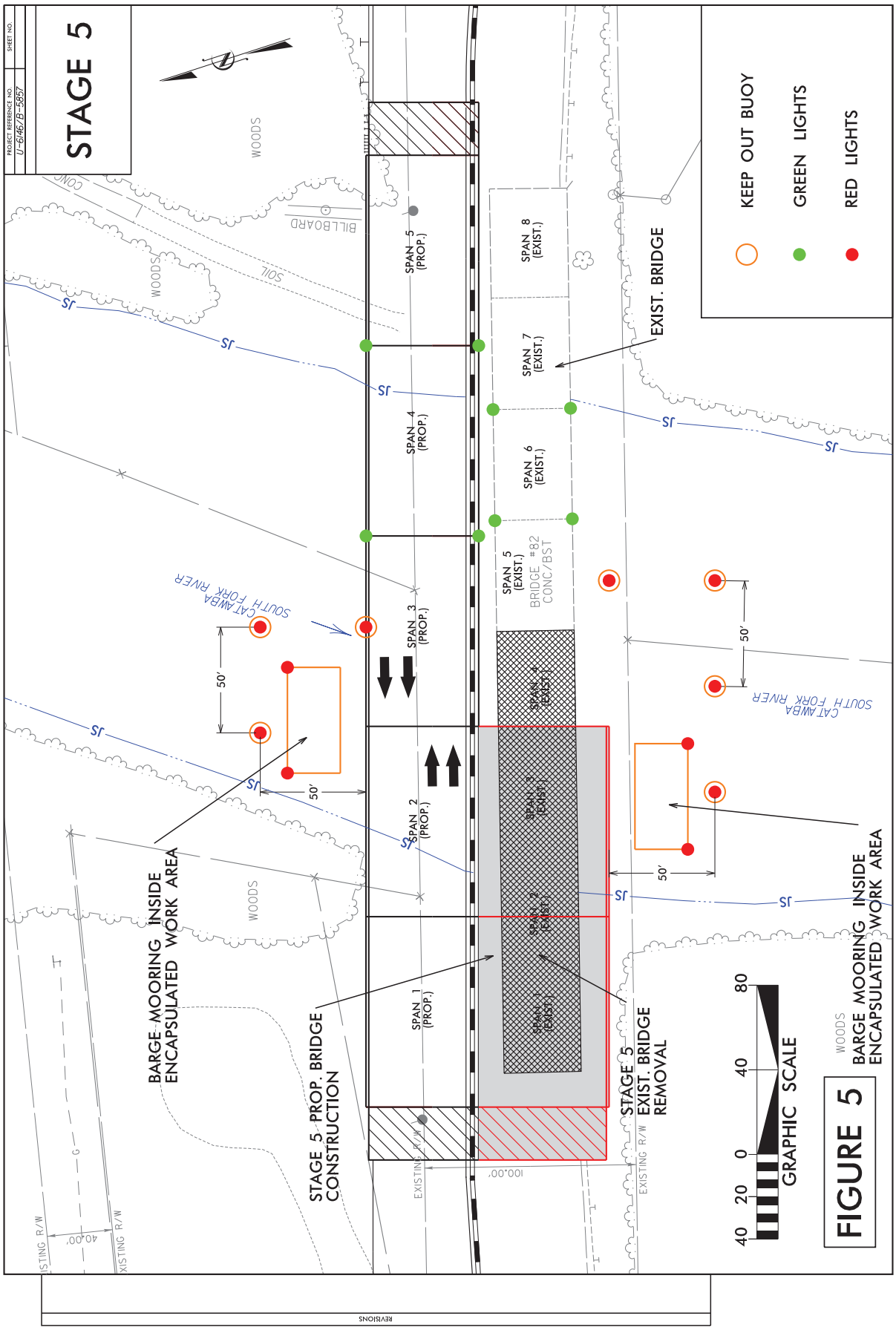
The U-6146 / B-5857 project will remove and replace the existing bridge No. 350082 over South Fork Catawba River in the Town of Cramerton, Gaston County. The work will have an impact on boater traffic on South Fork Catawba River. This document outlines the requirements for notification and protection of boaters, and the general scope of work that will impact the river. A system of buoys and marine safety lights will be employed to protect boater traffic from the work area. Navigation for boater traffic will need to be left open during bridge construction. Notification placards will be placed at public boat access ramps along the South Fork 11 Mills Blueway.

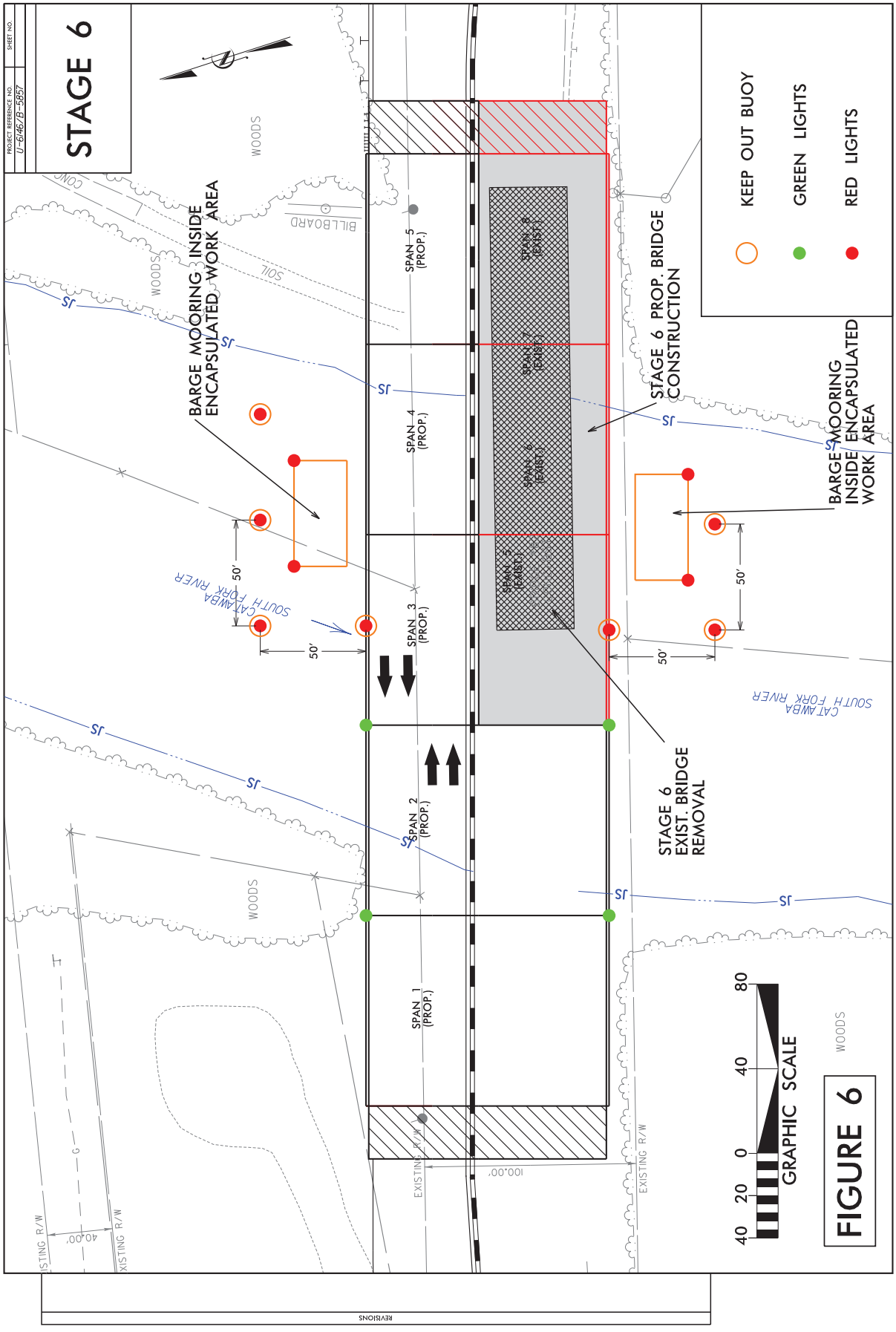

STAGE 1
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
SPAN 8 (EXIST.)
SPAN 7 (EXIST.)
SPAN 6 (EXIST.)
SPAN 5 (EXIST.)
BRIDGE #82
CONC/BST
SPAN 4 (EXIST.)
SPAN 3 (EXIST.)
SPAN 2 (EXIST.)
SPAN 1 (EXIST.)
SPAN 3 (PROP.)
SPAN 2 (PROP.)
SPAN 1 (PROP.)
100'
50'
50'
50'
50'
SOUTH FORK RIVER
CATAWBA
WOODS
BILLBOARD
SOIL
JS
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 1 PROP. BRIDGE CONSTRUCTION
EXIST. BRIDGE
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
EXISTING R/W
100.00'
40.00'
GRAPHIC SCALE
40 20 0 40 80
FIGURE 1
REVISIONS


STAGE 2
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
STAGE 2 PROP. BRIDGE CONSTRUCTION
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
EXIST. BRIDGE
SPAN 1 (PROP.)
SPAN 2 (PROP.)
SPAN 3 (PROP.)
SPAN 4 (PROP.)
SPAN 5 (PROP.)
SPAN 1 (EXIST.)
SPAN 2 (EXIST.)
SPAN 3 (EXIST.)
SPAN 4 (EXIST.)
SPAN 5 (EXIST.)
BRIDGE #82
CONC/BST
SPAN 6 (EXIST.)
SPAN 7 (EXIST.)
SPAN 8 (EXIST.)
50'
50'
50'
SOUTH FORK RIVER
CATAWBA
WOODS
BILLBOARD
SOIL
JS
EXISTING R/W
100.00'
40.00'
GRAPHIC SCALE
40 20 0 40 80
FIGURE 2
REVISIONS


STAGE 3
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
STAGE 3 PROP. BRIDGE CONSTRUCTION
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 3 EXIST. BRIDGE REMOVAL
EXIST. BRIDGE
BRIDGE #82 CONC/BST
SPAN 1 (PROP.)
SPAN 2 (PROP.)
SPAN 3 (PROP.)
SPAN 4 (PROP.)
SPAN 5 (PROP.)
SPAN 1 (EXIST.)
SPAN 2 (EXIST.)
SPAN 3 (EXIST.)
SPAN 4 (EXIST.)
SPAN 5 (EXIST.)
SPAN 6 (EXIST.)
SPAN 7 (EXIST.)
SPAN 8 (EXIST.)
WOODS
SOIL
CONC
BILLBOARD
SOUTH FORK RIVER
CATAWBA
50'
100.00'
40.00'
EXISTING R/W
GRAPHIC SCALE
40 20 0 40 80
FIGURE 3
REVISIONS


STAGE 4
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
WOODS
BILLBOARD
SOIL CONS
SPAN 5 (PROP.)
SPAN 4 (PROP.)
SPAN 3 (PROP.)
SPAN 2 (PROP.)
SPAN 1 (PROP.)
SPAN 8 (EXIST.)
SPAN 7 (EXIST.)
SPAN 6 (EXIST.)
SPAN 5 (EXIST.)
SPAN 4 (EXIST.)
SPAN 3 (EXIST.)
SPAN 2 (EXIST.)
SPAN 1 (EXIST.)
BRIDGE #82
CONC/BST
JS
SOUTH FORK CATAWBA RIVER
50'
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 4 PROP. BRIDGE CONSTRUCTION
STAGE 4 EXIST. BRIDGE REMOVAL
EXIST. BRIDGE
EXISTING R/W
100.00'
40.00'
GRAPHIC SCALE
40 20 0 40 80
FIGURE 4
REVISIONS

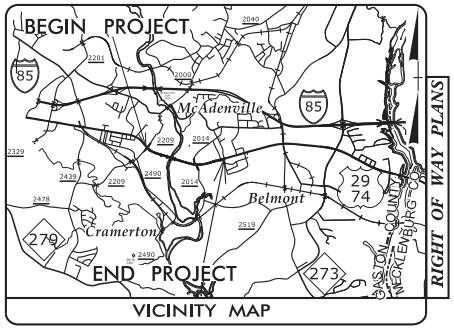

STAGE 5
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
EXIST. BRIDGE
SPAN 1 (PROP.)
SPAN 2 (PROP.)
SPAN 3 (PROP.)
SPAN 4 (PROP.)
SPAN 5 (PROP.)
SPAN 1 (EXIST.)
SPAN 2 (EXIST.)
SPAN 3 (EXIST.)
SPAN 4 (EXIST.)
SPAN 5 (EXIST.)
SPAN 6 (EXIST.)
SPAN 7 (EXIST.)
SPAN 8 (EXIST.)
BRIDGE #82
CONC/BST
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 5 PROP. BRIDGE CONSTRUCTION
STAGE 5 EXIST. BRIDGE REMOVAL
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
CATAWBA SOUTH FORK RIVER
WOODS
BILLBOARD
SOIL
JS
50'
100.00'
40.00'
EXISTING R/W
GRAPHIC SCALE
40 20 0 40 80
FIGURE 5
REVISIONS


STAGE 6
PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
KEEP OUT BUOY
GREEN LIGHTS
RED LIGHTS
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 6 PROP. BRIDGE CONSTRUCTION
BARGE MOORING INSIDE ENCAPSULATED WORK AREA
STAGE 6 EXIST. BRIDGE REMOVAL
SPAN 1 (PROP.)
SPAN 2 (PROP.)
SPAN 3 (PROP.)
SPAN 4 (PROP.)
SPAN 5 (PROP.)
SPAN 6 (EXIST.)
SPAN 7 (EXIST.)
SPAN 8 (EXIST.)
SPAN 9 (EXIST.)
50'
50'
50'
50'
SOUTH FORK RIVER
CATAWBA
WOODS
BILLBOARD
SOIL
JS
EXISTING R/W
100.00'
40.00'
GRAPHIC SCALE
40 20 0 40 80
FIGURE 6
REVISIONS

CONTRACT:

TIP PROJECT: U-6146/B-5857

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols



VICINITY MAP

RIGHT OF WAY PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GASTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6146/B-5857	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
48392.1.1 /45810.1.1	N/A	PE
48392.2.1 /45810.2.1	N/A	ROW
48392.2.2	N/A	UTIL.

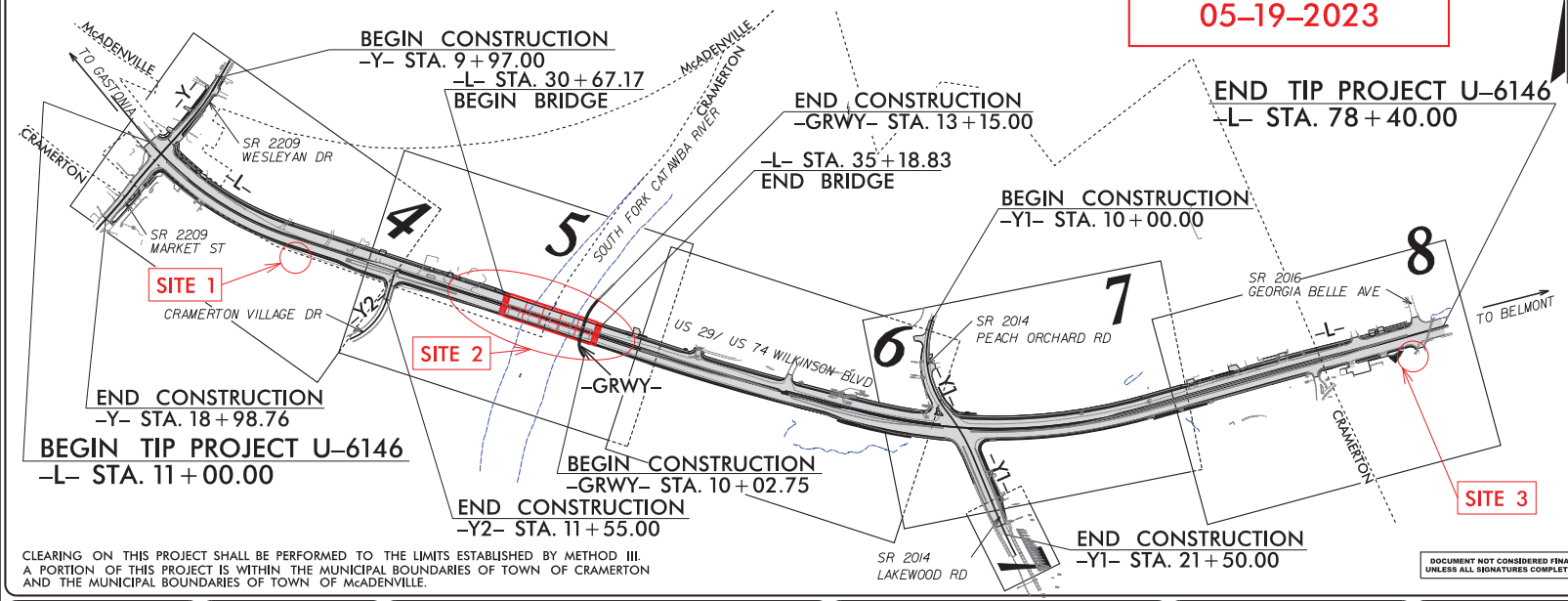
LOCATION: US 29/US 74 (WILKINSON BLVD) FROM SR 2209 (WESLEYAN DR/MARKET ST) TO SR 2016/SR 2017 (GEORGIA BELLE AVE/HUBBARD ST) AND BRIDGE #350082 OVER SOUTH FORK CATAWBA RIVER

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB & GUTTER, STRUCTURE, AND RETAINING WALLS

PERMIT DRAWING SHEET 1 OF 12

PERMIT DRAWINGS 05-19-2023

NAD 83/2011



BEGIN CONSTRUCTION
-Y- STA. 9+97.00
-L- STA. 30+67.17
BEGIN BRIDGE

END CONSTRUCTION
-Y- STA. 18+98.76

BEGIN TIP PROJECT U-6146
-L- STA. 11+00.00

END CONSTRUCTION
-GRWY- STA. 13+15.00

-L- STA. 35+18.83
END BRIDGE

BEGIN CONSTRUCTION
-GRWY- STA. 10+02.75

END CONSTRUCTION
-Y2- STA. 11+55.00

BEGIN CONSTRUCTION
-Y1- STA. 10+00.00

END TIP PROJECT U-6146
-L- STA. 78+40.00

END CONSTRUCTION
-Y1- STA. 21+50.00

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF TOWN OF CRAMERTON AND THE MUNICIPAL BOUNDARIES OF TOWN OF McADENVILLE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2016 = 22,600
ADT 2040 = 26,100
K = 12 %
D = 70 %
T = 4 % *
V = 50 MPH
* TTST =1% DUAL =3%
FUNC CLASS = URBAN ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-6146/B-5857 = 1.191 MILES
LENGTH STRUCTURE TIP PROJECT U-6146/B-5857 = 0.086 MILES
TOTAL LENGTH TIP PROJECT U-6146/B-5857 = 1.277 MILES

NCDOT CONTACT: BRYAN K. SOWELL, PE

PLANS PREPARED BY:
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 12
1710 E. Morton St
Shelby, NC 28150

RIGHT OF WAY DATE: JULY 14, 2021

LETTING DATE: FEBRUARY 2024

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

SANDRA MELVIN
PROJECT DESIGN ENGINEER

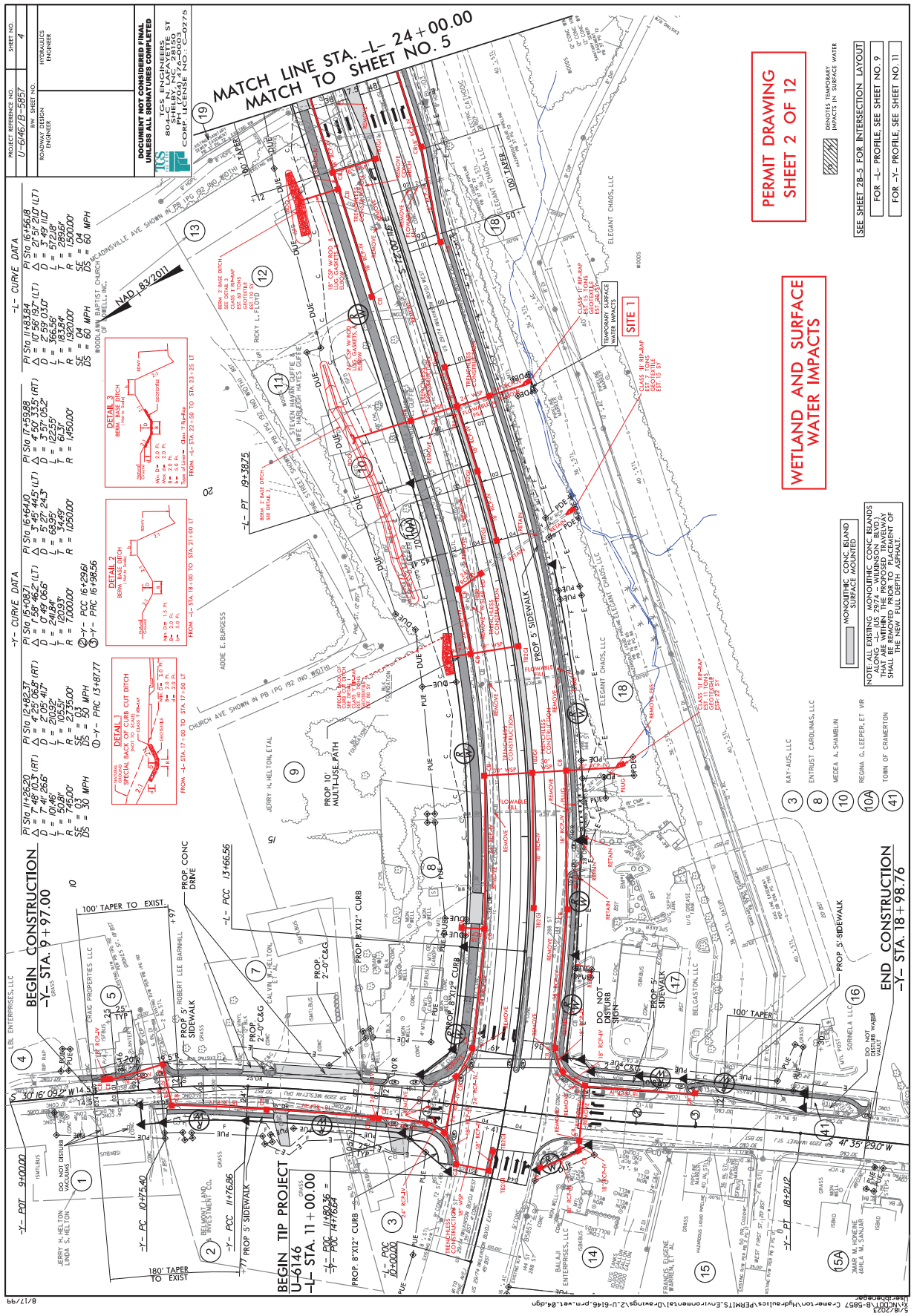
HYDRAULICS ENGINEER
SIGNATURE: P.E.

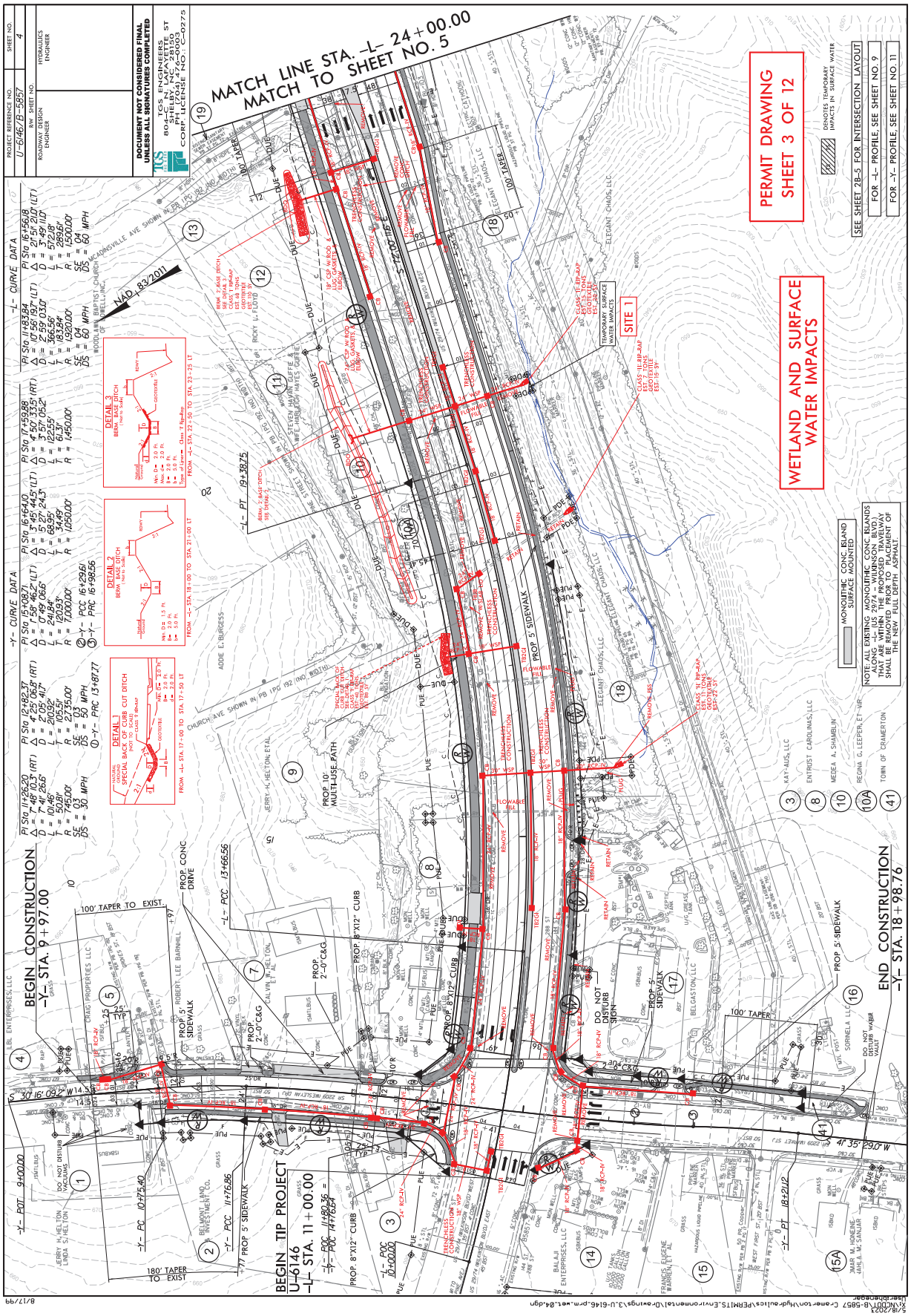
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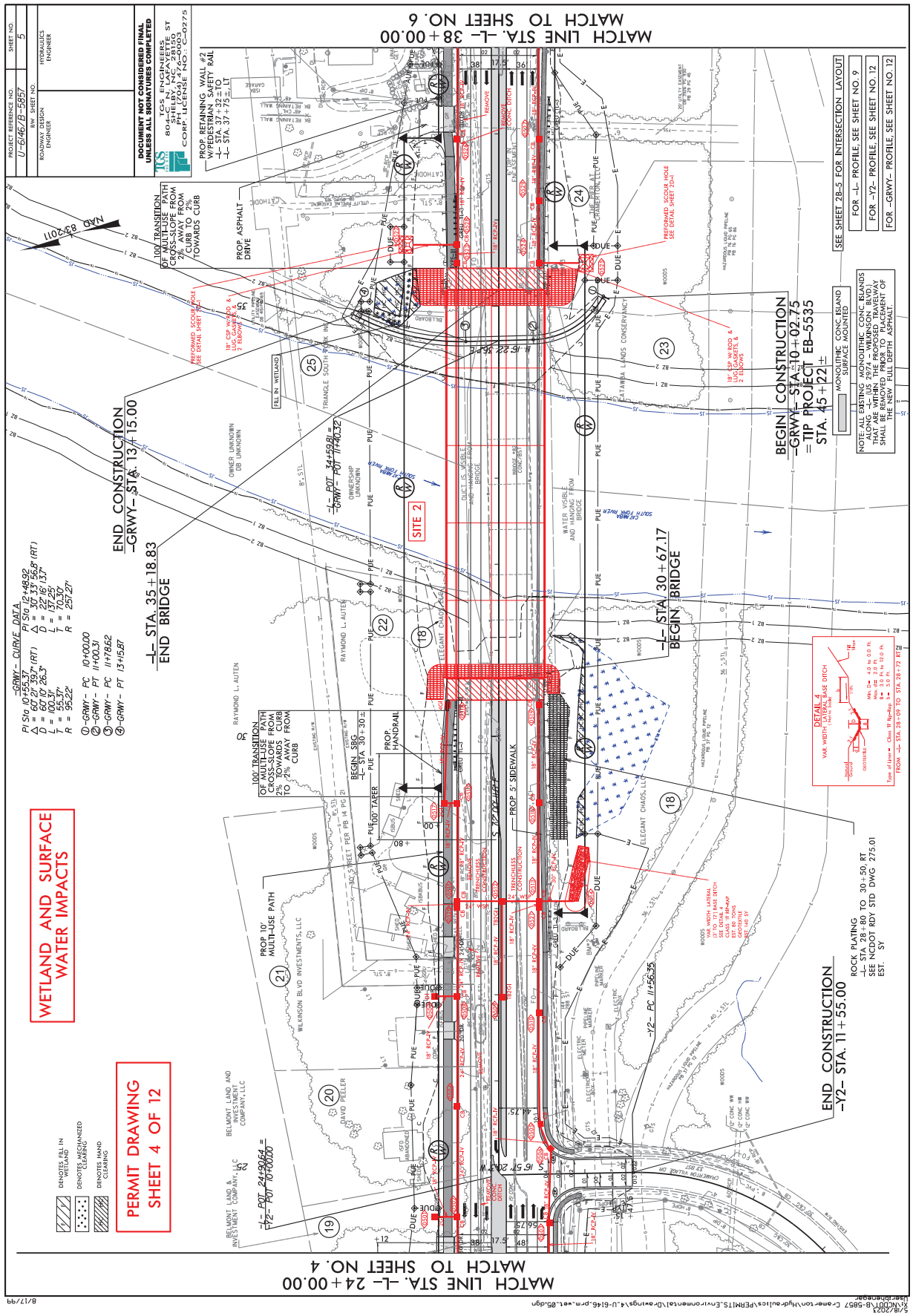
STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

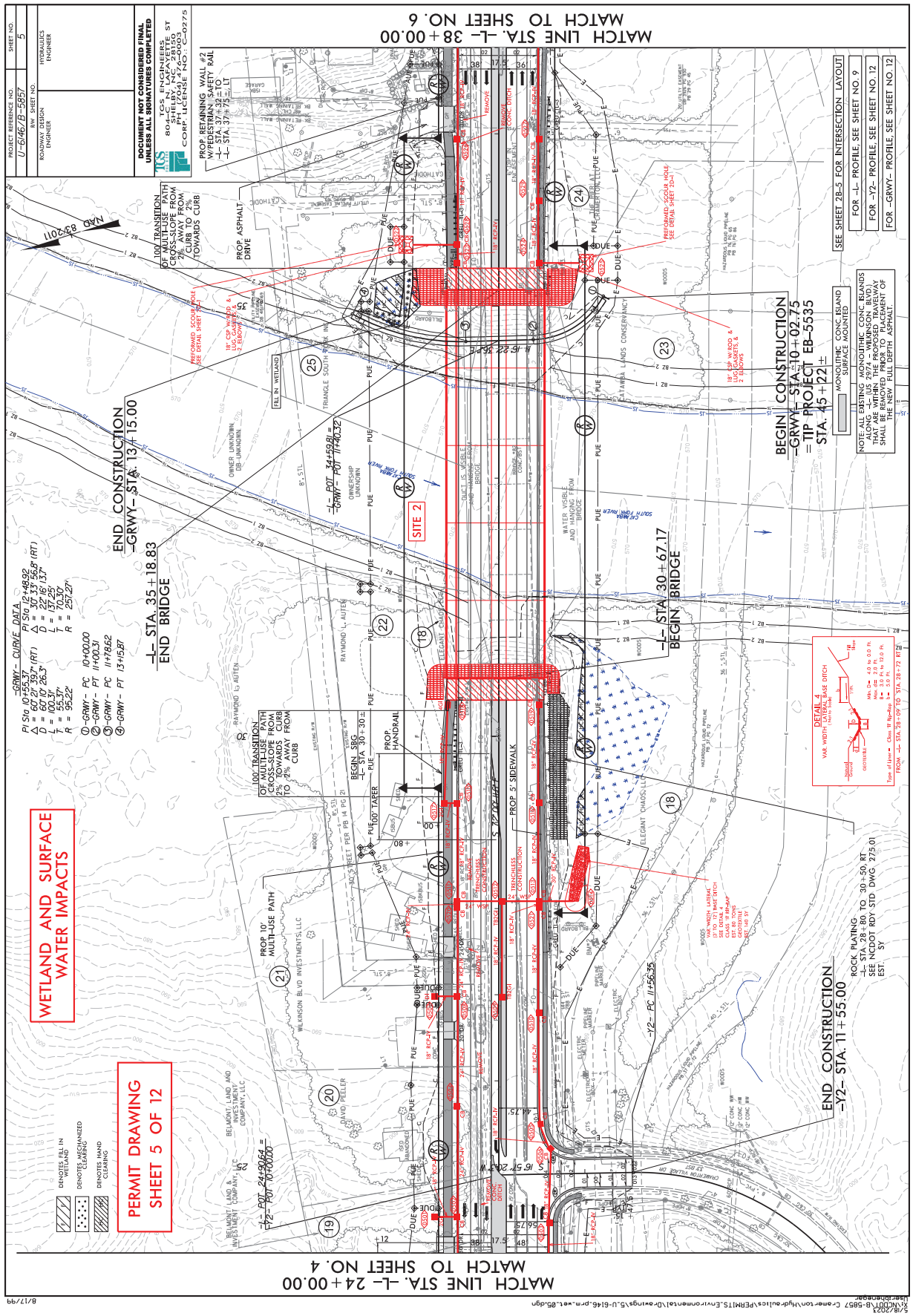
5/19/2023
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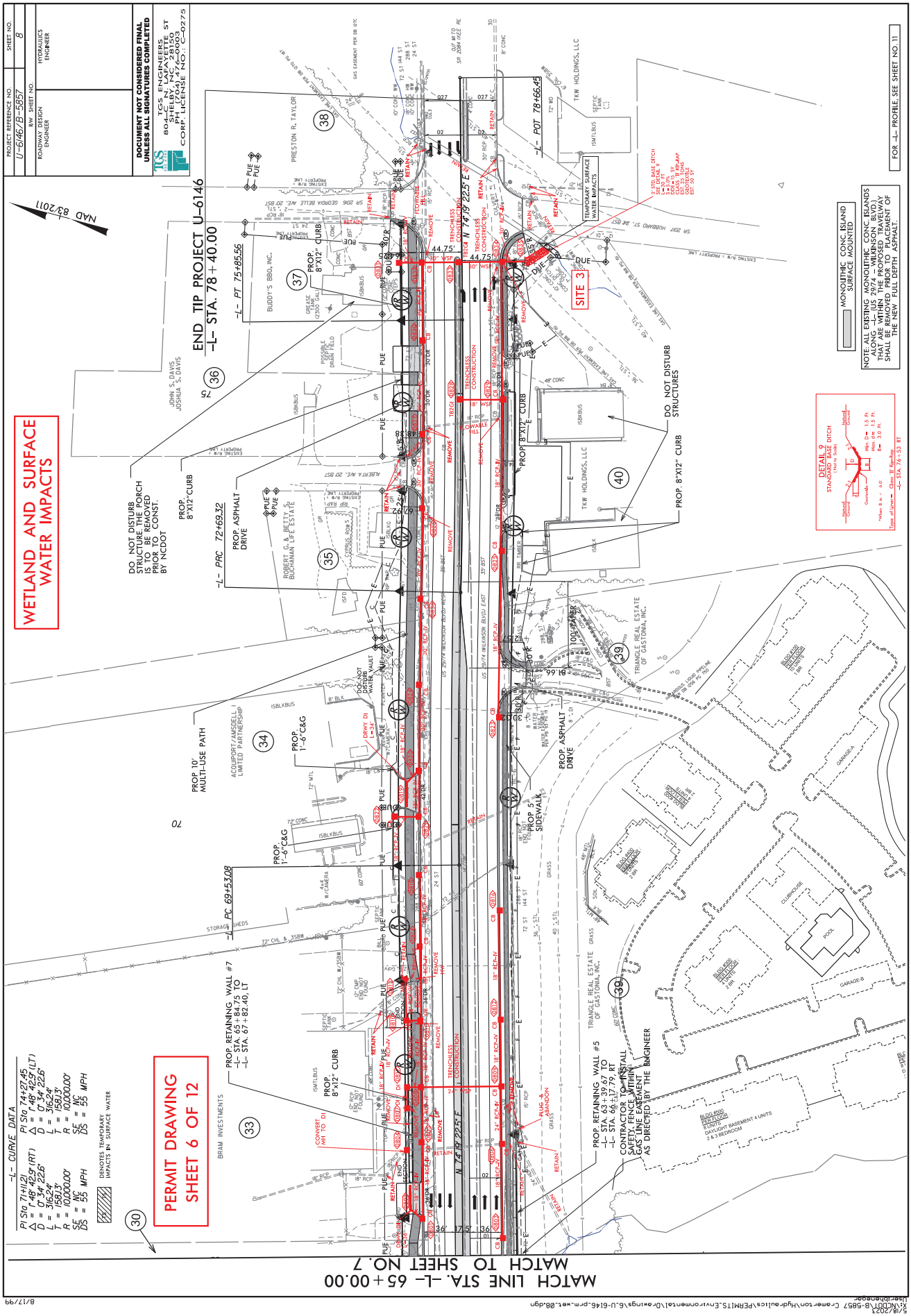
89/08/99


PERMIT DRAWING
SHEET 2 OF 12
WETLAND AND SURFACE WATER IMPACTS
SITE 1
MATCH LINE STA. -L- 24+00.00
MATCH TO SHEET NO. 5
BEGIN CONSTRUCTION
-Y- STA. 9+97.00
END CONSTRUCTION
-Y- STA. 18+98.76
BEGIN TIP PROJECT
U-6146
-L- STA. 11+00.00
NAD 83/2011
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP LICENSE NO: C-0275
SEE SHEET 2B-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y- PROFILE, SEE SHEET NO. 11
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MONOLITHIC CONC ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC ISLANDS ALONG -L- (US 2974 - WILKINSON BLVD.) THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED TO A DEPTH EQUIVALENT OF THE NEW PULL DEPTH ASPHALT.
-L- CURVE DATA
-Y- CURVE DATA
DETAIL 1
DETAIL 2
DETAIL 3
PROP 10' MULTI-USE PATH
PROP 8'X12' CURB
PROP 5' SIDEWALK
PROP CONC DRIVE
100' TAPER TO EXIST.
180' TAPER TO EXIST
100' TAPER
TEMPORARY SURFACE WATER IMPACTS
ELEGANT CHAOS, LLC
KAY-AUS, LLC
ENTRUST CAROLINAS, LLC
MEDEA A. SHAMBLIN
REGINA G. LEEPER, ET VIR
TOWN OF CRAMERTON
BELGASTON, LLC
SOMMELA LLC
JERRY H. HELTON, ETAL
LBL ENTERPRISES, LLC
CRAIG PROPERTIES LLC
BELMONT LAND INVESTMENT CO.
BALAAJI ENTERPRISES, LLC
FRANCIS EUGENE BARNES, ET AL
JAMES HOYLE GALLOP
OMAR M. HONEINE
JAHLA M. SANJAR
ADDIE E. BURGESS
STEVEN HAVAN GUFFEE
RICKY L. FLOYD
WOODLAWN BAPTIST CHURCH OF MCADENVILLE, INC.
MCADENVILLE AVE SHOWN IN PB 1PG 192 (NO WIDTH)
CHURCH AVE SHOWN IN PB 1PG 192 (NO WIDTH)
STEVENS STREET SHOWN IN PB 1PG 192 (NO WIDTH)
-L- PT 193875
-L- PCC 13+66.56
-L- POC 10+00.00
-L- POC 11+80.36 =
-Y- POC 14+76.84
-Y- PC 10+75.40
-Y- PCC 11+76.86
-Y- PT 18+22.12
-L- PT 11+26.20
-L- PC 12+82.37
-L- PT 15+40.87
-L- PC 16+46.40
-L- PT 17+59.88
-L- PT 11+83.84
-L- PC 16+56.18
-Y- PC 16+29.61
-Y- PRC 16+98.56
-Y- PC 16+29.61
-Y- PRC 13+87.77
S 12°20'26" E
S 30° 16' 09" W 14.33
N 4° 35' 29" W 90.76
S 4° 35' 29" E 90.76
DO NOT DISTURB VACUUM
DO NOT DISTURB SIGN
DO NOT DISTURB WATER
CLASS II RIP-RAP EST. 7 TONS EST. 10 SY
CLASS I RIP-RAP EST. 15 TONS EST. 20 SY
CLASS II RIP-RAP EST. 15 TONS EST. 20 SY
CLASS II RIP-RAP EST. 7 TONS EST. 10 SY
CLASS II RIP-RAP EST. 7 TONS EST. 10 SY
CLASS II RIP-RAP EST. 15 TONS EST. 20

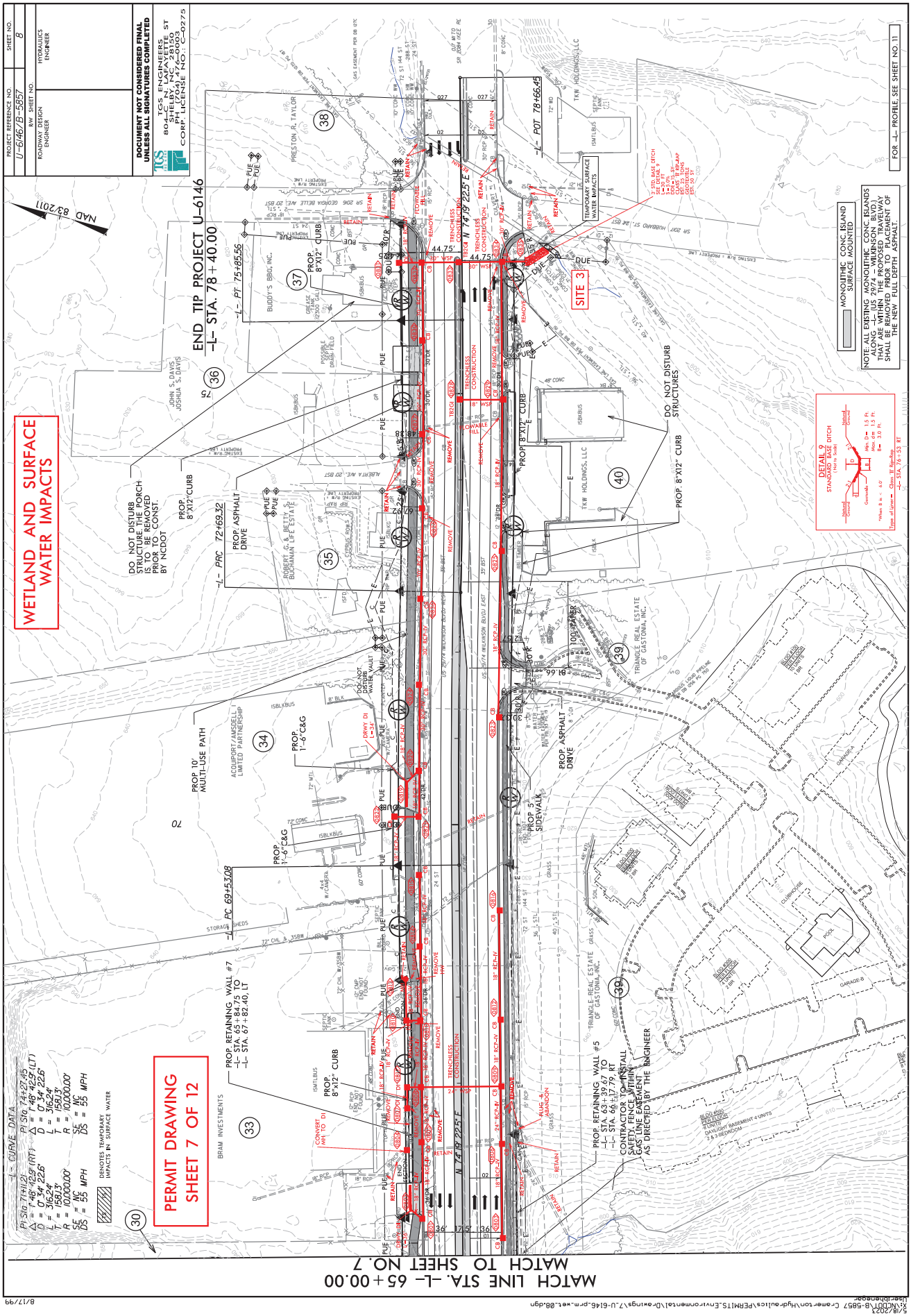

PERMIT DRAWING
SHEET 3 OF 12
WETLAND AND SURFACE WATER IMPACTS
SITE 1
BEGIN CONSTRUCTION
-Y- STA. 9+97.00
BEGIN TIP PROJECT
U-6146
-L- STA. 11+00.00
END CONSTRUCTION
-Y- STA. 18+98.76
MATCH LINE STA. -L- 24+00.00
MATCH TO SHEET NO. 5
NAD 83/2011
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP LICENSE NO: C-0275
SEE SHEET 28-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y- PROFILE, SEE SHEET NO. 11
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MONOLITHIC CONC ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC ISLANDS ALONG -L- (US 2974 - WILKINSON BLVD.) THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED AND REPLACEMENT OF THE NEW FULL DEPTH ASPHALT.
DETAIL 1
SPECIAL BACK OF CURB CUT DITCH
DETAIL 2
BERM DITCH
DETAIL 3
BERM DITCH
-L- CURVE DATA
-Y- CURVE DATA
PROP CONC DRIVE
PROP 5' SIDEWALK
PROP 8'X12" CURB
PROP 2'-0" C&G
100' TAPER TO EXIST
180' TAPER TO EXIST
100' TAPER
DO NOT DISTURB SIGN
DO NOT DISTURB WATER VALVE
MULTI-USE PATH
CHURCH AVE SHOWN IN PB 1 PG 192 (NO WIDTH)
MCADENVILLE AVE SHOWN IN PB 1 PG 192 (NO WIDTH)
ADDIE E. BURGESS
JERRY H. HELTON ETAL
BELMONT LAND INVESTMENT CO.
CRAIG PROPERTIES LLC
LBL ENTERPRISES, LLC
ELEGANT CHAOS, LLC
ENTRUST CAROLINAS, LLC
MEDEA A. SHAMBLIN
REGINA G. LEEPER, ET-VIR
TOWN OF CRAMERTON
BELGASTON, LLC
SOMMELA LLC
BALAJI ENTERPRISES, LLC
JAMES ANTHONY GALLAS
FRANCIS EUGENE BARNELL, III
JIMAR M. HONEINE
JAHLA M. M'SANJAR
KAY-AUS, LLC
STEVEN HAVEN GUFFEE
MRS. HARLEEN HAYES GUFFEE
WOODLAWN BAPTIST CHURCH
WELL, INC.
ROBERT LEE BARNHILL
CLASS 'I' RIP-RAP
EST. 7 TONS
EST. 19 SY
CLASS 'II' RIP-RAP
EST. 7 TONS
EST. 19 SY
CLASS 'II' RIP-RAP
EST. 7 TONS
EST. 19 SY
TEMPORARY SURFACE WATER IMPACTS
TEMPORARY SHEET PILE WALL
TEMPORARY SHEET PILE CELL
TEMPORARY SHEET PILE CELL CONNECTION
TEMPORARY SHEET PILE WALL REMOVAL
TEMPORARY SHEET PILE CELL REMOVAL
TEMPORARY SHEET PILE CELL CONNECTION REMOVAL
TRENCHLESS CONSTRUCTION
TRENCHLESS CONSTRUCTION REMOVAL
FLOWABLE FILL
RETAIN
REMOVE
PROP. 24" RCP-H
PROP. 18" RCP-H
PROP. 15" RCP-H
PROP. 12" RCP-H
PROP. 18" RCP-H
PROP. 24" RCP-H
-L- PCC 13+66.56
-L- PT 19+38.25
-Y- POT 9+00.00
-Y- PC 10+75.40
-Y- PCC 11+76.86
-L- POC 11+80.36
-Y- POC 11+76.84
-L- PCC 10+00.00
-Y- PT 18+21.12
S 22° 05' 41" E
S 69° 09' 22" W 14.3
S 4° 35' 29" W


WETLAND AND SURFACE WATER IMPACTS
PERMIT DRAWING SHEET 4 OF 12
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
MATCH LINE STA. -L- 24+00.00 MATCH TO SHEET NO. 4
MATCH LINE STA. -L- 38+00.00 MATCH TO SHEET NO. 6
END CONSTRUCTION -GRWY- STA. 13+15.00
-L- STA. 35+18.83 END BRIDGE
BEGIN CONSTRUCTION -GRWY- STA. 10+02.75 = -TIP PROJECT EB-5535 STA. 45+22±
-L- STA. 30+67.17 BEGIN BRIDGE
END CONSTRUCTION -Y2- STA. 11+55.00
SITE 2
PROP RETAINING WALL #2 W/PEDESTRIAN SAFETY RAIL -L- STA. 37+32±TO -L- STA. 37+75±_LT
PROP ASPHALT DRIVE
100' TRANSITION OF MULTI-USE PATH CROSS-SLOPE FROM 2% AWAY FROM CURB TO 2% TOWARDS CURB
PROP 10' MULTI-USE PATH
PROP 5' SIDEWALK
PROP HANDRAIL
100' TAPER
BEGIN SBG -L- STA 30+30±
-GRWY- PC 10+00.00
-GRWY- PT 11+00.31
-GRWY- PC 11+78.62
-GRWY- PT 13+15.87
-L- POT 34+59.81 = -GRWY- POT 1+40.32
-Y2- POT 24+90.64 = -Y2- POT 10+40.00
-Y2- PC 11+56.35
MONOLITHIC CONC. ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC. ISLANDS WITHIN THE LIMITS OF THE PROPOSED TRAVELWAY THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEW FULL DEPTH ASPHALT.
SEE SHEET 28-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y2- PROFILE, SEE SHEET NO. 12
FOR -GRWY- PROFILE, SEE SHEET NO. 12
ROCK PLATING -L- STA 28+80 TO 30+50, RT SEE NCDOT RDY STD DWG 275.01 EST. SY
DETAIL 4 VAR. WIDTH LATERAL BASE DITCH
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH. (704) 476-0003 CORP LICENSE NO: C-0275
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NAD 83/2011
WILKINSON BLVD INVESTMENTS, LLC
BELMONT LAND & INVESTMENT COMPANY, LLC
RAYMOND L. AUTEN
DAVID PEELER
TRIANGLE SOUTH PARK INC
OWNER UNKNOWN DB UNKNOWN
ELEGANT CHAOS, LLC
CATAWBA LANDS CONSERVANCY
WOODS
WATER VISIBLE AND HANGING FROM BRIDGE
DUCT IS VISIBLE AND HANGING FROM BRIDGE
PREFORMED SCOUR HOLE SEE DETAIL SHEET 20A
18" CSP W/RDD & LONG RADIUS 2 ELBOWS
FILL IN WETLAND
REMOVE CONC. DITCH
TRENCHLESS CONSTRUCTION
BOARDWALK OVER DITCH
ROCK CHECK DAM
SILT FENCE
ELECTRIC METER
PIPELINE MARKER
SOUTH FORK CREEK
CHASE RUN VILLAGE DR
SOUTH PARK MALL
ISFD ABANDONED


PERMIT DRAWING
SHEET 5 OF 12
WETLAND AND SURFACE
WATER IMPACTS
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP LICENSE NO: C-0275
PROP RETAINING WALL #2 W/PEDESTRIAN SAFETY RAIL
-L- STA. 37+32± TO
-L- STA. 37+75± LT
MATCH LINE STA. -L- 38+00.00
MATCH TO SHEET NO. 6
MATCH LINE STA. -L- 24+00.00
MATCH TO SHEET NO. 4
100' TRANSITION OF MULTI-USE PATH CROSS-SLOPE FROM 2% TOWARDS CURB TO 2% AWAY FROM CURB
PROP ASPHALT DRIVE
PROP 10' MULTI-USE PATH
PROP 5' SIDEWALK
PROP HANDRAIL
100' TAPER
BEGIN SBG
-L- STA 30+30±
-GRWY- CURVE DATA
P.I Sta 10+55.37
Δ = 60° 21' 39.7" (RT)
D = 60° 10' 26.3"
L = 100.31'
T = 55.37'
R = 95.22'
P.I Sta 12+48.92
Δ = 30° 33' 56.8" (RT)
D = 22° 16' 13.7"
L = 137.25'
T = 70.10'
R = 257.27'
①-GRWY- PC 10+00.00
②-GRWY- PT 11+00.31
③-GRWY- PC 11+78.62
④-GRWY- PT 13+15.87
END CONSTRUCTION
-GRWY- STA. 13+15.00
-L- STA. 35+18.83
END BRIDGE
-L- POT 34+59.81 =
-GRWY- POT 1+40.32
SITE 2
-L- STA. 30+67.17
BEGIN BRIDGE
BEGIN CONSTRUCTION
-GRWY- STA. 10+02.75
=TIP PROJECT EB-5535
STA. 45+22±
MONOLITHIC CONC. ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC. ISLANDS THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED PRIOR TO PLACEMENT OF NEW FULL DEPTH ASPHALT.
SEE SHEET 28-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y2- PROFILE, SEE SHEET NO. 12
FOR -GRWY- PROFILE, SEE SHEET NO. 12
DETAIL 4
VAR. WIDTH LATERAL BASE DITCH
NOT TO SCALE
Min. D= 4.0 to 6.0 Ft.
Max. ds= 2.0 Ft.
Min. ds= 1.0 Ft. to 12.0 Ft.
Max. D= 10.0 Ft.
Type of Liner = Class 'B' Rip-Rap
FROM -L- STA. 28+09 TO STA. 28+72 RT
END CONSTRUCTION
-Y2- STA. 11+55.00
-L- POT 24+90.64 =
-Y2- POT 0+00.00
ROCK PLATING
-L- STA. 28+80 TO 30+50, RT
SEE NCDOT RDY STD DWG. 275.01
EST. SY
PROP 72" CMP
PROP 18" RCP
PROP 24" RCP
PROP 30" RCP
PROP 36" RCP
PROP 42" RCP
PROP 48" RCP
PROP 54" RCP
PROP 60" RCP
PROP 72" RCP
PROP 18" RCP-FI
PROP 24" RCP-FI
PROP 30" RCP-FI
PROP 36" RCP-FI
PROP 42" RCP-FI
PROP 48" RCP-FI
PROP 54" RCP-FI
PROP 60" RCP-FI
PROP 72" RCP-FI
PROP 18" RCP-AP
PROP 24" RCP-AP
PROP 30" RCP-AP
PROP 36" RCP-AP
PROP 42" RCP-AP
PROP 48" RCP-AP
PROP 54" RCP-AP
PROP 60" RCP-AP
PROP 72" RCP-AP
PROPOSED SCOUR HOLE SEE DETAIL SHEET 20A-1
PREFORMED SCOUR HOLE SEE DETAIL SHEET 20A-1
18" CSP W/RDD & 1 LONG BEND & 2 ELBOWS
PROP 72" TRENCHLESS CONSTRUCTION
PROP 24" TRENCHLESS CONSTRUCTION
PROP 18" TRENCHLESS CONSTRUCTION
PROP 30" TRENCHLESS CONSTRUCTION
PROP 36" TRENCHLESS CONSTRUCTION
PROP 42" TRENCHLESS CONSTRUCTION
PROP 48" TRENCHLESS CONSTRUCTION
PROP 54" TRENCHLESS CONSTRUCTION
PROP 60" TRENCHLESS CONSTRUCTION
PROPOSED CHANNEL CLASS 'B' RIP-RAP
PROPOSED CHANNEL CLASS 'A' RIP-RAP



5/18/2023 XANCDOT\B-5857 Cramerton\Hydraulics\PERMITS\Environmental\Drawings\6\U-6146-prm-wet_08.dgn
User:bbergeron


WETLAND AND SURFACE WATER IMPACTS
PERMIT DRAWING SHEET 7 OF 12
END TIP PROJECT U-6146
-L- STA. 78+40.00
-L- POT 78+66.45
-L- PRC 72+69.32
-L- PC 69+53.08
-L- PT 75+85.56
SITE 3
MATCH LINE STA. -L- 65+00.00 TO SHEET NO. 7
PROP. RETAINING WALL #7 -L- STA. 65+84.75 TO -L- STA. 67+82.40, LT
PROP. RETAINING WALL #5 -L- STA. 63+39.67 TO -L- STA. 66+17.79, RT
CONTRACTOR TO INSTALL SAFETY FENCE WITHIN GAS LINE EASEMENT AS DIRECTED BY THE ENGINEER
PROP. 10' MULTI-USE PATH
PROP. 8'X12" CURB
PROP. ASPHALT DRIVE
PROP. 1'-6" C&G
PROP. 5' SIDEWALK
DO NOT DISTURB STRUCTURE. THE PORCH IS TO BE REMOVED PRIOR TO CONST. BY NCDOT
DO NOT DISTURB STRUCTURES
MONOLITHIC CONC. ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC. ISLANDS ALONG -MT- (US 29/74 WILKINSON BLVD.) THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEW FULL DEPTH ASPHALT.
DETAIL 9 STANDARD BASE DITCH
TEMPORARY SURFACE WATER IMPACTS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
-L- CURVE DATA
PI Sta 71+11.21: Δ = 1°48'42.9" (RT) D = 0°34'22.6" L = 316.24' T = 158.13' R = 10000.00' SE = NC DS = 55 MPH
PI Sta 74+27.45: Δ = 1°48'42.9" (LT) D = 0°34'22.6" L = 316.24' T = 158.13' R = 10000.00' SE = NC DS = 55 MPH
FOR -L- PROFILE, SEE SHEET NO. 11
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS 804 HELEN LAFAYETTE ST SUITE 150 PH (704) 476-8003 CORP LICENSE NO: C-0275
NAD 83/2011

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 19+98 to 20+09 RT	Impacts to Stream							< 0.01		12	
2	-L- 28+82 to 31+20 RT	Impacts to Wetland					0.03					
2	-L- 34+74 to 35+44 LT	Impacts to Wetland	0.01			0.02	0.03					
3	-L- 76+56 to 76+74 RT	Impacts to Stream							< 0.01		25	
TOTALS*:			0.01			0.02	0.06		< 0.01	0	37	0

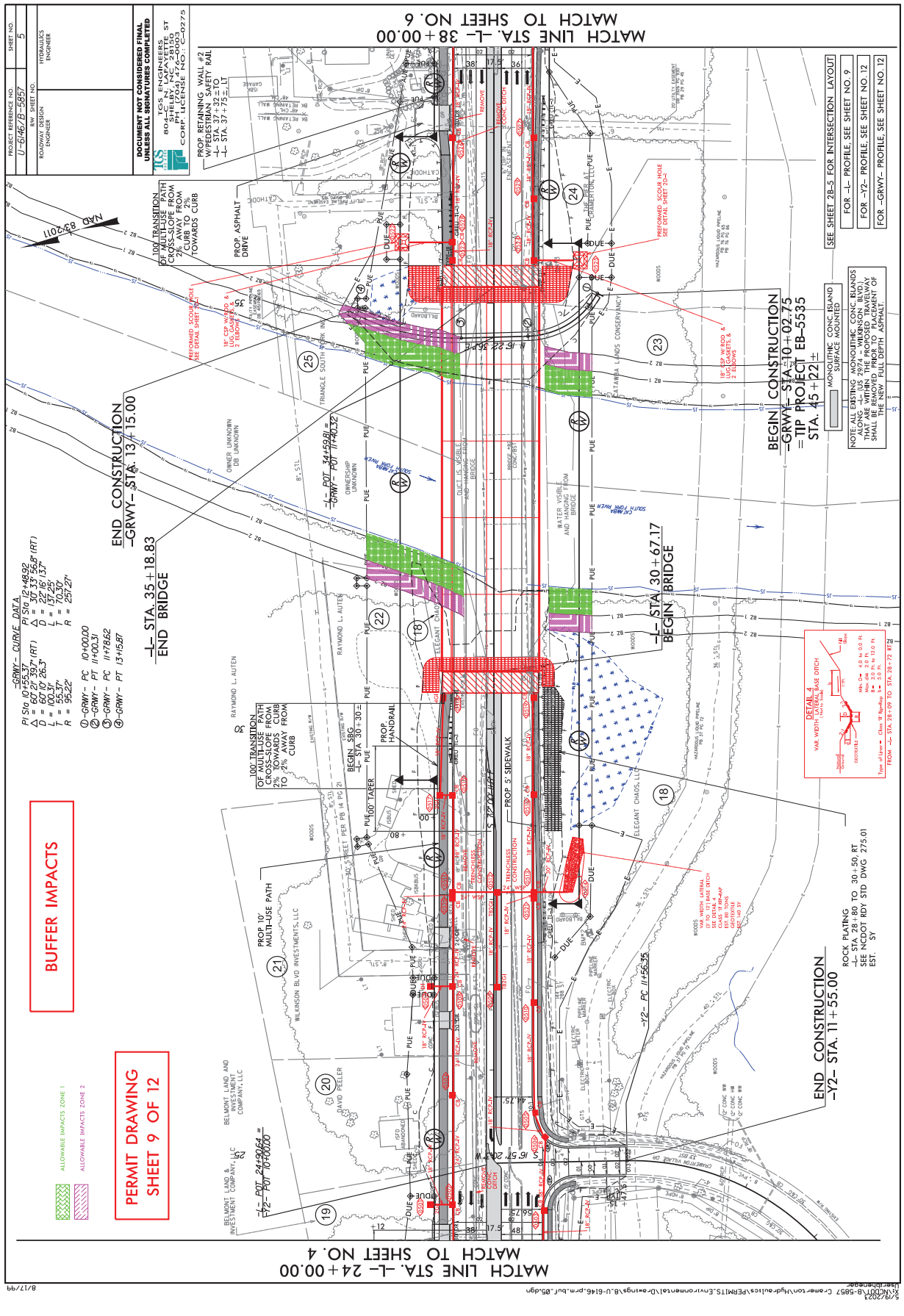
*Rounded totals are sum of actual impacts

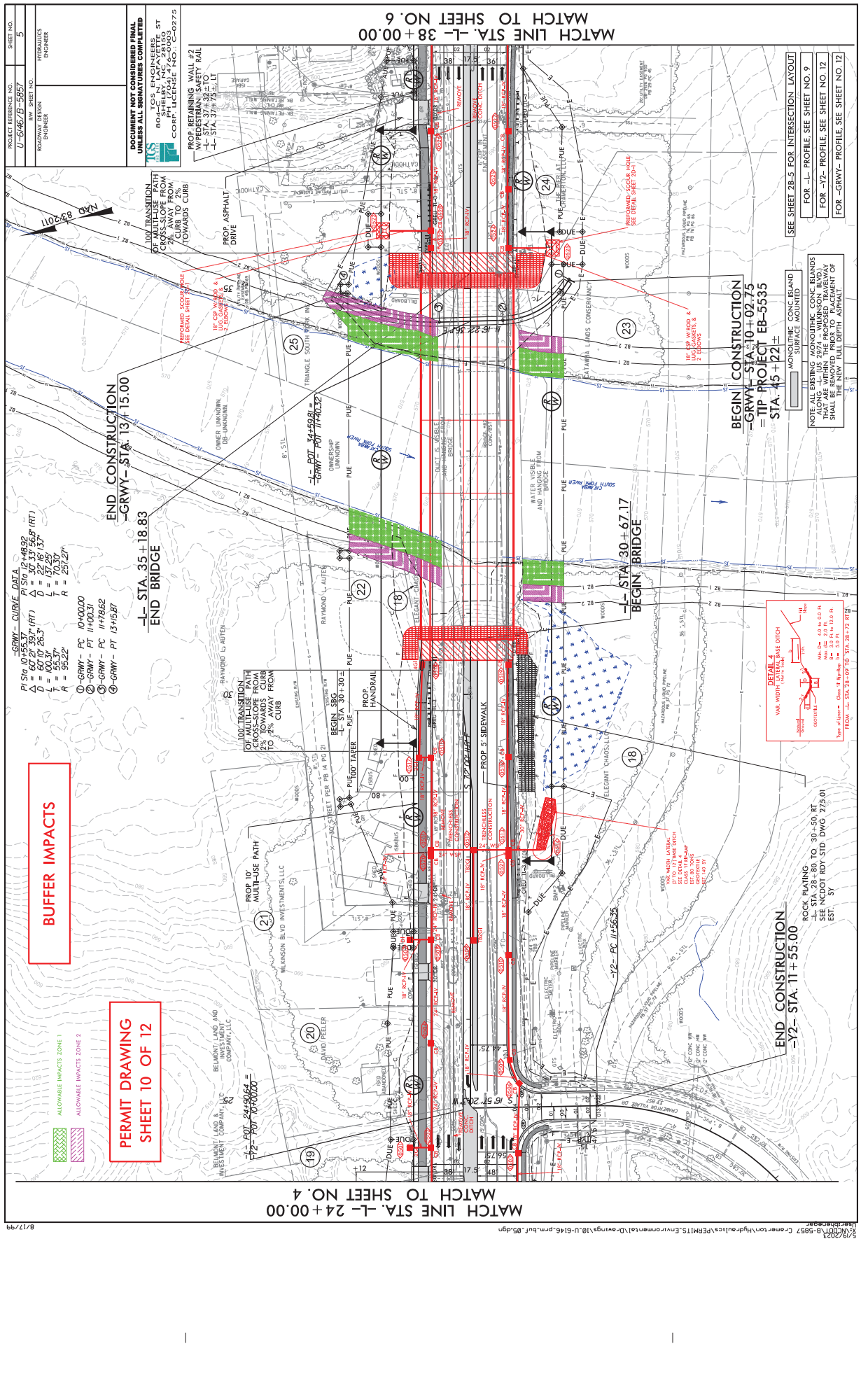
NOTES:
1. <0.01 acres of Permanent SW impacts for bridge interior bents at -L- 32+48 & 33+38.

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PERMIT DRAWING
SHEET 9 OF 12
BUFFER IMPACTS
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP LICENSE NO: C-0275
MATCH LINE STA. -L- 38+00.00
MATCH TO SHEET NO. 6
MATCH LINE STA. -L- 24+00.00
MATCH TO SHEET NO. 4
PROP RETAINING WALL #2 W/PEDESTRIAN SAFETY RAIL
-L- STA. 37+32± TO
-L- STA. 37+75± LT
100' TRANSITION OF MULTI-USE PATH CROSS-SLOPE FROM 2% TOWARDS CURB TO 2% AWAY FROM CURB TOWARDS CURB
PROP ASPHALT DRIVE
NAD 83/2011
END CONSTRUCTION
-GRWY- STA. 13+15.00
-L- STA. 35+18.83
END BRIDGE
-GRWY- CURVE DATA
P1 Sta 10+55.37
Δ = 60° 21' 39.7" (RT)
D = 60° 10' 26.3"
L = 100.31'
T = 55.37'
R = 95.22'
P1 Sta 12+48.92
Δ = 30° 33' 56.8" (RT)
D = 22° 16' 13.7"
L = 137.25'
T = 70.10'
R = 257.27'
①-GRWY- PC 10+00.00
②-GRWY- PT 11+00.31
③-GRWY- PC 11+78.62
④-GRWY- PT 13+15.87
-L- POT 34+59.81 =
-GRWY- POT 11+40.32
-Y2- POT 24+90.64 =
-Y2- POT 10+40.00
BEGIN CONSTRUCTION
-GRWY- STA. 10+02.75
-L- TIP PROJECT EB-5535
STA. 45+22±
-L- STA. 30+67.17
BEGIN BRIDGE
END CONSTRUCTION
-Y2- STA. 11+55.00
SEE SHEET 28-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y2- PROFILE, SEE SHEET NO. 12
FOR -GRWY- PROFILE, SEE SHEET NO. 12
MONOLITHIC CONC. ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC. ISLANDS WITHIN THE LIMITS OF THE PROPOSED TRAVELWAY THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEW FULL DEPTH ASPHALT.
DETAIL 4
VAR. WIDTH LATERAL BASE DITCH
ROCK PLATING
-L- STA 28+80 TO 30+50, RT
SEE NCDOT RDY STD DWG 275.01
EST. SY
RAYMOND L. AUTEN
BELMONT LAND & INVESTMENT COMPANY, LLC
WILKINSON BLVD INVESTMENTS, LLC
DAVID PEELER
ELEGANT CHAOS, LLC
CATAWBA LANDS CONSERVANCY
OWNER UNKNOWN
DB UNKNOWN
TRIANGLE SOUTH PARK INC
PROP 5' SIDEWALK
PROP 10' MULTI-USE PATH
PROP HANDRAIL
100' TAPER
BEGIN SBG
-L- STA 30+30±
WATER VISIBLE AND HANGING FROM BRIDGE
DUCT IS VISIBLE AND HANGING FROM BRIDGE
PREFORMED SCOUR HOLE SEE DETAIL SHEET 20A
18" CSP W/RDD & 1 LONG BEND & 2 ELBOWS
PROP 72" CMP
PROP 18" RCP
PROP 24"x38" HERCP
PROP 30" RCP
PROP 36" RCP
PROP 42" RCP
PROP 48" RCP
PROP 72" RCP
PROP 24"x38" HERCP
PROP 30"x45" HERCP
PROP 36"x54" HERCP
PROP 42"x64" HERCP
PROP 48"x72" HERCP
PROP 72"x110" HER


PERMIT DRAWING
SHEET 10 OF 12
BUFFER IMPACTS
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-6146/B-5857
SHEET NO. 5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH: (704) 476-0003
CORP LICENSE NO: C-0275
PROP RETAINING WALL #2 W/PEDESTRIAN SAFETY RAIL
-L- STA. 37+32± TO
-L- STA. 37+75± LT
PROP ASPHALT DRIVE
100' TRANSITION OF MULTI-USE PATH CROSS-SLOPE FROM 2% AWAY FROM CURB TO 2% TOWARDS CURB
MATCH LINE STA. -L- 38+00.00
MATCH TO SHEET NO. 6
MATCH LINE STA. -L- 24+00.00
MATCH TO SHEET NO. 4
END CONSTRUCTION
-GRWY- STA. 13+15.00
-L- STA. 35+18.83
END BRIDGE
-L- POT 34+59.81 =
-GRWY- POT 1+40.32
-GRWY- CURVE DATA
P.I. Sta 10+55.37
Δ = 60° 21' 39.7" (RT)
D = 60° 10' 26.3"
L = 100.31'
T = 55.37'
R = 95.22'
P.I. Sta 12+48.92
Δ = 30° 33' 56.8" (RT)
D = 22° 16' 13.7"
L = 137.25'
T = 70.10'
R = 257.27'
① -GRWY- PC 10+00.00
② -GRWY- PT 11+00.31
③ -GRWY- PC 11+78.62
④ -GRWY- PT 13+15.87
-Y2- POT 24+90.64 =
-Y2- POT 10+00.00
-Y2- PC 11+56.35
END CONSTRUCTION
-Y2- STA. 11+55.00
ROCK PLATING
-L- STA. 28+80 TO 30+50, RT
SEE NCDOT RDY STD DWG 275.01
EST. SY
-L- STA. 30+67.17
BEGIN BRIDGE
BEGIN CONSTRUCTION
-GRWY- STA. 10+02.75
= TIP PROJECT EB-5535
STA. 45+22±
MONOLITHIC CONC. ISLAND SURFACE MOUNTED
NOTE: ALL EXISTING MONOLITHIC CONC. ISLANDS THAT ARE WITHIN THE PROPOSED TRAVELWAY SHALL BE REMOVED PRIOR TO PLACEMENT OF NEW FULL DEPTH ASPHALT.
SEE SHEET 28-5 FOR INTERSECTION LAYOUT
FOR -L- PROFILE, SEE SHEET NO. 9
FOR -Y2- PROFILE, SEE SHEET NO. 12
FOR -GRWY- PROFILE, SEE SHEET NO. 12
DETAIL 4
VAR. WIDTH LATERAL BASE DITCH
NOT TO SCALE
PROP 10' MULTI-USE PATH
PROP 5' SIDEWALK
100' TRANSITION OF MULTI-USE PATH CROSS-SLOPE FROM 2% TOWARDS CURB TO 2% AWAY FROM CURB
BEGIN SBG -L- STA 30+30±
100' TAPER
PROP HANDRAIL
TRENCHLESS CONSTRUCTION
PROPOSED SCOUR HOLE SEE DETAIL SHEET 20-21
PREFORMED SCOUR HOLE SEE DETAIL SHEET 20-21
18" CSP W/RDD & 1 LONG BEND & 2 ELBOWS
WATER VISIBLE AND HANGING FROM BRIDGE
DUCT IS VISIBLE AND HANGING FROM BRIDGE
OWNER UNKNOWN DB UNKNOWN
OWNERSHIP UNKNOWN
BELMONT LAND & INVESTMENT COMPANY, LLC
WILKINSON BLVD INVESTMENTS I, LLC
ELEGANT CHAOS, LLC
DAVID PEELER
RAYMOND L. AUTEN
CATAWBA LANDS CONSERVANCY
TRIANGLE SOUTH
SOUTH TRYON PWER
CHARLOTTE WATER
PROP. ASPHALT DRIVE
PROP. 5' SIDEWALK
PROP. 10' MULTI-USE PATH
PROP. RETAINING WALL #2 W/PEDESTRIAN SAFETY RAIL
-L- STA. 37+32± TO
-L- STA. 37+75± LT
MAD 8/3/2011

RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
2	-L- 31+32 TO 32+30 LT	5@90' (54" PC GIRDERS)		X		3634	2441	6075					
2	-L- 31+13 TO 31+66 RT	5@90' (54" PC GIRDERS)		X		1517	1003	2520					
2	-L- 34+10 TO 34+97 LT	5@90' (54" PC GIRDERS)		X		3611	2856	6467					
2	-L- 33+90 TO 34+49 RT	5@90' (54" PC GIRDERS)		X		1667	1123	2790					
TOTALS:						**10429**	**7423**	**17852**	**0**	**0**	**0**	**0**	**0**

NOTES:
Total Allowable Buffer Impacts = 17,852 SF (0.410 Ac)

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WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)	WETLANDS IN BUFFERS	
		ZONE 1 (ft^2)	ZONE 2 (ft^2)
2	-L- 31+14 TO 31+20 RT	0	65
2	-L- 34+74 TO 34+86 LT	0	61
TOTAL:		**0**	**126**

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Rev. Jan 2009

County: GASTON

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM BOATER SAFETY PLAN	Lump Sum	L.S.	
0004	0015000000-N	205	SEALING ABANDONED WELLS	4 EA		
0005	0043000000-N	226	GRADING	Lump Sum	L.S.	
0006	0050000000-E	226	SUPPLEMENTARY CLEARING & GRUBBING	1 ACR		
0007	0057000000-E	226	UNDERCUT EXCAVATION	1,800 CY		
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	200 CY		
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	380 LF		
0010	0192000000-N	260	PROOF ROLLING	10 HR		
0011	0195000000-E	265	SELECT GRANULAR MATERIAL	1,800 CY		
0012	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	1,300 SY		
0013	0199000000-E	SP	TEMPORARY SHORING	2,525 SF		
0014	0223000000-E	275	ROCK PLATING	600 SY		
0015	0248000000-N	SP	GENERIC GRADING ITEM TYPE 1 BRIDGE APPROACH FILL, STATION 32+93 -L-	Lump Sum	L.S.	
0016	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF COAL ASH CONTAMINATED MATERIAL	50 TON		
0017	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL	100 TON		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0018	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	1,850 TON		
0019	0321000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	5,720 SY		
0020	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	24 LF		
0021	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	8,724 LF		
0022	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	2,056 LF		
0023	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	860 LF		
0024	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	28 LF		
0025	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	284 LF		
0026	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	124 LF		
0027	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")	9 EA		
0028	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (24", 0.064")	2 EA		
0029	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (18", 0.375")	46 LF		
0030	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (24", 0.375")	140 LF		
0031	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (30", 0.500")	146 LF		
0032	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (18", 0.375")	46 LF		
0033	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (24", 0.375")	140 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0034	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (30", 0.500")	146 LF		
0035	0995000000-E	340	PIPE REMOVAL	3,146 LF		
0036	1099500000-E	505	SHALLOW UNDERCUT	1,500 CY		
0037	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	4,000 TON		
0038	1110000000-E	510	STABILIZER AGGREGATE	500 TON		
0039	1112000000-E	505	GEOTEXTILE FOR SUBGRADE STABILIZATION	6,800 SY		
0040	1121000000-E	520	AGGREGATE BASE COURSE	200 TON		
0041	1220000000-E	545	INCIDENTAL STONE BASE	1,300 TON		
0042	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")	5,350 SY		
0043	1330000000-E	607	INCIDENTAL MILLING	3,460 SY		
0044	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	13,600 TON		
0045	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	13,600 TON		
0046	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	13,100 TON		
0047	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2,040 TON		
0048	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	300 TON		
0049	2022000000-E	815	SUBDRAIN EXCAVATION	112 CY		
0050	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	500 SY		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0051	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	84 CY		
0052	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	500 LF		
0053	2070000000-N	815	SUBDRAIN PIPE OUTLET	1 EA		
0054	2077000000-E	815	6" OUTLET PIPE	6 LF		
0055	2190000000-N	828	TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE	35 EA		
0056	2209000000-E	838	ENDWALLS	6.8 CY		
0057	2264000000-E	840	PIPE PLUGS	0.797 CY		
0058	2275000000-E	SP	FLOWABLE FILL	46 CY		
0059	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	174 EA		
0060	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	120.5 LF		
0061	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	11 EA		
0062	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	3 EA		
0063	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	38 EA		
0064	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6 EA		
0065	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	56 EA		
0066	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	55 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0067	2396000000-N	840	FRAME WITH COVER, STD 840.54	4 EA		
0068	2418000000-E	SP	FRAME WITH GRATES, DRIVEWAY DROP INLET	70 LF		
0069	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1 EA		
0070	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	35 EA		
0071	2535000000-E	846	**" X **" CONCRETE CURB (8" X 12")	880 LF		
0072	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-0")	30 LF		
0073	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	120 LF		
0074	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	13,740 LF		
0075	2556000000-E	846	SHOULDER BERM GUTTER	15 LF		
0076	2591000000-E	848	4" CONCRETE SIDEWALK	3,960 SY		
0077	2605000000-N	848	CONCRETE CURB RAMPS	43 EA		
0078	2612000000-E	848	6" CONCRETE DRIVEWAY	1,000 SY		
0079	2619000000-E	850	4" CONCRETE PAVED DITCH	73 SY		
0080	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	6,625 SY		
0081	2738000000-E	SP	GENERIC PAVING ITEM 4" CONCRETE MULTI-USE PATH	6,900 SY		
0082	2860000000-N	859	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX	1 EA		
0083	2950000000-N	859	CONVERT EXISTING JUNCTION BOX TO DROP INLET	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0084	3030000000-E	862	STEEL BEAM GUARDRAIL	2,950 LF		
0085	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	50 LF		
0086	3105000000-N	862	STEEL BEAM GUARDRAIL TERMINAL SECTIONS	2 EA		
0087	3145000000-E	862	EXTRA LENGTH GUARDRAIL POST (**' STEEL) (8')	110 EA		
0088	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	5 EA		
0089	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	1 EA		
0090	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	4 EA		
0091	3215000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE III	5 EA		
0092	3287000000-N	862	GUARDRAIL END UNITS, TYPE TL-3	8 EA		
0093	3360000000-E	863	REMOVE EXISTING GUARDRAIL	2,710 LF		
0094	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	62.5 LF		
0095	3389150000-N	862	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	1 EA		
0096	3420000000-E	SP	GENERIC GUARDRAIL ITEM WOOD RUB RAIL	70 LF		
0097	3575000000-E	SP	GENERIC FENCING ITEM HANDRAIL ON RETAINING WALL (BLACK)	310 LF		
0098	3575000000-E	SP	GENERIC FENCING ITEM PEDESTRIAN SAFETY RAIL (BLACK)	175 LF		
0099	3575000000-E	SP	GENERIC FENCING ITEM WOOD SAFETY RAIL	125 LF		
0100	3578000000-N	SP	GENERIC FENCING ITEM TIMBER BOLLARD	6 EA		

County: GASTON

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0101	3579000000-N	866	GENERIC FENCING ITEM BLACK VINYL COATED METAL LINE POSTS FOR 48" CHAIN LINK FENCE	68 EA		
0102	3579000000-N	866	GENERIC FENCING ITEM BLACK VINYL COATED METAL TERMINAL POSTS FOR 48" CHAIN LINK FENCE	4 EA		
0103	3580000000-E	866	GENERIC FENCING ITEM BLACK VINYL COATED CHAIN LINK FENCE, 48" FABRIC	650 LF		
0104	3628000000-E	876	RIP RAP, CLASS I	280 TON		
0105	3635000000-E	876	RIP RAP, CLASS II	199 TON		
0106	3649000000-E	876	RIP RAP, CLASS B	50 TON		
0107	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,320 SY		
0108	3659000000-N	873	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	2 EA		
0109	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	880 LF		
0110	4096000000-N	904	SIGN ERECTION, TYPE D	7 EA		
0111	4102000000-N	904	SIGN ERECTION, TYPE E	41 EA		
0112	4108000000-N	904	SIGN ERECTION, TYPE F	4 EA		
0113	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	6 EA		
0114	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	39 EA		
0115	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	7 EA		
0116	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	1 EA		

County: GASTON

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0117	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	517 SF		
0118	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	228 SF		
0119	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	191 SF		
0120	4415000000-N	1115	FLASHING ARROW BOARD	3 EA		
0121	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	5 EA		
0122	4430000000-N	1130	DRUMS	200 EA		
0123	4445000000-E	1145	BARRICADES (TYPE III)	176 LF		
0124	4447000000-E	SP	PEDESTRIAN CHANNELIZING DEVICES	50 LF		
0125	4455000000-N	1150	FLAGGER	120 DAY		
0126	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	2 EA		
0127	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	1 EA		
0128	4480000000-N	1165	TMA	2 EA		
0129	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	2,050 LF		
0130	4505000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER (ANCHORED)	1,000 LF		
0131	4510000000-N	1190	LAW ENFORCEMENT	144 HR		
0132	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM TEMPORARY RIVER WARNING SIGN	14 EA		
0133	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	200 EA		

County: GASTON

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0134	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	29,345 LF		
0135	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	926 LF		
0136	4709000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	1,465 LF		
0137	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	12 EA		
0138	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	82 EA		
0139	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	5,128 LF		
0140	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	57,900 LF		
0141	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	808 LF		
0142	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	460 LF		
0143	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	77 EA		
0144	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	350 LF		
0145	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	235 LF		
0146	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	115 LF		
0147	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	2 EA		
0148	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM YIELD LINE PAINT PAVEMENT MARKING (24")	30 LF		
0149	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM YIELD LINE THERMOPLASTIC PAVEMENT MARKING (24", 90 MILS)	30 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0150	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM POLYCARBONATE H-SHAPED MARKERS	602 EA		
0151	5325000000-E	1510	**" WATER LINE (14")	925 LF		
0152	5325200000-E	1510	2" WATER LINE	360 LF		
0153	5325600000-E	1510	6" WATER LINE	300 LF		
0154	5325800000-E	1510	8" WATER LINE	410 LF		
0155	5326000000-E	1510	10" WATER LINE	255 LF		
0156	5326200000-E	1510	12" WATER LINE	2,250 LF		
0157	5326600000-E	1510	16" WATER LINE	370 LF		
0158	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	13,300 LB		
0159	5536000000-E	1515	2" VALVE	2 EA		
0160	5540000000-E	1515	6" VALVE	3 EA		
0161	5546000000-E	1515	8" VALVE	2 EA		
0162	5552000000-E	1515	10" VALVE	2 EA		
0163	5558000000-E	1515	12" VALVE	8 EA		
0164	5558600000-E	1515	16" VALVE	1 EA		
0165	5606000000-E	1515	2" BLOW OFF	1 EA		
0166	5606600000-E	1515	6" BLOW OFF	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0167	5648000000-N	1515	RELOCATE WATER METER	6 EA		
0168	5649000000-N	1515	RECONNECT WATER METER	1 EA		
0169	5672000000-N	1515	RELOCATE FIRE HYDRANT	1 EA		
0170	5673000000-E	1515	FIRE HYDRANT LEG	85 LF		
0171	5686500000-E	1515	WATER SERVICE LINE	415 LF		
0172	5691300000-E	1520	8" SANITARY GRAVITY SEWER	259 LF		
0173	5709300000-E	1520	6" FORCE MAIN SEWER	240 LF		
0174	5768500000-E	1520	SEWER SERVICE LINE	100 LF		
0175	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	505 LB		
0176	5775000000-E	1525	4' DIA UTILITY MANHOLE	3 EA		
0177	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	4.4 LF		
0178	5804000000-E	1530	ABANDON 12" UTILITY PIPE	2,703 LF		
0179	5810000000-E	1530	ABANDON 16" UTILITY PIPE	318 LF		
0180	5835600000-E	1540	12" ENCASEMENT PIPE	250 LF		
0181	5835700000-E	1540	16" ENCASEMENT PIPE	120 LF		
0182	5836000000-E	1540	24" ENCASEMENT PIPE	55 LF		
0183	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (14")	925 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0184	5888000000-E	SP	GENERIC UTILITY ITEM 3" CONDUIT	1,160 LF		
0185	5888000000-E	SP	GENERIC UTILITY ITEM POLYETHYLENE ENCASEMENT	100 LF		
0186	6000000000-E	1605	TEMPORARY SILT FENCE	14,650 LF		
0187	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	835 TON		
0188	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	1,540 TON		
0189	6012000000-E	1610	SEDIMENT CONTROL STONE	2,875 TON		
0190	6015000000-E	1615	TEMPORARY MULCHING	15 ACR		
0191	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	900 LB		
0192	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	5.5 TON		
0193	6024000000-E	1622	TEMPORARY SLOPE DRAINS	365 LF		
0194	6029000000-E	SP	SAFETY FENCE	2,620 LF		
0195	6030000000-E	1630	SILT EXCAVATION	3,850 CY		
0196	6036000000-E	1631	MATTING FOR EROSION CONTROL	24,960 SY		
0197	6037000000-E	1629	COIR FIBER MAT	4,125 SY		
0198	6042000000-E	1632	1/4" HARDWARE CLOTH	7,495 LF		
0199	6043000000-E	1644	LOW PERMEABILITY GEOTEXTILE	100 SY		
0200	6070000000-N	1639	SPECIAL STILLING BASINS	34 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0201	6071002000-E	1642	FLOCCULANT	320 LB		
0202	6071012000-E	1642	COIR FIBER WATTLE	20 LF		
0203	6071014000-E	1642	COIR FIBER WATTLE BARRIER	110 LF		
0204	6071030000-E	1640	COIR FIBER BAFFLE	480 LF		
0205	6071050000-E	1644	**" SKIMMER (1-1/2")	3 EA		
0206	6084000000-E	1660	SEEDING & MULCHING	15 ACR		
0207	6087000000-E	1660	MOWING	7.5 ACR		
0208	6090000000-E	1661	SEED FOR REPAIR SEEDING	150 LB		
0209	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.25 TON		
0210	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	300 LB		
0211	6108000000-E	1665	FERTILIZER TOPDRESSING	8.5 TON		
0212	6111000000-E	SP	IMPERVIOUS DIKE	815 LF		
0213	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0214	6114800000-N	SP	MANUAL LITTER REMOVAL	5 MHR		
0215	6114900000-E	SP	LITTER DISPOSAL	2 TON		
0216	6117000000-N	1675	RESPONSE FOR EROSION CONTROL	25 EA		
0217	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	2 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0218	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION CLEANOUT	321 EA		
0219	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION, TYPE 1	107 EA		
0220	6132000000-N	SP	GENERIC EROSION CONTROL ITEM PREFABRICATED CONCRETE WASHOUT	11 EA		
0221	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	11 EA		
0222	7060000000-E	1705	SIGNAL CABLE	19,100 LF		
0223	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	75 EA		
0224	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	4 EA		
0225	7252000000-E	1710	MESSENGER CABLE (1/4")	550 LF		
0226	7264000000-E	1710	MESSENGER CABLE (3/8")	1,500 LF		
0227	7288000000-E	1715	PAVED TRENCHING (**********) (1, 2")	400 LF		
0228	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 1")	800 LF		
0229	7301000000-E	1715	DIRECTIONAL DRILL (**********) (1, 2")	650 LF		
0230	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	22 EA		
0231	7360000000-N	1720	WOOD POLE	8 EA		
0232	7372000000-N	1721	GUY ASSEMBLY	16 EA		
0233	7408000000-E	1722	1" RISER WITH WEATHERHEAD	3 EA		
0234	7420000000-E	1722	2" RISER WITH WEATHERHEAD	8 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0235	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	4,000 LF		
0236	7456100000-E	1726	LEAD-IN CABLE (14-2)	14,000 LF		
0237	7481000000-N	SP	SITE SURVEY	2 EA		
0238	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	2 EA		
0239	7481260000-N	SP	EXTERNAL LOOP EMULATOR PROCESSING UNIT	2 EA		
0240	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	7 EA		
0241	7576000000-N	SP	METAL STRAIN SIGNAL POLE	4 EA		
0242	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	4 EA		
0243	7613000000-N	SP	SOIL TEST	8 EA		
0244	7614100000-E	SP	DRILLED PIER FOUNDATION	48 CY		
0245	7630000000-N	SP	METAL STRAIN POLE DESIGN	2 EA		
0246	7631000000-N	SP	MAST ARM WITH METAL POLE DESIGN	4 EA		
0247	7636000000-N	1745	SIGN FOR SIGNALS	22 EA		
0248	7642100000-N	1743	TYPE I POST WITH FOUNDATION	3 EA		
0249	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	10 EA		
0250	7980000000-N	SP	GENERIC SIGNAL ITEM 2070LX CONTROLLER	2 EA		
0251	7980000000-N	SP	GENERIC SIGNAL ITEM PORTABLE CCTV CAMERA ASSEMBLY	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0252	7980000000-N	SP	GENERIC SIGNAL ITEM PROTECTIVE COATING FOR SINGLE MAST ARM POLE (BLACK)	4 EA		
0253	7980000000-N	SP	GENERIC SIGNAL ITEM PROTECTIVE COATING FOR STRAIN POLE (BLACK)	4 EA		
0254	7980000000-N	SP	GENERIC SIGNAL ITEM PROTECTIVE COATING FOR TYPE I PUSHBUTTON POST (BLACK)	2 EA		
0255	7980000000-N	SP	GENERIC SIGNAL ITEM PROTECTIVE COATING FOR TYPE II SIGNAL PEDESTAL (BLACK)	10 EA		
			WALL ITEMS			
0256	8801000000-E	SP	MSE RETAINING WALL NO **** (4)	3,220 SF		
0257	8802031000-E	455	PRECAST GRAVITY RETAINING WALLS	1,360 SF		
0258	8802040000-E	453	CIP GRAVITY RETAINING WALLS	1,060 SF		
0259	8847000000-E	SP	GENERIC RETAINING WALL ITEM SMSE RETAINING WALL NO. 5	3,710 SF		
			STRUCTURE ITEMS			
0260	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (32+93.00 -L-)	Lump Sum	L.S.	
0261	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (32+93.00 -L-)	Lump Sum	L.S.	
0262	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum	L.S.	
0263	8105500000-E	411	**'-**" DIA DRILLED PIERS IN SOIL (4'-6")	886.86 LF		
0264	8105600000-E	411	**'-**" DIA DRILLED PIERS NOT IN SOIL (4'-6")	279.8 LF		
0265	8111000000-E	411	PERMANENT STEEL CASING FOR **'-**" DIA DRILLED PIER (4'-6")	306.48 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0266	8113000000-N	411	SID INSPECTIONS	10 EA		
0267	8115000000-N	411	CSL TESTING	8 EA		
0268	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION ******** (32+93.00 -L-)	Lump Sum	L.S.	
0269	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	51,650 SF		
0270	8161000000-E	420	GROOVING BRIDGE FLOORS	34,247 SF		
0271	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	719.2 CY		
0272	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (32+93.00 -L-)	Lump Sum	L.S.	
0273	8217000000-E	425	REINFORCING STEEL (BRIDGE)	214,496 LB		
0274	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	40,842 LB		
0275	8265000000-E	430	54" PRESTRESSED CONCRETE GIRDERS	6,269.67 LF		
0276	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	38 EA		
0277	8364000000-E	450	HP 12 X 53 STEEL PILES	2,090 LF		
0278	8394000000-N	450	DYNAMIC PILE TESTING	2 EA		
0279	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-2" X 2'-6")	906.42 LF		
0280	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-4" X 2'-6")	499.25 LF		
0281	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	1,140 TON		
0282	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	1,270 SY		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0283	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0284	8860000000-N	SP	GENERIC STRUCTURE ITEM ELECTRICAL CONDUIT SYSTEM	Lump Sum	L.S.	
0285	8860000000-N	SP	GENERIC STRUCTURE ITEM STRIP SEAL EXPANSION JOINTS	Lump Sum	L.S.	
0286	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STATION 32+93.00 -L-	Lump Sum	L.S.	
0287	8867000000-E	SP	GENERIC STRUCTURE ITEM ANODIZED DOUBLE FACED TWO BAR METAL RAIL	491.75 LF		
0288	8867000000-E	SP	GENERIC STRUCTURE ITEM ANODIZED TWO BAR METAL RAIL	866.17 LF		

0909/Nov02/Q748079.347/D1341444209000/E288 **Total Amount Of Bid For Entire Project :**