

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

**INDUSTRY DRAFT REQUEST FOR PROPOSAL**



**DESIGN-BUILD PROJECT**

**TIP R-5777C**

**June 23, 2022**



*VOID FOR BIDDING*

DATE AND TIME OF TECHNICAL PROPOSAL SUBMISSION: **December 20, 2022 BY 4:00 PM**

DATE AND TIME OF PRICE PROPOSAL SUBMISSION: **January 10, 2023 BY 4:00 PM**

DATE AND TIME OF PRICE PROPOSAL OPENING: **January 17, 2023 AT 2:00 PM**

CONTRACT ID: C204695

WBS ELEMENT NO. 44648.3.4

FEDERAL-AID NO. N/A

COUNTY: Craven

ROUTE NO. US 70

MILES: 6.4

LOCATION: US 70 from the Havelock Bypass to east of SR 1116 (Thurman Road)

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK  
CONTAINED IN THE REQUEST FOR PROPOSALS

NOTICE:

ALL PROPOSERS 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 PROPOSER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. PROPOSERS 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. NOT WITHSTANDING THESE LIMITATIONS ON BIDDING, THE PROPOSER WHO IS AWARDED ANY PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING, REGARDLESS OF FUNDING SOURCES.

\_\_\_\_\_  
5% BID BOND OR BID DEPOSIT REQUIRED  
\_\_\_\_\_

**PROPOSAL FORM FOR THE CONSTRUCTION OF CONTRACT NO. C204695**

**IN CRAVEN COUNTY, NORTH CAROLINA**

**Date** \_\_\_\_\_ **20** \_\_\_\_\_

**DEPARTMENT OF TRANSPORTATION,**

**RALEIGH, NORTH CAROLINA**

The Design-Build Team herein acknowledges that it has carefully examined the location of the proposed work to be known as Contract No. C204695; has carefully examined the Final Request for Proposals (RFP) and all addendums thereto, specifications, special provisions, the form of contract, and the forms of contract payment bond and contract performance bonds, which are acknowledged to be part of the Contract; and thoroughly understands the stipulations, requirements and provisions. The undersigned Design-Build Team agrees to be bound upon their execution of the Contract and including any subsequent award to them by the Secretary of Transportation in accordance with this Contract to provide the necessary contract payment bond and contract performance bond within fourteen calendar days after the written notice of award is received by them.

The undersigned Design-Build Team further agrees to provide all necessary materials, machinery, implements, appliances, tools, labor, and other means of construction, except as otherwise noted, to perform all the work and required labor to design, construct and complete all the work necessary for State Highway Contract No. C204695 in Craven County by no later than the dates(s) specified in the Final RFP or Technical Proposal, whichever is earlier, and in accordance with the requirements of the Engineer, the Final RFP and Addenda thereto, the 2018 *Standard Specifications for Roads and Structures*, specifications prepared by the Department, the Technical Proposal prepared by the Design-Build Team, at the lump sum price(s) bid by the Design-Build Team in their Price Proposal.

The Design-Build Team shall provide signed and sealed documents prepared by the Design-Build Team, which specifications and plans show the details covering this project and adhere to the items noted above.

The Design-Build Team acknowledges that project documents furnished by the Department are preliminary and provided solely to assist the Design-Build Team in the development of the project design. Unless noted otherwise herein, the Department does not warrant or guarantee the sufficiency or accuracy of any information furnished by the Department.

The Department does not warrant or guarantee the sufficiency or accuracy of any investigations made, nor the interpretations made or opinions of the Department as to the type of materials and conditions to be encountered at the project site. The Design-Build Team is advised to make such independent investigations, as they deem necessary to satisfy their self as to conditions to be encountered on this project. The Design-Build Team shall have no claim for additional compensation or for an extension of contract time for any reason resulting from the actual conditions encountered at the site differing from those indicated in any of the information or

documents furnished by the Department except as may be allowed under the provisions of the 2018 *Standard Specifications for Roads and Structures*.

Although the Department has furnished preliminary designs for this project, unless noted otherwise herein, the Design-Build Team shall assume full responsibility, including liability, for the project design, including the use of portions of the Department design, modification of such design, or other designs as may be submitted by the Design-Build Team.

The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of all work performed under this contract, and shall indemnify and hold the Department harmless for any additional costs and all claims against the Department or the State which may arise due to errors or omissions of the Department in furnishing the preliminary project designs and information, and of the Design-Build Team in performing the work.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures*, January 2018, as well as, all design manuals, policy and procedures manuals, and AASHTO publications and guidelines referenced in the Request For Proposals, with all amendments and supplements thereto, are by reference, incorporated and made part of this contract; that, except as herein modified, all the design, construction and Construction Engineering Inspection included in this contract shall be done in accordance with the documents noted above and under the direction of the Engineer.

If the Design-Build Proposal is accepted and the award is made, the Technical Proposal submitted by the Design-Build Team is by reference, incorporated and made part of this contract. 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 by written approval as allowed by the Request for Proposals.

Accompanying the Price Proposal shall be 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 Design-Build Team fails 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 them, as provided in the 2018 *Standard Specifications for Roads and Structures*; otherwise said deposit will be returned to the Design-Build Team.

## TABLE OF CONTENTS

### COVER SHEET

### PROPOSAL SHEETS

| <b>PROJECT SPECIAL PROVISIONS</b>  | <i>PAGE NO.</i> |
|--|-----------------|
| Contract Time and Liquidated Damages .....   | 1               |
| Other Liquidated Damages and Incentives .....  | 1               |
| Required Provision for Infra Grant .....   | 2               |
| Payout Schedule .....  | 3               |
| Mobilization .....   | 3               |
| Substantial Completion .....   | 4               |
| Construction Moratorium .....  | 4               |
| Submittal of Quantities, Fuel Base Index Price and Opt-Out Option .....                                | 5               |
| Individual Meetings with Proposers .....   | 6               |
| Execution of Bid, Non-Collusion Affidavit, Debarment Certification<br>and Gift Ban Certification ..... | 6               |
| Submission of Design-Build Proposal .....  | 7               |
| Alternative Technical Concepts and Confidential Questions .....  | 8               |
| Schedule of Estimated Completion Progress .....  | 14              |
| Minority Business Enterprise and Women Business Enterprise .....                                       | 15              |
| Special Notice to Bidders .....  | 32              |
| Protection of Railroad Interest – NCRR and NSR .....   | 32              |
| Contractor’s License Requirements .....  | 33              |
| Use of Unmanned Aircraft System (UAS) .....  | 34              |
| Subsurface Information .....   | 34              |
| Cooperation between Contractors .....  | 34              |
| Bid Documentation .....  | 35              |
| Twelve Month Guarantee .....   | 38              |
| Outsourcing Outside of the USA .....   | 39              |
| Permanent Vegetation Establishment .....   | 39              |
| Erosion & Sediment Control / Storm Water Certification .....   | 40              |
| Procedure for Monitoring Borrow Pit Discharge .....  | 45              |
| Clearing and Grubbing .....  | 47              |
| Building and Appurtenance Removal / Demolition .....   | 47              |
| Manufactured Quarry Fines in Embankments .....   | 47              |
| Culvert Pipe .....   | 49              |
| Drainage Pipe .....  | 50              |
| Bridge Approach Fills – Geotextiles .....  | 51              |
| Cement Treated Base Course .....   | 51              |
| Price Adjustments for Asphalt Binder .....   | 53              |
| Price Adjustments - Asphalt Concrete Plant Mix .....   | 53              |
| Field Office .....   | 53              |
| Geotextile for Pavement Stabilization .....  | 56              |

|   |            |
|---|------------|
| CCTV Wood Pole .....  | 57         |
| Junction Boxes (Limited Access Facilities).....                       | 58         |
| Ethernet Cable.....   | 67         |
| Conduit for Jetting Fiber .....                                       | 68         |
| Portable CCTV Camera and Trailer .....                                | 78         |
| Portable Changeable Message Sign for Incident Management .....        | 88         |
| Automated Machine Guidance .....                                      | 99         |
| Horizontal Drains.....  | 101        |
| Portable Construction Lighting.....                                   | 102        |
| High Visibility Devices.....  | 103        |
| Sequential Flashing Warning Lights.....                               | 105        |
| Work Zone Presence Lighting .....                                     | 108        |
| Work Zone Digital Speed Limit Signs.....                              | 111        |
| Work Zone Performance Pavement Markings.....                          | 116        |
| Typical Median Access Areas .....                                     | 120        |
| Sound Barrier Wall .....  | 130        |
| Continuous Flight Auger Piles for Sound Barrier Walls .....           | 132        |
| Architectural Concrete Surface Treatment .....                        | 137        |
| AASHTO Type 4 / NCDOT Standard Bead – Double Dropped Glass Beads .... | 142        |
| National Forest Lands .....   | 143        |
| Equipment Cleaning for National Forest Service Lands .....            | 143        |
| Management of Non-Native Invasive Species.....                        | 143        |
| Herbicide Application of National Forest Lands .....                  | 144        |
| Removal of NNIS Via Mechanical Methods on NFS Lands.....              | 145        |
| Natural Fiber Matting .....   | 145        |
| Special Requirements for Work in National Forest.....                 | 146        |
| <br>  |            |
| <b>GENERAL .....</b>  | <b>150</b> |
| <br>  |            |
| <b>SCOPES OF WORK</b>   |            |
| <br>  |            |
| Roadway .....   | 168        |
| Environmental Permits.....  | 187        |
| Erosion and Sedimentation Control.....                                | 195        |
| GeoEnvironmental .....  | 212        |
| Geotechnical Engineering.....   | 214        |
| Hydraulics .....  | 227        |
| ITS.....  | 234        |
| Pavement Management.....  | 244        |
| Pavement Markings .....   | 253        |
| Public Involvement and Information .....                              | 256        |

|  |     |
|--|-----|
| Railroad Coordination.....                               | 259 |
| Right of Way.....  | 265 |
| Signing.....   | 273 |
| Structures.....  | 279 |
| Temporary Traffic Signals and Signal Communications..... | 282 |
| Transportation Management.....                           | 287 |
| Utilities Coordination.....                              | 312 |

## **STANDARD SPECIAL PROVISIONS**

|  |     |
|--|-----|
| Railroad Grade Crossing.....                                       | 321 |
| Restrictions on ITS Equipment and Services.....                    | 321 |
| Equipment Idling Guidelines.....                                   | 321 |
| Plant and Pest Quarantines.....                                    | 322 |
| Rock and Broken Pavement Fills.....                                | 323 |
| Corrugated Aluminum Alloy Culvert Pipe.....                        | 324 |
| Culvert Pipe.....  | 324 |
| Bridge Approach Fills.....   | 326 |
| Alternate Bridge Approach Fills for Integral Abutments.....        | 328 |
| Piles.....   | 330 |
| Automated Fine Grading.....  | 331 |
| Stabilization of Coastal Plain Sands.....                          | 331 |
| Aggregate Subgrade.....  | 331 |
| Final Surface Testing.....   | 332 |
| Milling Asphalt Pavement.....                                      | 332 |
| Asphalt Concrete Plant Mix Pavements.....                          | 333 |
| Subsurface Drainage.....   | 337 |
| Guardrail End Units, Type TL-3.....                                | 337 |
| Guardrail Anchor Units and Temporary Guardrail Anchor Units.....   | 338 |
| Impact Attenuator Units, Type TL-3.....                            | 338 |
| Portland Cement Concrete Production and Delivery.....              | 339 |
| Thermoplastic Intermixed Bead Testing.....                         | 341 |
| Non-Cast Iron Snowplowable Pavement Markers.....                   | 341 |
| Materials for Portland Cement Concrete.....                        | 344 |
| Temporary Shoring.....   | 344 |
| Material and Equipment Storage & Parking of Personal Vehicles..... | 357 |
| Work Zone Installer.....   | 357 |
| Law Enforcement.....   | 358 |
| Extruded Thermoplastic Pavement Marking Thickness.....             | 359 |
| Bridge Approach Fills – Geotextile.....                            | 359 |
| Polyurea Pavement Markings Media and Thickness.....                | 359 |
| Snowplowable Pavement Markers.....                                 | 360 |
| Thermoplastic Pavement Marking Material – Color Testing.....       | 362 |
| Tack for Mulch for Erosion Control.....                            | 362 |
| On-the-Job Training.....   | 362 |
| Availability of Funds - Termination of Contracts.....              | 367 |

NCDOT General Seed Specifications for Seed Quality .....368  
Errata .....371  
Title VI and Nondiscrimination .....373  
Minimum Wages.....383  
Division One .....384

**PROPOSAL FORMS - ITEMIZED SHEET, ETC.**

Itemized Proposal Sheet (TAN SHEET)  
Fuel Usage Factor Chart and Estimate of Quantities  
Listing of DBE Subcontractors  
Execution of Bid, Non-Collusion Affidavit, Debarment Certification and Gift Ban  
Certification  
Signature Sheet

**\*\*\* PROJECT SPECIAL PROVISIONS \*\*\***

**CONTRACT TIME AND LIQUIDATED DAMAGES**

(7-12-7)

DB1 G04A

The date of availability for this contract is February 27, 2023, except that the Design-Build Team shall only begin ground disturbing activities as allowed by this Request for Proposals (RFP). The Design-Build Team shall consider this factor in determining the proposed completion date for this project.

The completion date for this contract is defined as the date proposed in the Technical Proposal by the proposer who is awarded the project. The completion date thus proposed shall not be later than August 1, 2028.

When observation periods are required by the special provisions, they are not a part of the work to be completed by the completion date and / or intermediate contract times. Should an observation period extend beyond the Final Completion Date proposed by the Design-Build Team in the Technical Proposal, the performance and payment bonds shall remain in full force and effect until the observation period has been completed and the work accepted by the Department.

The liquidated damages for this contract are **Seven Thousand Dollars (\$7,000.00)** per calendar day. As an exception to this amount, where the contract has been determined to be substantially complete as defined by the *Substantial Completion* Project Special Provision found elsewhere in this RFP, the liquidated damages will be reduced to **Twenty-Five Hundred Dollars (\$2,500.00)** per calendar day.

Where the Design-Build Team who is awarded the contract has proposed a completion date for the contract as required above, but also has proposed an earlier date for substantial completion, then both of these proposed dates will become contract requirements.

Liquidated damages of **Seven Thousand Dollars (\$7,000.00)** per calendar day will be applicable to the early date for substantial completion proposed by the bidder. Liquidated damages of **Twenty-Five Hundred Dollars (\$2,500.00)** per calendar day will be applicable to the Final Completion Date proposed by the bidder where the Design-Build Team has proposed an earlier date for substantial completion.

**OTHER LIQUIDATED DAMAGES AND INCENTIVES**

(3-22-7) (Rev. 2-14-8)

DB1 G11

**Reference the Transportation Management and ITS Scope of Work found elsewhere in this RFP for more information on the following time restrictions and liquidated damages:**

Liquidated Damages for Intermediate Contract Time #1 for failure to repair a damaged NCDOT ITS fiber optic communications cable and restore communications within 24 hours are \$500.00 per hour or any portion thereof.



Liquidated Damages for Intermediate Contract Time #2 for failure to reestablish NCDOT fiber optic communications within 24 hours after a disruption are \$2,500.00 per day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for failure to provide a plan that defines 1) an anticipated NCDOT fiber optic communications disruption timeframe and 2) a plan of action for reestablishing NCDOT communications a minimum of 21 calendar days prior to a proposed disruption in service are \$10,000.00 per failure.

Liquidated Damages for Intermediate Contract Time #4 for failure to restore communication to ITS devices or provide a replacement device within 24 hours are \$500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for lane narrowing, lane closure, holiday and special event time restrictions on US 70 are \$500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #6 for lane narrowing, lane closure, holiday and special event time restrictions on all other roads are \$500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #7 for road closure time restrictions for construction operations on US 70 are \$1,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #8 for road closure time restrictions for construction operations on all ramps and loops are \$500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #9 for road closure time restrictions for construction operations on all other roads except US 70 and all ramps / loops are \$250.00 per 15-minute period or any portion thereof.

**Liquidated Damages for Erosion and Sedimentation Control efforts apply to this project.**

Reference the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP for additional information under the Erosion Control Damages Section.

**REQUIRED PROVISION FOR INFRA GRANT**

The Contractor is hereby notified that this project will be partially financed with Infrastructure for Rebuilding America (INFRA) Funds. The Contractor shall assure that all subcontracts, and other contracts for services for an INFRA funded project shall also have this Project Special Provision in their contracts. As such, the Department may require the Contractor to provide reports, and other information as evidence to document the progress and expenditures on the

project on a monthly, quarterly and / or yearly basis. No direct payment will be made for providing any reports required by the INFRA Grant.

### **PAYOUT SCHEDULE**

(11-16-09)

DB1 G13

No later than 12:00 o'clock noon on the sixth day after the Price Proposal opening, the responsive proposer with the lowest adjusted price shall submit a proposed Anticipated Monthly Payout Schedule to the office of the State Contract Officer. The Anticipated Monthly Payout Schedule shall be submitted as a hard copy version and as an electronic version in Excel Spreadsheet. Both versions of the Anticipated Monthly Payout Schedule shall be submitted in a sealed package with the outer wrapping clearly marked "Anticipated Monthly Payout Schedule" along with the Design-Build Team name and the contract number. The Anticipated Monthly Payout Schedule will be used by the Department to establish the monthly funding levels for this project. The Anticipated Monthly Payout Schedule shall parallel, and agree with, the project schedule the Design-Build Team submits as a part of their Technical Proposal. The Anticipated Monthly Payout Schedule shall include a monthly percentage breakdown (in terms of the total contract amount percentages) of the work anticipated to be completed. The Anticipated Monthly Payout Schedule shall begin with the Date of Availability and end with the Actual Completion Date proposed by the Design-Build Team. If the Anticipated Monthly Payout Schedule is not submitted as stated herein, the Technical and Price Proposals will be considered irregular by the Department, and the bid may be rejected.

As detailed above, the Design-Build Team shall submit electronic and hard copy updates of the Anticipated Monthly Payout Schedule on March 15<sup>th</sup>, June 15<sup>th</sup>, September 15<sup>th</sup>, and December 15<sup>th</sup> of each calendar year until project acceptance. The Design-Build Team shall submit all updates to the Resident Engineer, with copies to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

### **MOBILIZATION**

(3-11-19)

DB1 G15B

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

#### **Page 8-1, Subarticle 800-2, MEASUREMENT AND PAYMENT**

Delete this subarticle in its entirety and replace with the following:

#### **800-2 MEASUREMENT AND PAYMENT**

Five percent of the "Total Amount of Bid for Entire Project" shall be considered the lump sum amount for Mobilization. Partial payments for Mobilization will be made beginning with the first partial pay estimate paid on the contract. Payment will be made at the rate of 50 percent of the lump sum amount calculated for Mobilization. The remaining 50 percent will be paid with the partial pay estimate following approval of all permits required in the Environmental Permits Scope of Work for this project.

**SUBSTANTIAL COMPLETION**

(3-22-07)

DB1 G16

When the special provisions provide for a reduction in the rate of liquidated damages for the contract time or an intermediate contract time after the work is substantially complete, the work will be considered substantially complete when the following requirements are satisfied:

- (A) Through traffic has been placed along the project or along the work required by an intermediate contract time and the work is complete to the extent specified below, and all lanes and shoulders are open such that traffic can move unimpeded at the posted speed. Intersecting roads and service roads are complete to the extent that they provide the safe and convenient use of the facility by the public.
- (B) The final layers of pavement for all lanes and shoulders along the project or along the work required by an intermediate contract time are complete.
- (C) Excluding signs on intersecting roadways, all signs are complete and accepted.
- (D) All guardrails, drainage devices, ditches, excavation and embankment are complete.
- (E) Remaining work along the project consists of permanent pavement markings, permanent pavement markers or incidental construction that is away from the paved portion of the roadway.

Upon apparent substantial completion of the entire project or the work required by an intermediate contract time, the Engineer will make an inspection of the work. If the inspection discloses the entire project or the work required by an intermediate contract time is substantially complete; the Engineer will notify the Design-Build Team in writing that the work is substantially complete. If the inspection discloses the entire project or the work required by an intermediate contract time is not substantially complete, the Engineer will notify the Design-Build Team in writing of the work that is not substantially complete. The entire project or the work required by an intermediate contract time will not be considered substantially complete until all of the recommendations made at the time of the inspection have been satisfactorily completed.

**CONSTRUCTION MORATORIUM**

(5-20-22)

DB1 G18C

Currently, there are no known records of northern long-eared bat (NLEB) maternity roost trees within 150 feet of the project. Prior to beginning any tree clearing activities, the Design-Build Team shall coordinate with the Design-Build Unit and the Environmental Coordination and Permitting Group to reconfirm that no NLEB maternity roost trees exist within 150 feet of the project. If the Department reconfirms that no NLEB maternity roost trees exist within 150 feet of the project, the Design-Build Team will be allowed to clear trees between May 1<sup>st</sup> and June 30<sup>th</sup>. If any NLEB maternity roost trees are found within 150 feet of the project, no tree cutting will be allowed from **May 1<sup>st</sup>** through **June 30<sup>th</sup>** of any year.

In addition, no tree cutting will be allowed on any day of the year during the portion of the day that the air temperature is <40 degrees Fahrenheit.

**SUBMITTAL OF QUANTITIES, FUEL BASE INDEX PRICE AND OPT-OUT OPTION**

7/1/21

DB1 G43

**(A) Submittal of Quantities**

**Submit quantities** on the *Fuel Usage Factor Chart and Estimate of Quantities* sheet, located in the back of this RFP, following the Itemized Proposal Sheet.

The Design-Build Team shall prepare an Estimate of Quantities that they anticipate incorporating into the completed project and upon which the Price Proposal was based. The quantity breakdown shall include all items of work that appear in the *Fuel Usage Factor Chart and Estimate of Quantities* sheet. Only those items of work which are specifically noted in the *Fuel Usage Factor Chart and Estimate of Quantities* sheet will be subject to fuel price adjustments.

**Submittal** - The submittal shall be signed and dated by an officer of the Design-Build Team. The information shall be copied and submitted in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and shall be delivered at the same time and location as the Technical Proposal. The original shall be submitted in the Price Proposal.

**Trade Secret** - Information submitted on the *Fuel Usage Factor Chart and Estimate of Quantities* sheet will be considered "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.

**(B) Base Index Price**

The Design-Build Team's Estimate of Quantities will be used on the various partial payment estimates to determine fuel price adjustments. The Design-Build Team shall submit a payment request for quantities of work completed based on the work completed for that estimate period. The quantities requested for partial payment shall be reflective of the work actually accomplished for the specified period. The Design-Build Team shall certify that the quantities are reasonable for the specified period. The base index price for DIESEL #2 FUEL is \$        per gallon.

**(C) Opt Out of Fuel Price Adjustment**

If the Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments, a quantity of zero shall be entered for all quantities in the *Fuel Usage Factor Chart and Estimate of Quantities* sheet and the declination box shall be checked. Failure to complete this form will mean that the Design-Build Team is declining the Fuel Price Adjustments for this project.

**(D) Change Option**

The proposer will not be permitted to change the option after the copy of the *Fuel Usage Factor Chart and Estimate of Quantities* sheet is submitted with the Technical Proposal.

**(E) Fuel Usage Factor for Asphalt Line Items**

If the Design-Build Team elects to pursue reimbursement for Fuel Price Adjustments, the Design-Build Team shall select either the 0.90 **or** 2.90 Fuel Usage Factor for each individual asphalt line item by marking the appropriate Factor on the *Fuel Usage Factor Chart*. If the Design-Build Team does not mark either Fuel Usage Factor or marks both Fuel Usage Factors for an asphalt line item, the 2.90 Fuel Usage Factor shall be used for that asphalt line item.

**(F) Failure to Submit**

Failure to submit the completed *Fuel Usage Factor Chart and Estimate of Quantities* sheet separately with the Technical Proposal and in the Price Proposal will result in the Technical and Price Proposal being considered irregular by the Department and the Technical and Price Proposal may be rejected.

**INDIVIDUAL MEETINGS WITH PROPOSERS**

(9-1-11)

DB1 G048

The Department will provide at least two Question and Answer Sessions and one Hydraulic & Geotechnical Question and Answer Session to meet with each proposer individually to specifically address questions regarding the draft Requests for Proposals.

The Department will afford each proposer two additional meetings with the Department (maximum 90-minute time limit per each meeting) to discuss project specifics and address the proposer's concerns and questions. These meetings may occur at any time after the first Question and Answer Session with the proposers and before two weeks prior to the Technical Proposal submittal date. The proposer shall request these meetings in writing to the State Contract Officer, providing the Department a minimum of one week advance notice of the requested date. The proposer shall also state in the request those disciplines within the Department that are requested to be in attendance. The Department makes no assurance that the request may be honored on that specific date or that all disciplines requested can be in attendance.

**EXECUTION OF BID, NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

(1/24/13)

DB1 G52

The Proposer's attention is directed to the various sheets in the Request for Proposals which are to be signed by the Proposer. A list of these sheets is shown below. The signature sheets are located behind the Itemized Proposal Sheet in this Request for Proposal. The NCDOT bid bond form is available on-line at:

**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**

or by contacting the Records and Documents office at 919-707-6900.

1. Applicable Signature Sheets: 1, 2, 3, 4, 5, or 6 (Bid)
2. Bid Bond dated the day of the Price Proposal submission

The Proposer shall certify to the best of his knowledge all subcontractors, material suppliers and vendors utilized herein current status concerning suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency, in accordance with the "Debarment Certification" located behind the *Execution of Bid Non-Collusion Affidavit, Debarment Certification and Gift Ban Certification* signature sheets in this RFP. Execution of the bid signature sheets in conjunction with any applicable statements concerning exceptions, when such statements have been made on the "Debarment Certification", constitutes the Proposer's certification of "status" under penalty of perjury under the laws of the United States.

### **SUBMISSION OF DESIGN-BUILD PROPOSAL**

(9-1-11) Rev. (8-30-17)

DB1 G55B

The Proposer's attention is directed that each Proposer's Design-Build Proposal shall comply with the following requirements in order for that Design-Build Proposal to be responsive and considered for award.

1. The Proposer shall be prequalified with the Department prior to submitting a Price Proposal.
2. The Proposer shall deliver the Technical Proposal and the Price Proposal to the place indicated, and prior to the times indicated in this Request for Proposals.
3. The Price Proposal documents shall be signed by an authorized employee of the Proposer.
4. The Price Proposal shall be accompanied by Bid surety in the form of a Bid Bond or Bid Deposit, dated the day of the Price Proposal submission.
5. If Minority and Women's Business Enterprise (MBE / WBE) goals are established for this contract, the Proposer shall complete the form Listing of MBE / WBE Subcontractors contained elsewhere in this RFP in accordance with the *Minority Business Enterprise and Women Business Enterprise* Project Special Provision found elsewhere in this RFP.
6. The Design-Build Proposal shall address all the requirements as specified in this Request for Proposals.

In addition to the above requirements, failure to comply with any of the requirements of Article 102-8 of the Standard Special Provisions, Division One (found elsewhere in this RFP), Article 102-9 of the 2018 *Standard Specifications for Roads and Structures*, or Article 102-10 of the 2018 *Standard Specifications for Roads and Structures* and as amended in the Standard

Special Provisions, Division One (found elsewhere in this RFP) may result in a Design-Build Proposal being rejected.

### **ALTERNATIVE TECHNICAL CONCEPTS AND CONFIDENTIAL QUESTIONS**

(6-8-11) (Rev. 1-27-22)

DB1 G56A

To accommodate innovation that may or may not be specifically allowed by the RFP, or other documents incorporated into the contract by reference, the Design-Build Team has the option of submitting Confidential Questions and Alternative Technical Concepts.

#### **Definitions**

A Confidential Question is a private query to the Department containing information whose disclosure could alert others to certain details of doing business in a particular manner.

An Alternative Technical Concept is a private query to the Department that requests a variance to the requirements of the RFP, or other documents incorporated into the contract by reference, that is equal or better in quality or effect, as determined by the Department in its sole discretion, and that has been used elsewhere under comparable circumstances.

#### **Confidential Questions**

The Design-Build Team will be permitted to ask Confidential Questions of the Department, and neither the question nor the answer will be shared with other Design-Build Teams. The Department, in its sole discretion, will determine if a question is considered confidential.

Confidential Questions arising prior to issuance of the Final RFP will be allowed during the industry review of the draft RFPs with the individual Design-Build Teams. The Department will answer the Confidential Question verbally at the industry review meeting, if possible, and / or through subtle changes in the Final RFP, which will clarify the scope by either allowing or disallowing the request. To the greatest extent possible, the revision will be made in such a manner as to not disclose the Confidential Question.

After issuance of the Final RFP, Confidential Questions may be submitted to the State Contract Officer via the Design-Build e-mail address (designbuild@ncdot.gov). After evaluation, the State Contract Officer will respond to the question in writing and / or through subtle changes in the Final RFP, as reflected in an Addendum, which will clarify the scope by either allowing or disallowing the request. To the greatest extent possible, the revision will be made in such a manner as to not disclose the Confidential Question. Minor questions will not be acknowledged or answered.

If the Design-Build Team includes concepts / work based on the Confidential Questions and answers, the concepts / work shall be discussed in the Technical Proposal.

### **Alternative Technical Concepts**

The Design-Build Team will be allowed to submit a maximum of six (6) Alternative Technical Concepts. The aforementioned maximum number of ATCs shall include both Preliminary and Formal ATCs. Excluding (1) Formal ATCs that are submitted in response to the Department's favorable review of a Preliminary ATC, (2) ATCs that are deemed to take advantage of an error or omission in the RFP, and (3) ATCs that contain multiple concepts, all ATCs submitted by the Design-Build Team shall count towards the maximum number of allowable ATCs, regardless of the Department's response. The Design-Build Team is cautioned that ATCs that receive responses that nullify the ATC shall count towards the maximum number of allowable ATCs. For example, at a minimum, the responses below shall count towards the maximum number of allowable ATCs:

- The ATC does not qualify as an ATC
- The RFP does not permit the concept proposed in the ATC, and the Department did not evaluate or consider the ATC
- A documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question without further regard for confidentiality
- More than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP without further regard for confidentiality

Additionally, should the Design-Build Team resubmit an ATC that the Department did not approve, the original ATC, as well as all ATC resubmittals, shall count towards the maximum number of allowable ATCs, resulting in a minimum of two ATCs.

Once an ATC has been submitted to the Department, the Design-Build Team will **NOT** be allowed to rescind the ATC.

Should the Design-Build Team submit a single ATC with multiple concepts, the Department (1) will not evaluate the concepts proposed in the ATC, and (2) will return the ATC to the Proposer requiring a separate submittal for each individual concept. The single ATC with multiple concepts will not be considered received within the ATC submittal deadlines noted below.

Initial ATC submittals shall be submitted in accordance with the following deadlines:

- The Design-Build Team will be allowed to submit the maximum number of allowable ATCs prior to the Final RFP distribution.
- The Design-Build Team will be allowed to submit a maximum of four (4) ATCs after the Final RFP distribution provided (1) the ATC submittal does not exceed the aforementioned maximum number of allowable ATCs, and (2) the ATC is received by the Department no later than seven weeks prior to the Technical Proposal submittal deadline.



The Design-Build Team may include an ATC in the Technical and Price Proposal only if the ATC was received by the Department in accordance with the requirements noted above and it has been approved by the Department (including conditionally approved ATCs, if all conditions are met).

The submittal deadlines above only apply to initial ATC submittals that contain one concept. Resubmittal of an ATC that (1) has been revised in response to the Department's requests for further information concerning a prior submittal, (2) is a Formal ATC for a Preliminary ATC that received a favorable response from the Department, or (3) requests approval of additional required variances to the RFP requirements that were omitted in the original ATC submittal shall be received by the Department no later than three weeks prior to the Technical Proposal submittal deadline.

The Design-Build Team shall be solely responsible for reviewing all versions of the RFP, including all Addenda, and determining variances required by a Formal ATC. The Design-Build Team is cautioned that the Department's approval in no way implies that the Design-Build Team has requested approval of all the required variances to the RFP requirements. Additionally, should the Department revise the RFP after a Formal ATC has been approved, the Design-Build Team shall be solely responsible for reviewing the RFP and determining if the ATC deviates from the revised requirements. If necessary, the Design-Build Team must submit a request for approval of all additional required variance(s) no later than three weeks prior to the Technical Proposal submittal deadline unless the ATC deviates from revised requirements in an RFP Addendum that is distributed within three weeks prior to the Technical Proposal submittal deadline. If the ATC deviates from revised requirements in an RFP Addendum that is distributed within three weeks prior to the Technical Proposal submittal deadline, the Design-Build Team must submit a request for approval of all additional required variance(s) within five business days of the date of the Department's ATC response letter and / or the RFP Addendum distribution, as appropriate.

An ATC shall in no way take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference. If, at the sole discretion of the Department, an ATC is deemed to take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, the RFP will be revised without regard for confidentiality. If at any time, the Department receives a documented question on the project similar to a concept submitted in the form of a Preliminary ATC or Formal ATC, the Department reserves the right to revise the RFP without further regard for confidentiality.

By approving an ATC, the Department acknowledges that the ATC may be included in the design and RFC Plans; however, approval of any ATC in no way relieves the Design-Build Team of its obligation to satisfy (1) other contract requirements not specifically identified in the ATC submittal; (2) the Department's comments resulting from review of the design details post-Award; (3) any obligation that may arise under applicable laws and regulations; and (4) any obligation mandated by the regulatory agencies as a permit condition.

## ATC Submittals

All ATCs shall be submitted in electronic .pdf format to the State Contract Officer, via the Design-Build e-mail address (designbuild@ncdot.gov). Excluding the ATC distribution letter, the ATC shall not include any reference to the submitter's identity.

## Formal ATCs

Each Formal ATC submittal shall include the following information:

- 1) **Description** - A detailed description and schematic drawings of the ATC configuration or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions, etc.] and a traffic operational analysis, if appropriate)
- 2) **Usage** - Where and how the ATC would be used on the project
- 3) **Deviations** - References to all RFP requirements, or other documents incorporated into the contract by reference, that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such variance(s)
- 4) **Analysis** - An analysis justifying use of the ATC and why the variance to the RFP requirements, or other documents incorporated into the contract by reference, should be allowed. **All intersection and interchange reconfigurations shall include corresponding electronic traffic analyses files and a signing concept.**
- 5) **Impacts** - Discussion of potential vehicular traffic impacts, environmental impacts, community impacts, safety and life-cycle project impacts, and infrastructure costs (including impacts on the cost of repair and maintenance)
- 6) **History** - A detailed description of other projects where the ATC has been used, the success of such usage, and names and telephone numbers of project owners that can confirm such statements
- 7) **Risks** - A description of added risks to the Department and other entities associated with implementing the ATC
- 8) **Costs** - An estimate of the ATC implementation costs to the Department, the Design-Build Team, and other entities (right of way, utilities, mitigation, long term maintenance, etc.)

The Formal ATC, if approved, shall be included in the Price Proposal if the Design-Build Team elects to include it in their Technical Proposal.

## **Review of ATCs**

A panel will be selected to review each ATC, which may or may not include members of the Technical Review Committee. The Design-Build Team shall make no direct contact with any member of the review panel, except as may be permitted by the State Contract Officer. Unapproved contact with any member of the review panel shall result in a disqualification of that ATC.

At any time, the Department may request additional information regarding a proposed ATC. To the greatest extent possible, the Department will return responses to, or request additional information from, the Design-Build Team within 15 business days of the original submittal of a Formal ATC. If additional information is requested, the Department will provide a response within ten business days of receipt of all requested information.

In accordance with the *Individual Meetings with Proposers* Project Special Provision found elsewhere in this RFP, a Design-Build Team's ATC may be discussed during confidential one-on-one meeting(s). Under no circumstances will the Department be responsible or liable to the Design-Build Team or any other party as a result of disclosing any ATC materials, whether the disclosure is deemed required by law, by a court order, or occurs through inadvertence, mistake or negligence on the part of the Department or their respective officers, employees, contractors, or consultants.

In the event that the Department receives 1) ATCs from more than one Design-Build Team or 2) an ATC and a documented question outside of the ATC process that are deemed by the Department, in its sole discretion, to be similar in nature, the Department reserves the right to modify the RFP without further regard for confidentiality.

## **The Department Response to Formal ATCs**

The Department will review each Formal ATC and will respond to the Design-Build Team with one of the following determinations:

- 1) The Formal ATC is approved.
- 2) The Formal ATC is not approved.
- 3) The Formal ATC is not approved in its present form, but may be approved upon satisfaction, in the Department's sole discretion, of certain identified conditions that shall be met or certain clarifications or modifications that shall be made (conditionally approved).
- 4) The submittal does not qualify as an ATC but may be included in the Design-Build Proposal without an approved ATC (i.e., the concept complies with the baseline requirements of the RFP).

- 5) The Formal ATC is deemed to take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, in which case the Formal ATC will not be considered, and the RFP will be revised to correct the error or omission without further regard for confidentiality.
- 6) A documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question without further regard for confidentiality.
- 7) More than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP without further regard for confidentiality. This response could also follow and supersede one of the other previously provided responses above.
- 8) The Formal ATC contains multiple concepts and has not been considered. Should the Design-Build Team wish to pursue one or more of the concepts presented in the Formal ATC, a submittal for each individual concept shall be required.

### **Formal ATC Inclusion in Technical Proposal**

The Design-Build Team may incorporate one or more approved Formal ATCs as part of its Technical and Price Proposals. If the Department responded to a Formal ATC by stating that it would be approved if certain conditions were met, those conditions shall be stipulated and met in the Technical Proposal or the concept will be deemed in violation of the RFP requirements.

In addition to outlining each implemented Formal ATC, and providing assurances to meet all attached conditions, the Design-Build Team shall also include a copy of the Formal ATC approval letter from the State Contract Officer in each of the twelve Technical Proposals submitted. This letter will be included in the distribution of the Technical Proposals to the Technical Review Committee.

Approval of a Formal ATC in no way implies that the Formal ATC will receive a favorable review from the Technical Review Committee. The Technical Proposals will be evaluated in regards to the evaluation criteria found in this RFP, regardless of whether or not Formal ATCs are included.

The Price Proposal shall reflect all incorporated Formal ATCs. Except for incorporating approved Formal ATCs, the Technical Proposal may not otherwise contain exceptions to, or deviations from, the requirements of the RFP, or other documents incorporated into the contract by reference.

### **Preliminary ATCs**

At the Design-Build Team's option, a Preliminary ATC submittal may be made that presents a concept and a brief narrative of the concept's benefits. The purpose of allowing a Preliminary

ATC is to limit the Design-Build Team's expense in the pursuit of a Formal ATC that may be quickly denied by the Department.

To the greatest extent possible, the Department will review Preliminary ATCs within ten business days of submittal and will respond to the Design-Build Team with one of the following determinations:

- 1) The Preliminary ATC would be considered as a Formal ATC if the Team so elects to pursue a Formal ATC submission.
- 2) The Preliminary ATC is denied.
- 3) An ATC is not required.
- 4) The Preliminary ATC takes advantage of an error or omission in the RFP or other documents incorporated into the contract by reference, in which case the Preliminary ATC will not be considered, and the RFP will be revised to correct the error or omission without further regard for confidentiality.
- 5) A documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question without further regard for confidentiality.
- 6) More than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP without further regard for confidentiality. This response could also follow and supersede one of the other previously supplied responses above.
- 7) The Preliminary ATC contains multiple concepts and has not been considered. Should the Design-Build Team wish to pursue one or more of the concepts presented in the Preliminary ATC, a submittal for each individual concept shall be required.

The Department in no way warrants that a favorable response to a Preliminary ATC submittal will translate into a favorable response to a Formal ATC submittal. Likewise, a favorable response to a Preliminary ATC submittal is not sufficient to include the ATC in the Technical Proposal.

#### **SCHEDULE OF ESTIMATED COMPLETION PROGRESS**

(9-1-11) (Rev. 3-31-21)

DB1 G58

The Design-Build Team's attention is directed to the *Availability of Funds - Termination of Contracts* Standard Special Provision found elsewhere in this RFP. The Department of Transportation's schedule of estimated completion progress for this project, as required by that Standard Special Provision, shall be as follows:

| <u>Fiscal Year</u>         | <u>Progress (% of Dollar Value)</u> |
|----------------------------|-------------------------------------|
| 2024 (07/01/23 - 06/30/24) | 6 % of Total Amount Bid             |
| 2025 (07/01/24 – 06/30/25) | 18 % of Total Amount Bid            |
| 2026 (07/01/25 - 06/30/26) | 33 % of Total Amount Bid            |
| 2027 (07/01/26 - 06/30/27) | 29 % of Total Amount Bid            |
| 2028 (07/01/27 - 06/30/28) | 13 % of Total Amount Bid            |
| 2029 (07/01/28 - 06/30/29) | 1 % of Total Amount Bid             |

In accordance with Article 108-2 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall also furnish its own progress schedule. Any acceleration of the progress as shown by the Design-Build Team'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. 8-17-21)

102-15(J)

DB1 G66

#### **Description**

The purpose of this project 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 the Price Proposal is submitted 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 the Price Proposal is submitted 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 contract Combined MBE / WBE Goal.

*Goal Confirmation Letter* - Written documentation from the Department to the Proposer confirming the Design-Build Team's approved, committed participation along with a listing of the committed MBE and WBE firms.

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

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

*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 Design-Build Team 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.

**<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>**

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract.

**<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>**

JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.

**<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>**

*Letter of Intent* - Form signed by the Contractor and the MBE / WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE / WBE for the estimated amount (based on quantities and unit prices) listed at the time the Price Proposal is submitted.

**<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 contained elsewhere in this RFP.

**[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).docx](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>**



**Combined MBE / WBE Goal**

The Combined MBE / WBE Goal for this project is **7.0%**

The Combined MBE / WBE Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **3.0%**

- (1) *If the anticipated MBE participation is more than zero*, the Design-Build Team shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated MBE participation is zero*, the Design-Build Team shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **4.0%**

- (1) *If the anticipated WBE participation is more than zero*, the Design-Build Team shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated WBE participation is zero*, the Design-Build Team shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Proposer is required to submit only participation to meet the Combined MBE / WBE Goal. The Combined MBE / WBE Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

**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 the Price Proposal is submitted, Proposers 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 firm 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 the Price Proposal is submitted will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of Price Proposal opening will be acceptable for listing in the Proposer's submittal of MBE and WBE participation. The Design-Build Team shall indicate the following required information:

- (1) *If the Combined MBE / WBE Goal is more than zero,*
  - (a) Proposers, at the time the Price 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 Price Proposal to be considered responsive. Proposers shall indicate the total dollar value of the MBE and WBE participation for the contract.
  - (b) If Proposers 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.** Price Proposals submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of Price Proposals. The Department will not consider these Price Proposals for award and the proposal will be rejected.
  - (c) The Proposer shall be responsible for ensuring that the MBE / WBE is certified at the time the Price Proposal is submitted by checking the Directory of Transportation Firms. If the firm is not certified at the time of the opening of the Price Proposals, 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 proposes on a contract that contains a Combined MBE / WBE Goal, the firm is responsible for meeting the Combined MBE / WBE Goal or making good faith efforts to meet the Goal, just like any other proposer. In most cases, a MBE or WBE proposer 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 proposer and any other similarly certified subcontractors will count toward the Goal. The MBE or WBE proposer shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the Combined MBE / WBE 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 proposer would.

**Written Documentation - Letter of Intent**

The Proposer shall submit written documentation for each MBE / WBE that will be used to meet the contract Combined MBE / WBE Goal, indicating the Proposer'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. on the sixth calendar day following opening of Price Proposals 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 Proposer 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 Design-Build Team 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 Price Proposals, 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 Price Proposal of the Proposer with the apparent adjusted low price exceeds \$500,000.00 and if the committed MBE / WBE participation submitted exceeds the algebraic sum of the Combined MBE / WBE Goal by \$1,000.00 or more, the excess will be placed on deposit by the Department for future use by the Proposer. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the Proposer with the apparent adjusted low price fails to submit sufficient participation by MBE and WBE firms to meet the contract Combined MBE / WBE Goal, as part of the good faith effort, the Department will consider allowing the Proposer to withdraw funds to meet the Combined MBE / WBE Goal, as long as there are adequate funds available from the Proposer's MBE and WBE bank accounts.

### **Submission of Good Faith Effort**

If the Proposer fails to meet or exceed the Combined MBE / WBE Goal, the Proposer with the apparent adjusted low price shall submit to the Department documentation of adequate good faith efforts made to reach the Combined MBE / WBE 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 Price Proposals 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 Design-Build Team cannot send the information electronically, then one complete set and five 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 Proposer took all necessary and reasonable steps to achieve the Combined MBE / WBE 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 Proposer 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 Proposer has made. Listed below are examples of the types of actions a Proposer 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 Proposer must solicit this interest within at least ten days prior to the opening of the Price Proposals 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 Proposer 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 contract Combined MBE / WBE Goal when the work to be sublet includes potential for MBE / WBE participation (2<sup>nd</sup> and 3<sup>rd</sup> 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 Proposer's responsibility to make a portion of the work available to MBE / WBE firms 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 Proposer using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE / WBE firms, and would take a firm's price and capabilities, as well as the contract Combined MBE / WBE 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 proposer's failure to meet the contract Combined MBE / WBE 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 Proposer of the responsibility to make good faith efforts. Proposing Design-Build Teams 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 Proposer'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 Price Proposals in the Proposer'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 Proposer.
- (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 seven days from the opening of the Price Proposals the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the Proposer's inability to get MBE or WBE quotes.
- (I) Any other evidence that the Proposer submits which shows that the Proposer has made reasonable good faith efforts to meet the contract Combined MBE / WBE Goal.

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

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

If the Department does not award the contract to the Proposer with the apparent adjusted low price, the Department reserves the right to award the contract to the Proposer with the next apparent adjusted low price 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 Combined MBE / WBE Goal.

### **Non-Good Faith Appeal**

The State Prequalification Engineer will notify the Design-Build Team verbally and in writing of non-good faith. A Design-Build Team may appeal a determination of non-good faith made by the Goal Compliance Committee. If a Design-Build Team wishes to appeal the determination made by the Committee, they shall provide written notification to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within two 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 actually performed by the MBE / WBE and the actual payments to MBE / WBE firms by the Design-Build Team.

(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 firm may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted towards 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 not 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 (e.g. 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 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 Contractor responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the contract work 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 Design-Build Team may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

A Design-Build Team may count toward its MBE or WBE requirement 60.0 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100.0 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

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

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

### **Commercially Useful Function**

(A) MBE / WBE Utilization

The Design-Build Team may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE / WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE / WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining



quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE / WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE / WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the Design-Build Team 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 Contractor 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 Design-Build Team 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 Design-Build Team 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 Design-Build Team shall not terminate the MBE / WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Design-Build Team seeks to perform the work of the terminated subcontractor with another MBE / WBE subcontractor, a non-MBE / WBE subcontractor, or with the Design-Build Team's own forces or those of an affiliate.

The Design-Build Team must give notice in writing both by certified mail and e-mail to the MBE / WBE subcontractor, with a copy to the Engineer of its intent to request to terminate and / or substitute, and the reason for the request. The Design-Build Team must give the MBE / WBE subcontractor five business days to respond to the Design-Build Team'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 business days, must advise the Design-Build Team 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 after receiving the Department's written approval based upon a finding of good cause for the proposed termination and / or substitution. 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 1,200 or applicable state law.
- (f) The listed MBE / WBE subcontractor is not a responsible contractor.
- (g) The listed MBE / WBE subcontractor voluntarily withdraws from the Design-Build Team and provides written notice of withdrawal.
- (h) The listed MBE / WBE subcontractor is ineligible to receive MBE / WBE credit for the type of work required.
- (i) An MBE / WBE owner dies or becomes disabled with the result that the listed MBE / WBE subcontractor is unable to complete its work on the contract.
- (j) Other documented good cause that compels the termination of the MBE / WBE subcontractor. Provided, that good cause does not exist if the Prime Contractor seeks to terminate an MBE / WBE it relied upon to obtain the contract so that the Prime Contractor can self-perform the work for which the MBE / WBE subcontractor was engaged or so that the Prime Contractor can substitute another MBE / WBE or non-MBE / WBE subcontractor after contract award.

The Design-Build Team shall comply with the following for replacement of a committed MBE / WBE firm:

(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 the Price Proposal was submitted 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 MBEs / WBEs submitted at the time the Price Proposal was submitted 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 Design-Build Team 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 / WBE 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 / WBE for specific subbids including, at a minimum:
    - (a) The names, addresses, and telephone numbers of MBE / WBE who were contacted.
    - (b) A description of the information provided to MBE / WBE regarding the plans and specifications for portions of the work to be performed.
  - (3) A list of reasons why MBE / WBE quotes were not accepted.
  - (4) Efforts made to assist the MBEs / WBEs contacted, if needed, in obtaining bonding or insurance required by the Design-Build Team.
- (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 Design-Build Team to solicit replacement MBE / WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
  - (2) When a committed MBE / WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE / WBE firm, the Design-Build Team shall take all necessary and reasonable steps to replace the MBE / WBE subcontractor with another similarly certified MBE / WBE subcontractor to perform at least the same amount of work to meet the 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).
  - (3) Exception: If the MBE / WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, the Department will not require the Design-Build Team 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 and Department's overall race-neutral goals.

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 Prime Contractor or any affiliated companies within the Design-Build Team fails to follow this procedure they may be disqualified from further bidding for a period of up to six 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 Design-Build Team 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 Design-Build Team'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 Design-Build Team 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 Design-Build Team shall seek participation by MBEs / WBEs unless otherwise approved by the Engineer.

When the Design-Build Team requests changes in the work that result in the reduction or elimination of work that the Design-Build Team committed to be performed by a MBE / WBE, the Design-Build Team 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 Design-Build Team 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 Design-Build

Team shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60.0% or 100.0%) of expenditures claimed for MBE / WBE credit.

### **Reporting Minority and Women Business Enterprise Participation**

The Design-Build Team 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 Prime Contractor, or other affiliated companies within the Design-Build Team, from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2<sup>nd</sup> 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 Design-Build Team to submit the required information in the time frame specified may result in the disqualification of that Prime Contractor and any affiliate companies within the Design-Build Team 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 Prime Contractor and any affiliate companies within the Design-Build Team from being approved for work on future DOT projects until the required information is submitted.

Design-Build Teams 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 Design-Build Team 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 2018 *Standard Specifications for Roads and Structures* may be cause to disqualify the Prime Contractor or any other affiliated company within the Design-Build Team from further bidding for a specified length of time.

**SPECIAL NOTICE TO BIDDERS**

(2-19-13) (Rev. 9-7-17)

DB1 G71

Project R-5777C involves the reconstruction of at-grade crossings and encroachment onto existing Railroad right of way. The North Carolina Department of Transportation (NCDOT) will be administering the project and the work will be constructed in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*; NCDOT *Construction Manual*; Norfolk Southern Railway (NSR) *Public Projects Manual*, latest edition; North Carolina Railroad Company *Specifications for Wire, Conduit and Cable Occupations Of North Carolina Railroad Company – Form NCR 101*, latest edition; North Carolina Railroad Company *Specifications for Pipeline Occupancy of North Carolina Railroad Company Property - Form NCR 102*, latest edition; *Manual on Uniform Traffic Control Devices*; latest edition, *AREMA Manual for Railway Engineering*, latest edition; Norfolk Southern Railway - *Standard Specifications for Materials and Construction*, latest edition; *North Carolina Railroad / Norfolk Southern Railway Special Provisions for Railway Interests*; *Federal Aid Policy Guide 23 CFR 140I*; *Federal Aid Policy Guide 23 CFR 646*; and *North Carolina Administrative Code Section T19A: 02B, 0150 through 0158*.

The construction will be taking place in existing Railroad right of way owned by NCR and adjacent to an existing main track that is operated and maintained by NSR. Safety in the right of way will be top priority and NSR's safety and security policies shall be followed for all employees working within the right of way. The safety and security policies and guidelines are further defined in the Project Special Provisions found elsewhere in this RFP.

All work adjacent to live tracks shall be coordinated with NSR's Roadway Worker In Charge, as defined in the *Protection of Railroad Interest – NCR and NSR Project Special Provision* found elsewhere in this RFP. As a result of safety requirements for passing trains, there will be intermittent delays requiring all labor and equipment within 25 feet of the operating tracks to stop work until authorized to proceed by the operating Railroad. This will result in intermittent delays to the Design-Build Team's operations. The Design-Build Team needs to account for this in preparing their bid. The Design-Build Team shall have no claims whatsoever against NCDOT, NCR, or NSR for any additional cost incurred for delays caused by train operations or any changes to the information above.

**PROTECTION OF RAILROAD INTEREST – NCR AND NSR**

(2-19-13) (Rev. 12-10-21)

DB1 G73

**KEY STAKEHOLDERS AND ROLES FOR THE JOB**

The following defines the roles of key stakeholders and persons with authority on the project:

| TERMS  | DEFINITIONS   |
|--|---|
| Owner, Company   | North Carolina Railroad Company (NCRR). They own the right of way / easement, facilities, tracks, structures, etc., that Norfolk Southern Railway (NSR) and others operate on.  |
| Owner’s Engineer / Representative                      | NCRR’s engineer or their authorized representative for the project.   |
| Operating Railroad, Railroad, Railway, Railway Company | NSR operates and Railroad Company maintains the track facilities and signals.   |
| Railroad Engineer                                      | NSR Engineers or their authorized representatives.  |
| RWIC / Flagman   | Roadway Worker In Charge. This is NSR’s onsite representative responsible for obtaining track time for work activities adjacent to the tracks and safety within the Railroad right of way / easement. The Roadway Worker In Charge may be in charge of multiple Railroad flagmen assigned to a project if more than one is required or may be the flagman for the project.                                |
| Standard Specifications, Specifications                | NCDOT Standard Specifications for Road and Structures, January 2018.  |
| NCDOT Rail, Rail Division                              | The North Carolina Department of Transportation, Rail Division. They are a branch of the Department of Transportation responsible for schedule review, reviewing change orders; assisting in answering requests for information (RFI), and working with the owners, operating rail and the Department, and the FRA for compliance and project closeout.   |
| NSR Public Projects Manual                             | Norfolk Southern Railway Public Projects Manual, January 2022.  |
| NCRR Specifications                                    | This includes the following documents:<br><br>North Carolina Railroad - NCR101 – Specifications for Wire, Conduit and Cable Occupations of North Carolina Railroad Company Property,<br><br>NCR102 – Specifications for Pipeline Occupancy of North Carolina Railroad Company Property,<br><br>NCR103 – Specific Requirements of North Carolina Railroad Company for Work on its right of way / easement. |

The Design-Build Team shall perform all work in accordance with the September 2021 *North Carolina Railroad Company Engineering Department Design and Construction Guidelines and the August 12, 2021 North Carolina Railroad / Norfolk Southern Railway – Special Provisions for Protection of Railway Interests* provided by the Department. In case of conflicting design and construction parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

**CONTRACTOR'S LICENSE REQUIREMENTS**

(7-1-95)

DB1 G88

If the Design-Build Team does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he shall sublet such work to a contractor properly licensed in accordance with Article 2 of Chapter 87 of the General Statutes (licensing of



heating, plumbing, and air conditioning contractors) and Article 4 of Chapter 87 of the General Statutes (licensing of electrical contractors).

### **USE OF UNMANNED AIRCRAFT SYSTEM (UAS)**

(7-1-19)

DB1 G092

The Design-Build Team 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 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system*, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit, as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Design-Build Team shall complete the NCDOT UAS - Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer, in writing, prior to beginning the operations.

All Design-Build team members operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS shall be at the Design-Build Team's discretion. Except as allowed otherwise below, no measurement or payment will be made for the use of UAS. In the event that the Department directs the Design-Build Team to utilize UAS, all costs associated with using UAS will be paid for as extra work, in accordance with Subarticle 104-8(A) of the *Standard Specifications for Roads and Structures*.

### **SUBSURFACE INFORMATION**

(10-2-20)

DB1 G112C

Available subsurface information will be provided on this project. The Design-Build Team shall be responsible for additional investigations and for verifying the accuracy of the subsurface information supplied by the Department.

### **COOPERATION BETWEEN CONTRACTORS**

(9-1-11) (Rev. 9-7-17)

DB1 G133

The Design-Build Team's attention is directed to Article 105-7 of the 2018 *Standard Specifications for Roads and Structures*.

- Project R-1015 is located south of and adjacent to Project R-5777C. Project R-1015 was Let July 2019 and has an anticipated May 2024 Final Completion date.
- Project R-5777D is located within the limits of Project R-5777C. The project includes the installation of broadband fiber on US 70 from I-40 (Exit 309) to the Morehead City Port.

Project R-5777D was Let March 2021 and has an anticipated October 2026 Final Completion date.

- Project U-5713 / R-5777A & B is located north of and adjacent to Project R-5777C. Project U-5713 / R-5777A & B was Let in September 2019 and has an anticipated December 2023 Final Completion date.

The Design-Build Team on this project shall cooperate with the Contractor or Design-Build Team 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.

## **BID DOCUMENTATION**

(7-31-12) (Rev. 8-3-15)

DB1 G142

### **General**

The successful Design-Build Team shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the Price Proposal for this contract to the Department within ten days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

### **Terms**

*Bid Documentation* - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Proposer in the preparation of the Price Proposal. The term *bid documentation* includes, but is not limited to, Design-Build Team equipment rates, Design-Build Team overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Proposer in formulating and determining the Price Proposal. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Proposer in determining the Price Proposal. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Proposer in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

*Design-Build Team's Representative* - Officer of the Prime Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Prime Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Prime Contractor.

*Escrow Agent* - Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

### **Escrow Agreement Information**

A draft copy of the Escrow Agreement will be mailed to the Proposer after the notice of award for informational purposes. The Proposer and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

### **Failure to Provide Bid Documentation**

The Proposer's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within ten days after the notice of award is received by him may be just cause for rescinding the award of the contract and may result in the removal of the Proposer from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the Proposer with the next lowest adjusted price or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

### **Submittal of Bid Documentation**

- (A) Appointment - Email **specs@ncdot.gov** or call 919.707.6900 to schedule an appointment.
- (B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within ten days after the notice of award is received.
- (C) Packaging - The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

### **Affidavit**

Bid documentation will be considered a certified copy if the proposer includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Proposer to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the proposer to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be

signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

### **Verification**

Upon delivery of the bid documentation, the Department's Contract Officer and the Design-Build Team's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Design-Build Team's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Design-Build Team's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

### **Confidentiality of Bid Documentation**

The bid documentation and affidavit in escrow are, and will remain, the property of the Proposer. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Design-Build Team gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Design-Build Team authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Proposer as a *trade secret* at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

### **Duration and Use**

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Prime Contractor receives the final estimate; or until such time as the Design-Build Team:

- (A) Gives written notice of intent to file a claim,
- (B) Files a written claim,
- (C) Files a written and verified claim,
- (D) Initiates litigation against the Department related to the contract; or
- (E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Design-Build Team against the Department, or receipt of a letter from the Design-Build Team authorizing release, the Department may obtain the release and custody of the bid documentation.

The Proposer certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the Price Proposal and that no other bid documentation shall be relevant or material in litigation over claims brought by the Design-Build Team arising out of this contract.

### **Release of Bid Documentation to the Contractor**

If the bid documentation remains in escrow 60 calendar days after the time the Design-Build Team receives the final estimate and the Design-Build Team has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Prime Contractor.

The Prime Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Prime Contractor. The Prime Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Prime Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Prime Contractor to determine final dispersion of the bid documentation.

### **Payment**

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

### **TWELVE-MONTH GUARANTEE**

(7-15-03)

DB1 G145

- (A) The Design-Build Team 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 and shall replace such defective materials and workmanship without cost to the Department. The Design-Build Team will not be responsible for damage due to 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 Design-Build Team shall be responsible for invoking the warranted repair work with the manufacturer. The Design-Build Team's responsibility shall be limited to the terms of the manufacturer's guarantee. NCDOT shall 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 Design-Build Team would be wholly responsible for under the terms of the contract. Examples include pavement structures, bridge components and sign structures. This provision will not be used as a mechanism to force the Design-Build Team to return to the project to make repairs or perform additional work that the Department would normally compensate the Design-Build Team for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders, etc.) are not parts of this guarantee.

Appropriate provisions of the payment and / or performance bonds shall cover this guarantee for the project. In addition, failure on the part of the responsible entity(ies) of the Design-Build Team to perform guarantee work within the terms of this provision shall be just cause to remove the responsible entity(ies) from the Department's corresponding prequalified list. The Design-Build Team shall be removed for a minimum of six months and will be reinstated only after all work has been corrected and the Design-Build Team requests reinstatement in writing.

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)

DB1 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.

#### **PERMANENT VEGETATION ESTABLISHMENT**

(6-11-15) (Rev. 8-30-17)

104

DB01 G160

Establish permanent vegetation stands of the Long Term Stabilization mixtures identified in the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish 80% coverage of permanent vegetation 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 Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP and the applicable sections of the 2018 *Standard Specifications for Roads and Structures*.

Once the Engineer has determined that 80% coverage of permanent vegetation has been established, the Design-Build Team will be notified to remove the remaining erosion control

devices that are no longer needed. The Design-Build Team shall 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.

### **EROSION & SEDIMENT CONTROL / STORMWATER CERTIFICATION**

(1-16-07) (Rev. 10-26-20)

105-16, 225-2, 16

DB1 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 Pollutant 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 (E & SC / SW) Supervisor to manage the Design-Build Team and subcontractor(s) operations, ensure 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 shall be 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. The Certified Supervisor shall 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 Design-Build Team's temporary work not shown on the plans developed by the Design-Build Team, 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 Design-Build Team 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 Design-Build Team's operations.
  - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces and / 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 shall be, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, e.g. from equipment operations / 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 seven 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. At the discretion of Division of Water Resources personnel, additional monitoring may be required 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 NC Department of Environmental 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 Design-Build Team and subcontractors' construction activities.
  - (b) Ensure that all operators and / or subcontractor(s) 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 Design-Build Team'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 Design-Build Team 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 Design-Build Team 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 Design-Build Team 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 Designers and notify the Engineer, in writing, of changes in certified personnel over the life of the contract within two 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 Installer and Certified Designer may be revoked or suspended with the issuance of an Immediate Corrective Action (ICA), Notice of Violation (NOV), or Cease and Desist Order for erosion and sediment control / stormwater related issues.

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

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

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

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

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

Failure to appeal within ten calendar days shall result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified shall 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 seven days of hearing the appeal. The decision of the Chief Engineer shall be final and will be made in writing to the certificant.

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

### **Measurement and Payment**

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

### **PROCEDURE FOR MONITORING BORROW PIT DISCHARGE**

(1-22-13) (Rev. 9-7-17)

DB1 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 Design-Build Team 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 DWR 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 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team 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 shall 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 Design-Build Team's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Design-Build Team.

To plan, design, construct, and maintain BMPs to address water quality standards, the Design-Build Team shall use the NCDOT *Turbidity Reduction Options for Borrow Pits Matrix*, available at the website noted below:

**[https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/  
TurbidityReductionOptionSheet.pdf](https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf)**

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 DWR'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 Design-Build Team 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 Design-Build Team may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the Price Proposal 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.

### **CLEARING AND GRUBBING**

(9-1-11)(Rev. 8-18-15)

DB2 R01

With the exception of areas with Permanent Utility Easements, perform clearing on this project to the limits established by Method "III" shown on Roadway Standard Drawing No. 200.03. In areas with Permanent Utility Easements, clearing shall extend to the right of way limits.

### **BUILDING AND APPURTENANCE REMOVAL / DEMOLITION**

(9-1-11) (Rev. 9-7-17)

DB2 R12A

Unless otherwise as agreed upon by the Department, seal all wells and remove or demolish all buildings and appurtenances, in their entirety, that are located either partially or completely within the project's right of way limits or are located outside the project's right of way limits but within property purchased as an uneconomical remnant in accordance with Sections 205, 210 and 215 of the 2018 *Standard Specifications for Roads and Structures*.

The Department will perform all assessment, removal and disposal of asbestos. Once the Design-Build Team has acquired a parcel and all buildings and appurtenances have been vacated, the Design-Build Team shall immediately notify the Division Right of Way Agent in writing. Upon receipt of the written notification, the Department then requires 60 days to assess and remove any asbestos prior to the Design-Build Team demolishing any building or appurtenance.

### **MANUFACTURED QUARRY FINES IN EMBANKMENTS**

(11-30-16) (Rev. 9-7-17)

235

DB02 R72

#### **Description**

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Design-Build Team 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 pavement stabilization in accordance with the *Geotextile for Pavement Stabilization* Project Special Provision found elsewhere in this RFP and the detail developed by the Design-Build Team. Geotextile for pavement stabilization shall be 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.

### **Manufactured Quarry Fines (MQF)**

Site specific approval of MQFs material shall 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 2018 NCDOT *Standard Specifications for Roads and Structures*.

### **Geotextiles**

In embankment areas where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. The Geotextile for Pavement Stabilization shall adhere to all requirements of the *Geotextile for Pavement Stabilization* Project Special Provision found elsewhere in this RFP except the notification of subgrade elevation, sampling and waiting period required in the Construction Methods section.

### **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, addresses 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 prior to incorporation.

**Construction Methods**

Place MQFs in the core of the embankment section with at least four 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 ten 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 4.0 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

**CULVERT PIPE**

(7-1-19)(Rev. 4-26-22)

305, 310

DB3 R35

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 3-5, Article 305-1 DESCRIPTION, Lines 12 - 14**, replace with the following:

Where shown in the plans developed by the Design-Build Team, the Design-Build Team may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, HDPE pipe, polypropylene pipe, or PVC pipe in accordance with the following requirements.

**Page 3-5, Article 305-2 MATERIALS**, add the following after **Line 16**:

| <b>Item</b>                      | <b>Section</b> |
|----------------------------------|----------------|
| Polypropylene Pipe               | 1032-9         |
| Galvanized Corrugated Steel Pipe | 1032-3         |

**Page 3-6, Article 310-2 MATERIALS**, add the following after **Line 9**:

| <b>Item</b>                      | <b>Section</b> |
|----------------------------------|----------------|
| Polypropylene Pipe               | 1032-9         |
| Galvanized Corrugated Steel Pipe | 1032-3         |

**Page 3-6, Article 310-4 SIDE DRAIN PIPE, Lines 24 - 25**, replace the first sentence of the second paragraph with the following:

Where shown in the plans developed by the Design-Build Team, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

**Page 3-7, Article 310-5 PIPE END SECTIONS, Lines 2 - 4**, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel



pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

**Page 10-60, add Article 1032-9:**

**(A) General**

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA / QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

**(B) End Treatments, Pipe Tees and Elbows**

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

**(C) Marking**

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QA / QC Program:

- (1) AASHTO or ASTM designation
- (2) The date of manufacture
- (3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker shall be applied to the inside of the pipe. Do not use pipe sections, flared end sections, tees or elbows that do not have this seal of approval.

**DRAINAGE PIPE**

(9-1-11)

DB3 R36

**Description**

Where shown in the plans developed by the Design-Build Team, the Design-Build Team shall use Reinforced Concrete Pipe, Corrugated Aluminum Alloy Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe) in accordance with the following requirements:

- All pipe types shall be subject to the maximum and minimum fill height requirements as found on Roadway Standard Drawing No. 300.01 - Sheet 3 of 3. The appropriate Reinforced Concrete Pipe class and the appropriate gage thickness for Corrugated Aluminum Alloy Pipe shall be selected based on fill height.

- Site specific conditions may limit a particular material beyond what is identified in this Project Special Provision. These conditions include, but are not limited to, abrasion, environmental, soil resistivity and pH, high ground water and special loading conditions. The Design-Build Team shall determine if additional restrictions are necessary.
- Slope drains shall be Corrugated Aluminum Alloy Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe).
- Transverse median drains, storm drainage system pipes and open-ended cross drains shall be Reinforced Concrete Pipe unless the pipe slope is greater than 10%, in which case the pipe shall be Corrugated Aluminum Alloy Pipe.

### **BRIDGE APPROACH FILLS - GEOTEXTILE**

(4-26-22)

DB4 R03

Place a single layer of Type 5 Geotextile one foot below the approach slab for the full width and length of the approach fill. Type 5 Geotextile shall meet the requirements of Section 1056 of the 2018 *Standard Specifications for Roads and Structures*. This revision applies to the 2018 Roadway Standard Drawing Nos. 422.01, 422.02, 422.03 and Detail in Lieu of Standard Drawing No. 422DO10.

### **CEMENT TREATED BASE COURSE**

(7-22-13) (Rev. 3-29-21)

DB5 R21A

#### **General**

The Design-Build Team shall be responsible for the following:

1. Performing all laboratory tests in a laboratory certified by the AMRL / NCDOT Laboratory Proficiency Program
2. Sampling Aggregate
3. Conducting Laboratory tests to determine:
  - a. Job Mix Formula
  - b. Quantity of cement required to achieve specified strengths
4. Designating areas to be stabilized by cement treated base course and the required rates of application
5. Conducting field tests to determine unconfined compressive strength

#### **Sampling Aggregate**

Aggregate shall be sampled from the proposed aggregate pile at the quarry. An AASHTO classification test with unit weight and optimum moisture determination shall be completed on the sample. The aggregate shall meet the Acceptance Criteria in Column B of Table 1010-4 of the NCDOT Aggregate Sampling Manual.

**Job Mix Formula**

A job mix formula shall be established for the accepted aggregate three weeks prior to proposed production. During production, the aggregate shall meet the tolerances specified in Table 540-1 of the 2018 *Standard Specifications for Roads and Structures*.

**Determine Required Portland Cement Rate**

The quantity of Portland cement required shall be 3.0 - 4.0 percent by weight of the aggregate. Mix 3.5% and 4.0% Portland cement, aggregate and water at 1.5% over optimum and cure for seven days. Select rate of cement that provides a minimum and maximum unconfined compressive strength of 500 psi and 800 psi at seven days, respectively.

**Submittals for Review and Approval Prior to Construction**

The Design-Build Team shall adhere to the following submittal guidelines:

- Submit all laboratory test results for review and approval
- Submit a sketch in plan view showing areas of the project to be stabilized by Cement Treated Base Course and application rates
- Submit any other documentation that supports the Design-Build Team's recommendations

**Construction of Cement Treated Base Course**

The Design-Build Team shall construct the Cement Treated Base Course as specified in Section 540 of the North Carolina Department of Transportation 2018 *Standard Specifications for Roads and Structures* except that Articles 540-5, 540-7 and 540-13 do not apply.

**Unconfined Compressive Strength**

For Cement Treated Base Course, the Design-Build Team shall make field specimens, cure them for seven days and test them in the laboratory. The minimum and maximum acceptable unconfined compressive strength for Cement Treated Base Course shall be 450 psi and 850 psi, respectively. One test shall be required for every 400 feet per lane width at random locations selected using random number tables.

### **Submittals for Review During Construction**

The Design-Build Team shall submit the unconfined compressive strength test results for review and acceptance.

### **PRICE ADJUSTMENTS FOR ASPHALT BINDER**

(9-1-11) (Rev. 8-23-18)

DB6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the 2018 *Standard Specifications for Roads and Structures*.

The base price index for asphalt binder for plant mix is \$ **PRICE TO BE INCLUDED IN THE FINAL RFP** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **\_\_\_\_\_**.

### **PRICE ADJUSTMENTS - ASPHALT CONCRETE PLANT MIX**

(9-1-11) (Rev. 9-8-17)

DB6 R26

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

#### **Page 6-15, Article 609-11 and Page 6-31, Article 610-14**

Add the following paragraph before the first paragraph:

The “Asphalt Price” used to calculate any price adjustments set forth in this section shall be \$40.00 per theoretical ton. This price shall apply for all mix types.

### **FIELD OFFICE**

(6-1-07) (Rev. 1-4-22)

DB 08-01

#### **Description**

This work consists of furnishing, erecting, equipping, maintaining and removing a field office for the exclusive use of Department Engineers and Inspectors at a location on the project approved by the Engineer. Provide a field office that complies with the current A. D. A. Design and Accessibility Standards, the National Electric Code, local, state, and federal regulations, and the following:

#### **Procedures**

Upon completion of the contract, the field office and equipment shall remain the property of the Design-Build Team. The field office shall be separated from buildings and trailers used by the Design-Build Team and shall be erected and functional as an initial operation. Failure to have the field office functional when construction activities first begin on the project, and maintained, as determined by the Engineer, throughout the project’s construction duration, shall result in

withholding payment of the Design-Build Team's monthly progress estimate. The Design-Build Team shall maintain the field office in an operational state throughout the project's construction duration. The Design-Build Team shall remove the field office when directed by the Engineer.

Provide a field office that is weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, has a width of at least ten feet, and a floor-to-ceiling height that is at least seven feet six inches. Provide inside walls and a ceiling that are constructed of plywood, fiber board, gypsum board, or other suitable materials. Have the exterior walls, ceiling, and floor insulated.

Provide a field office with a minimum 1200-square foot floor space and that is equipped with the following:

| <u>Number</u> | <u>Item</u>   |
|---------------|---|
| 1             | Telephone service   |
| 1             | Internet connection service with a Wi-Fi modem and two data ports in all rooms except the kitchenette and bathrooms |
| 1             | Double-pedestal desk (approximately 60 by 34 inches, at least 2,000 square inches)                                  |
| 1             | Plan and drafting table (approximately 30 by 96 inches) with adjustable stool                                       |
| 1             | Computer table having a minimum size of 48 by 30 by 29 inches   |
| 1             | Plan rack for 24-inch by 36-inch drawings with six plan clamps  |
| 2             | Four-drawer fire protection file, 15-inch drawer width, minimum UL rating of Class 350                              |
| 6             | Adjustable five-leg base rolling office chairs  |
| 1             | Wastebasket per room  |
| 1             | Telephone   |
| 1             | Print / copy / scan / fax machine (8-inch x 11-inch and 11-inch x 17-inch prints / copies)                          |

### **Windows and Doors**

Provide a field office with at least three windows with blinds, each having an area of at least 540 square inches, capable of being easily opened and secured from the inside and having at least two exterior passage doors. Provide doors at least 30 inches in width and 78 inches in height. Provide screens for all windows and doors. Equip exterior passage doors with locks, and furnish at least two keys to the Engineer. Provide accessibility in compliance with the current A. D. A. Design and Accessibility Standards, and the State Building Code; and maintain them free from obstructions.

### **Steps**

Provide accessibility in compliance with the current A. D. A. Design and Accessibility Standards, and the State Building Code; and maintain them free from obstructions.

**Storage Facility for Nuclear Gauge**

Provide an outside storage facility for the Department's nuclear gauge. Provide a facility that has a minimum 64-square foot floor space, is weatherproof, tightly floored and roofed, and has a tamper resistant key operated lock. The storage facility shall not be located within ten feet of any other structure including the field office. Furnish at least two keys to the Engineer.

**Lighting, Heating and Air Conditioning**

The field office shall have satisfactory lighting, electrical outlets, heating equipment, an exhaust fan, and an air conditioner connected to an operational power source. Provide at least one lighting fixture in each room and at least one fluorescent light fixture over the plan and drafting table. Furnish electrical current and fuel for heating equipment.

**Fire Extinguishers**

Furnish and maintain one fire extinguisher for each exterior passage door. Fire extinguishers may be chemical or dry powder. UL Classification 10-B:C (minimum), suitable for Type A:B:C: fires. Provide, mount and maintain fire extinguishers in accordance with OSHA Safety and Health Standards.

**Toilets**

Provide a toilet conforming to the requirements of the state and local boards of health or other bodies or courts having jurisdiction in the area. When separate facilities for men and women are not available, place a sign with the words "Rest Room" (with letters at least one inch in height) over the doorway, and provide an adequate positive locking system on the inside of the doorway. Maintain responsibility for the water and sewer connections or the installation and connection of a water well, and septic tank and drain field. These facilities shall conform to all local and state permits.

**Utilities**

Except for telephone service, make arrangements for necessary internet and utility connections, maintain internet and utility connections, pay internet and utility service fees and bills, and make arrangements for final disconnection of internet and utility connections. Furnish a telephone in each field office and permit the work necessary to install it. Installation and service fees for the telephone will be paid for by the Department.

**Storage Facility for Test Equipment**

Provide a storage facility that is separated from the field office, for storage of test equipment, other than the nuclear gauge. Provide a facility that has a minimum 64-square foot floor space, is weatherproof, tightly floored and roofed, and has a tamper resistant key operated lock. Furnish at least two keys to the Engineer.

## Miscellaneous Items

The field office shall also include the following:

1. A certification that the office is free of asbestos and other hazardous materials
2. A broom, dustpan, mop and bucket, and general cleaning supplies
3. Provide and maintain an all-weather parking area for six vehicles, including graveled access to the paved surface

## **GEOTEXTILE FOR PAVEMENT STABILIZATION**

(5-7-14) (Rev. 1-7-22)

DB 08-05

### Description

Supply and install geotextile for pavement stabilization at locations where manufactured quarry fines are used in embankment. (Reference the *Manufactured Quarry Fines in Embankments* Project Special Provision found elsewhere in this RFP) Define “subbase” as the portion of the roadbed below the pavement structure (asphalt base course / ABC).

### Materials

Refer to Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

| Item        | Section |
|-------------|---------|
| Geotextiles | 1056    |

Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following tensile strength requirements in the machine direction (MD) and cross-machine direction (CD):

| <b>GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS</b> |                                  |             |
|---|----------------------------------|-------------|
| Tensile Strength  | Requirement (MARV <sup>A</sup> ) | Test Method |
| Tensile Strength @ 5% Strain (MD & CD <sup>A</sup> )      | 1,900 lb/ft                      | ASTM D4595  |
| Ultimate Tensile Strength (MD & CD <sup>A</sup> )         | 4,800 lb/ft                      | ASTM D4595  |

A. MD, CD and MARV per Article 1056-3 of the 2018 *Standard Specifications for Roads and Structures*.

### Construction Methods

The Design-Build Team shall show proposed locations of geotextile for pavement stabilization in the plans developed by the Design-Build Team.

Place geotextile for pavement stabilization on top of the subbase as shown in the plans developed by the Design-Build Team. Pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install geotextile for pavement stabilization either perpendicular or parallel

to the survey or lane line as shown in the plans developed by the Design-Build Team. All geotextile joints shall overlap a minimum of 18 inches. Completely cover subbase with geotextile for pavement stabilization. If installed parallel to the survey line or lane line, the outer edge of a full roll of geotextile shall be installed on the outer edge of the area requiring pavement stabilization. Hold geotextiles in place with wire staples or anchor pins as needed.

Do not damage geotextile for pavement stabilization when placing aggregate. Do not operate heavy equipment directly on geotextiles. Prior to operating any heavy equipment on geotextile for pavement stabilization, place a minimum of four inches of aggregate onto the geotextile. Replace any damaged geotextiles to the satisfaction of the Engineer.

## **CCTV WOOD POLE**

### **DESCRIPTION**

Furnish and install wood poles, grounding systems and all necessary hardware for CCTV camera installations. Reference applicable Sections of Article 1720 of the 2018 *Standard Specifications for Roads and Structures* for Materials and Construction.

Furnish an air terminal and lightning protection system in accordance with the *Air Terminal & Lightning Protection System* Project Special Provision found on the NCDOT ITS and Signals Unit Design Resources website.

Furnish and install wood poles with grounding systems and all necessary hardware in accordance with Section 1720 of the 2018 *Standard Specifications for Roads and Structures*.

### **MATERIALS**

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL. For Wood poles refer to Sub articles 1082-3(F) Treated Timber and Lumber - Poles and 1082-4(A) - General; 1082-4 (B) - Timber Preservatives; 1082-4(G) - Poles; in the 2018 *Standard Specifications for Roads and Structures*.

### **CCTV Wood Pole**

Unless otherwise specified in the plans developed by the Design-Build Team, furnish Class 3 or better wood poles that are a minimum of 60-foot long to permit the CCTV camera to be mounted approximately 45 feet above the ground and a minimum five feet from the top of the pole.

### **CONSTRUCTION METHODS**

Mark final pole locations and receive approval from the Engineer before installing poles. Comply with all requirements of Section 1720-3 of the 2018 *Standard Specifications for Roads and Structures*.



Install the required Air Terminal & Lightning Protection System as described in the *Air Terminal & Lighting Protection* Project Special Provision found on the NCDOT ITS and Signals Unit Design Resources website and as referenced in the following Typical Details:

- CCTV Camera Installation for Wood Pole with Aerial Electrical Service
- CCTV Camera Installation for Wood Pole with Underground Electrical Service

### **JUNCTION BOXES (LIMITED ACCESS FACILITIES)**

#### **Description**

The Design-Build Team shall furnish and install junction boxes with covers, graded stone, concrete collar, and all necessary hardware in accordance with the plans and specifications. Comply with the provisions contained in the details of this provision. Provide Electronic Marking Balls to aid in locating buried junction boxes.

#### **Materials**

##### **A. General**

Refer to Division 8 and 10 of the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b>                                      | <b>Section</b> |
|--|----------------|
| Incidental Concrete Construction                 | 825            |
| #57 or #67 Washed Stone                          | 1005           |
| Portland Cement Concrete Production and Delivery | 1000           |
| Reinforcing Steel                                | 1070           |

Furnish material, equipment, and hardware under this section that is pre-approved on the ITS and Signals QPL.

##### **B. Junction Box**

Provide junction boxes with pull slots and at least two size 3/8-inch diameter stainless steel hex head cover bolts to match inserts in the box. Ensure junction boxes are provided with open bottoms.

Provide vertical extensions of six inches to 12 inches as required by project provisions. Provide the required logo on the cover. Provide pull slot(s) with stainless steel pin(s).

Provide third party certification that the junction boxes and covers meet ANSI/SCTE 77 2013 and Tier 22 loading. Provide certification that testing methods are compliant with ANSI/SCTE 77 2013.

Provide standard size junction boxes and covers with minimum outside dimensions of 18" (l) x 11" (w) x 12" (d). Provide a cover embossed with the following wording "NCDOT Electrical".

Provide oversized junction boxes and covers with minimum outside dimensions of 30" (l) x 17" (w) x 24" (d) for installing only drop cable.

Provide special oversized junction boxes and covers with minimum outside dimensions of 48" (l) x 30" (w) x 36" (d) where underground fiber-optic splice enclosures and truck line conduits are to be installed or as directed by the plans developed by the Design-Build Team.

Provide additional oversized junction boxes and covers as identified in the plans developed by the Design-Build Team where underground fiber-optic splice enclosures and conduit requirements require a junction box that is larger than what is listed above. Boxes of this nature can be supplied with a cover that is of a single or split cover design, but boxes with a split cover shall be supplied with a center brace to support the cover / lid.

For oversized and special oversized junction boxes, provide a cover embossed with the following wording "NCDOT Fiber Optic". Additionally, for junction boxes designated for fiber optic cable, furnish an access point / hatch on the lid to allow access to the tracer wire bonding / isolation test switch that is located inside the junction box (See "Tracer Wire Bonding / Isolation Test Switch" requirements below).

For oversized and any special oversized junction boxes, provide junction boxes with mouse holes or knock-outs fabricated in the sides to accommodate conduit entrances. Boxes fabricated without mouse holes or knock-outs shall be approved by the manufacturer for field drilling conduit entrance holes. Consult the manufacturer to identify the amount of surface area that can be removed for field drilling conduit entrance holes without violating the boxes structural integrity. Upon request, provide written approval from the manufacturer stating their recommendations.

### **C. Electronic Marker Ball**

Furnish an electronic marking ball, with a minimum life expectancy of 15 years and that is locatable when buried up to five feet deep to aid in locating buried junction boxes. Ensure the marking ball is designed to be self-leveling to provide precise horizontal positioning of the marker ball electronics (internal passive antenna) once installed in a junction box. Ensure the marker balls are compatible with a Metro Mark - Passive Marker Locator Model #760DX or approved equivalent and are tuned to the following frequencies:

- Orange Ball – 101.4 KHz - Fiber Installations
- Red Ball – 169.8 KHz – Power Cable Installations

#### **D. Tracer Wire Bonding / Isolation Test Switch**

For all unburied junction boxes designated for “communications cable”, furnish as an integral part of the junction box assembly, a tracer wire access testing port via a retractable mechanism that allows easy access to the tracer wire system through a Bonding / Isolation switch. Ensure the Bonding / Isolation switch can be accessed through a small hatch located in the lid of the junction box. The hatch shall be designed into the lid and secured via a security bolt. The Bonding / Isolation switch must be retractable so it can be accessed without removing the lid of the junction box. The Bonding / Isolation switch shall include a minimum of five termination lugs for trace wires and one lug for grounding. Once the Bonding / Isolation switch is moved via the retractable mechanism, ensure the switch can be disengage effectively breaking the bond and allowing individual isolation of tracer wire circuits for locating. Ensure the Bonding / Isolation switch on the retractable mechanism is mounted in a location on the interior wall of the junction box which will not interfere with the installation or removal of the lid. When the Bonding / Isolation switch is pushed back down via the retractable mechanism, the Bonding / Isolation switch shall automatically return to a closed or bonded position.

Furnish a 5/8 inch by 10-foot, copper clad, ground rod to be driven inside the junction box.

For all buried junction boxes designated for “communications cable”, bond all tracer wires to the ground rod in accordance with the Buried Junction Box detail drawing included in this provision.

#### **Construction Methods**

##### **(A) Junction Boxes**

Install standard size junction boxes as shown in the plans developed by the Design-Build Team. When lateral runs for electrical cables are greater than 300 feet, install additional junction boxes to ensure distances between junction boxes does not exceed 300 feet.

Install oversized junction boxes and any special oversized junction boxes at maximum intervals of 1500 feet unless otherwise approved by the Department.

Backfill beneath and around the boxes using #57 or #67 washed stone in conformance with Section 1005 of the 2018 *Standard Specifications for Roads and Structures*. Backfill beneath the box a minimum of 12 inches and around the exterior of the box a minimum of three inches.

Avoid placing junction boxes on slopes of 3:1 or greater.

##### **(B) Concrete Collar**

Install an eight-inch thick reinforced concrete collar that extends 12 inches for the edges of the junction box and complies with Section 825 of the 2018 *Standard Specifications for Roads and Structures*. Ensure the reinforcing of the concrete collar consist of two rectangular hoops of #4 rebar tied in the corners. Provide minimum Class B concrete. Fill construction joints between the

junction box and the concrete with an expansion joint filler. Ensure concrete collar is installed flush with grade.

### **(C) Junction Box Installation Requirements**

For all junction boxes designated to carry fiber optic communications cable or electrical services, install the junction box based on its location as listed below:

#### Communications

- Junction box located at a ramp terminal or within six feet of an equipment cabinet:
  - Install the junction box flush with the surrounding grade with the required concrete collar.
- Junction box located other than at the top of a ramp or within six feet of an equipment cabinet:
  - Install the junction box so that the top of the box falls six inches to no more than eight inches below the surrounding grade. These junction boxes do not require a concrete collar.

#### Electrical Service

- Junction box located at the bottom of a service pole or within six feet of an equipment cabinet or service disconnect:
  - Install the junction box flush with the surrounding grade with the required concrete collar.
- Junction box located other than at the bottom of a service pole or within six feet of an equipment cabinet or service disconnect:
  - Install the junction box so that the top of the junction box falls six inches to no more than eight inches below the surrounding grade. These junction boxes do not require a concrete collar.

### **(D) Electronic Marker Ball**

Install the appropriate colored Marker Ball in each junction box upon completion of the junction box installation. Test to ensure that the Marker Ball is functioning properly with the approved electronic locator device. Record precise latitudinal and longitudinal coordinates for the location of each locate ball / junction box. See “GPS Coordinates” requirements below in this provision.

**(E) Tracer Wire Bonding / Isolation Switch**

For all junction boxes designated for communications cable, install a ground rod (5/8 inches by 10-foot, copper clad) in the junction box and secure a minimum of five feet of #14 AWG THWN, green insulated, 19-strand copper tracer wire to the ground rod using an approved bonding clamp. Secure the opposing end of the tracer wire to the main bonding lug located on the Bonding / Isolation switch. Test ground rod resistance to obtain 20 ohms or less reading, install one additional ground rod if the 20 ohms or less reading is not achieved.

Secure all tracer wires that originate from the same side of the junction box together using a gel-filled wire nut along with a minimum of five feet slack Green, #14 AWG, THWN tracer wire to form a connection to one of the termination ports on the Bonding / Isolation switch. Provide a permanent nylon tag to the tracer wire jumper close to the tracer wire terminal port that identifies the direction of the tracer wire system as it leaves the junction box. Use a black indelible ink pen or other approved method, to label the nylon tag.

No splices of tracer wires are allowed outside of the interior portion of the junction box, unless approved by the Engineer. If external splices are necessary, use lockable connectors specifically manufactured for use in underground tracer wire systems. Connectors shall use a dielectric silicon filled compartment to seal out moisture and corrosion and shall be installed in a manner to prevent any uninsulated wire exposure. Gel-filled wire nuts are not acceptable for making splices outside of the junction box.

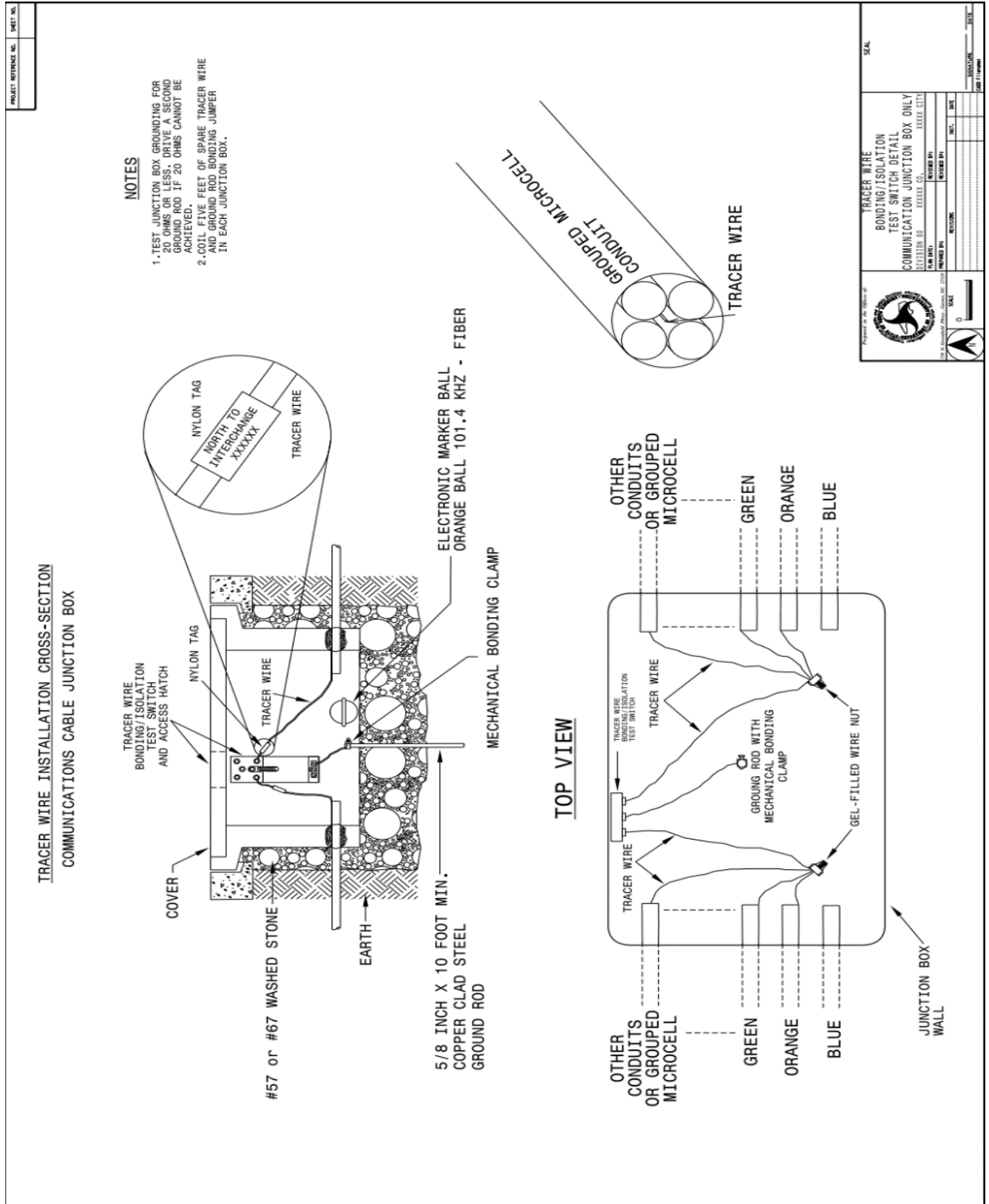
Upon completion and in the presence of the Engineer, test all legs of the tracer wire system using a tuned frequency transmitter and locator to ensure the tracer wire system forms a complete and operational system.

**(F) GPS Coordinates**

Provide real world coordinates for all junction boxes and equipment cabinets installed or used under this project. Provide the coordinates in feet units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83). Furnish coordinates that do not deviate more than 1.7 feet in the horizontal plane and 3.3 feet in the vertical plane. Global positioning system (GPS) equipment able to obtain the coordinate data within these tolerances may be used. Submit cut sheets on the GPS unit proposed to collect the data for approval by the Engineer.

Provide a digital copy of all information regarding the location (including, but not limited to, manufacturer, model number, and NCDOT inventory number) in the Microsoft® spreadsheet shown by example below. Provide this information to the Engineer and the NCDOT ITS & Signals Management Section via the Design-Build Unit.

| <b>NCDOT<br/>Inv #</b> | <b>Name</b>                        | <b>Location</b>                               | <b>Latitude</b> | <b>Longitude</b> | <b>Manufacturer</b> | <b>Model #</b>                      |
|------------------------|------------------------------------|---|-----------------|------------------|---------------------|-------------------------------------|
| 05-0134                | Equipment Cabinet                  | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5500        | 35.6873          | McCain              | Type-332                            |
| 05-0134                | Junction Box # 1<br>(Phase 2 Side) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5516        | 35.6879          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |
| 05-0134                | Junction Box # 2<br>(Phase 2 Side) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5506        | 35.6876          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |
| 05-0134                | Junction Box # 3<br>(Near Cabinet) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5501        | 35.6873          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |
| 05-0134                | Junction Box # 4<br>(Phase 6 Side) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5486        | 35.6873          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |
| 05-0134                | Junction Box # 5<br>(Phase 6 Side) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5493        | 35.6876          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |
| 05-0134                | Junction Box # 6<br>(Phase 4 Side) | US 70 at Raynor<br>Rd./ Auburn-<br>Knightdale | -78.5503        | 35.6879          | Quazite             | PG1118BA12(Box)<br>PG118HA00(Cover) |



**CONDUIT ENTERING JUNCTION BOX (BURIED INSTALLATION)**

1. PROVIDE OVERSIZED AND SPECIAL OVERSIZED JUNCTION BOXES WITH WAUSE HOLES. ALL HOLES SHALL BE FIELD DRILLED AND SHALL BE FIELD DRILLED TO PREVENT ENTRANCE HOLES.
2. FOR ALL OVERSIZED AND SPECIAL OVERSIZED JUNCTION BOXES, ALL CONDUITS SHALL ENTER THROUGH PRECAST KNOCKOUTS OR FIELD DRILLED HOLES AND SEALED WITH NON-SHRINKING GROUT. THE BOX TO THE CONDUITS. NO CONDUIT SHALL FAIL TO ITS DESIGNER EXCEPT FOR DRIP.
3. LEAVE CONDUITS ENTERING JUNCTION BOX OVERLAPPING INITIALLY FOR JETTING PURPOSES. AFTER FROM IS INSTALLED AND TO BE JETTED WITH FROM THE JUNCTION BOX. SMALL PACKED WITH THE CONDUIT FOR JETTING PROJECT SPECIAL PROVISIONS.
4. SEAL ALL CONDUITS AFTER INSTALLATION WITH REGROUT WITH NON-SHRINKING GROUT. SEAL CONDUITS WITH A MECHANICAL FIBER/DUCT CONDUIT PLUGS.

**INSTALLATION CROSS-SECTION COMMUNICATIONS JUNCTION BOX (BURIED)**

**NOTES**

1. FURNISH "TIER 22" RATED JUNCTION BOXES AND COVERS
2. SECURE COVER WITH HEX BOLTS.
3. BOX OUTSIDE DIMENSIONS:  
 1) OVERSIZED: 30" (L) X 17" (W) X 24" (d)  
 2) SPECIAL OVERSIZED: 48" (L) X 30" (W) X 36" (d)
4. TEST JUNCTION BOX GROUNDING FOR 20 OHMS OR LESS. DRIVE A SECOND GROUND ROD IF 20 OHMS CANNOT BE ACHIEVED.
5. COIL FIVE FEET OF SPARE TRACER WIRE AND GROUND ROD BONDING JUMPER IN EACH JUNCTION BOX.

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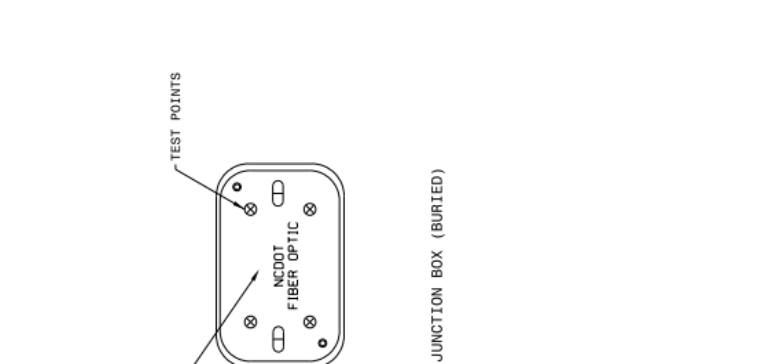
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**TOP VIEW**

ENSURE CONDUIT COLORS LINE UP ENTERING AND EXITING JUNCTION BOX FOR EASE OF JETTING INSTALLATION

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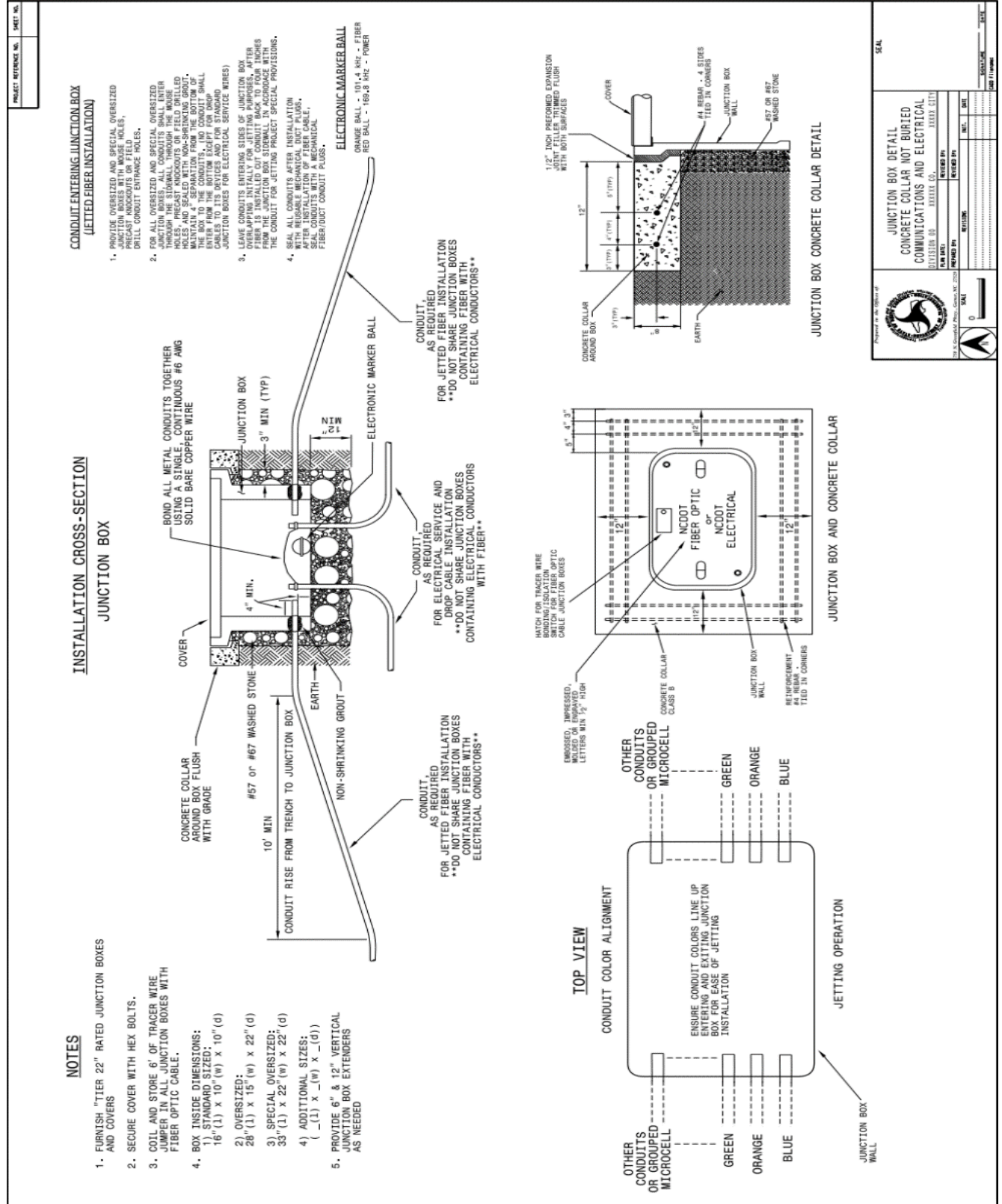
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## **ETHERNET CABLE**

### **Description**

The Design-Build Team shall furnish and install Ethernet cable to serve as interconnect between Ethernet switches, PoE injectors, Signal Controllers and ITS devices.

### **Materials**

Furnish CAT6 Ethernet cable or better that complies with ANSI/TIA Standards for Balanced Twisted-Pair Telecommunications Cabling and Components Standards. Furnish cable that is suitable for outdoor installation with UV stabilization and meets or exceeds the following:

- Meets ANSI/TIA 568C.2 Networking Standard
- Supports 10/100/1,000/10,000Mbps
- 1,000Mbps @ 300 Meter Cable Length
- 10,000Mbps @ 50 Meter Cable Length
- 4 twisted pair cables
- 23 AWG (minimum) solid bare copper conductors (Copper clad aluminum is not allowed)
- 2+ twists per centimeter
- Nylon Spline to reduce cross talk
- Gel Filled High-density polyethylene insulation, PVC jacket
- Ascending / Descending Sequential Foot Markings
- Compliant with EIA/TIA standards
- UL/CSA listed
- UV Stabilized PE Jacket

Meets the following Minimum Electrical Operating Characteristics:

- Frequency Bandwidth: 1 – 250 MHz
- Attenuation (Insertion Loss): 19.8 dB
- Characteristic Impedance: 100 Ohms +/- 15
- Near-End Cross Talk - NEXT (Min.): 44.3 dB
- Power Sum Near-End Cross Talk PS-NEXT (Min.): 42.3 dB
- Equal-Level Far End Crosstalk (ELFEXT): 27.8 dB
- Power Sum Equal-Level Far End Crosstalk (PS-ELFEX): 24.8 dB
- Return Loss: 20.1 dB
- Delay Skew: 45 ns
- Connector Type: RJ45

The Ethernet cable shall be factory tested on reels for each pair's mutual capacitance, crosstalk loss, insulation resistance, and conductor resistance. Furnish the Engineer with a certified factory report for each reel showing compliance with these Project Special Provisions, the factory test

results, and the manufactured date of the cable. The Design Build Team shall not use Ethernet cable manufactured more than one year before the date of installation.

Provide RJ-45 connectors with gold conductors that are terminated according to EIA/TIA 568 standards. Provide connectors with eight contacts. Furnish connectors appropriately rated for the cable being installed.

Ethernet patch cables used to interconnect equipment inside of a cabinet or equipment rack shall be factory terminated. Ethernet cables which run outside of the cabinet may be field terminated. Ethernet cables installed inside of buildings to interconnect switching rack equipment shall bare the Low Smoke/Zero Halogen (LSZH) designation. Ethernet cables installed inside of buildings and passes from one equipment room to another may be field terminated. For Ethernet patch cables used to connect equipment inside an equipment rack cabinet provide factory preterminated jumpers that minimize excessive slack that must be dressed inside the cabinet but provides sufficient slack to make neat runs.

### **Construction Methods**

Install Ethernet cable in conduits, cabinets, junction boxes, risers, and on aerial messenger cable at locations shown in the Plans developed by the Design-Build Team. Allow a minimum of ten feet of cable slack in the cabinet.

Ethernet cables shall not be spliced. Ethernet cables should not exceed lengths of 100 meters or 328 feet. In cases where the Ethernet cables exceed lengths of 100 meters or 328 feet a signal regenerator or Ethernet extender shall be used. All Ethernet cables shall be labeled with waterproof, smear resistant labels. The labels shall denote the equipment cabinets or housing they are routed from and the device and device identifier they are connected to.

The Design Build Team shall not exceed 80 percent of the manufacturer's maximum pulling tension when installing underground Ethernet cable. Use a clutch device (dynamometer) so as not to exceed the allowable pulling tension if the cable is pulled by mechanical means. Do not use a motorized vehicle to generate cable-pulling forces.

Keep tension on the cable reel and the pulling line at the start of each pull. Do not release the tension in the cable if the pulling operation is halted. Restart the pulling operation by gradually increasing the tension until the cable is in motion.

### **CONDUIT FOR JETTING FIBER**

#### **Description**

For jetted fiber installations, furnish and install conduit that is manufactured from High Density Polyethylene (HDPE) materials and has internal longitudinal ribbing and factory lubrication.

Furnish individual HDPE conduits (Traditional) and Grouped Microcell Conduits that are comprised of individual microducts manufactured into a multi-cell conduit configuration as

required by the plans developed by the Design-Build Team. Furnish individual HDPE conduits (Traditional) with an embedded tracer wire. See the “Traditional - HDPE Conduit” Section below. Furnish grouped microcell conduits with an internal tracer wire.

HDPE conduit shall be suitable for direct buried applications through standard trenching, plowing and / or directional drilling operations.

Ensure the conduit is coilable and can be furnished on reels.

### **Materials**

Furnish material, equipment, and hardware under this section that is pre-approved on the ITS and Signals QPL on the Technical Proposal submittal date.

#### **Solid Wall HDPE Conduit with Internal Ribbing (Traditional & Grouped Microcell)**

Use HDPE conduit that conforms to the material and dimensional requirements of UL Standard 651A. Provide conduit meeting Conduit trade Size and Standard Dimension Ratio (SDR) based on the fiber count as listed below or as required in the plans developed by the Design-Build Team. Ensure the supplied conduits meet or exceed the minimum wall thickness ratios (SDR) corresponding to EPEC-40 (Schedule 40) or EPEC-B (SDR 13.5) as listed in UL Standard 651A.

| <b>HDPE CONDUIT SIZE and FIBER COUNT</b> |                                       |                   |
|--|---------------------------------------|-------------------|
| <b>Traditional Conduit Trade Size</b>    | <b>Fiber Count (None Micro-Fiber)</b> | <b>Furnish</b>    |
| 1”                                       | 12 - 96                               | EPEC-40           |
| 1 ¼”                                     | 12 - 144                              | EPEC-40           |
| 1 ½”                                     | 72 - 288                              | EPEC-B (SDR 13.5) |
| 2”                                       | 288 - larger                          | EPEC-B (SDR 13.5) |

Ensure the PE resin compounds used in manufacturing the conduit meet or exceed the cell classification PE 334480C (black with 2% minimum carbon black) or PE 334480E (colored conduit with UV inhibitors) in ASTM D3350 and the table below.

| <b>RESIN PROPERTIES</b>                          |   |                                       |
|--|---|---------------------------------------|
| <b>Property</b>                                  | <b>Requirement</b>  | <b>Test Method</b>                    |
| Density  | 0.940 g/cm <sup>3</sup> min.  | ASTM D1505<br>ASTM D792<br>ASTM D4883 |
| Melt Index<br>(condition 190/2.16 is acceptable) | < 0.4 grams/10 minutes  | ASTM D1238                            |
| Flexural Modulus                                 | 80,000 psi, min.  | ASTM D790                             |
| Tensile Strength                                 | Tensile Strength 3,000 psi, min.  | ASTM D638                             |
| Elongation                                       | Elongation 400%, min.   | ASTM D638                             |
| Slow Crack Growth Resistance                     | An ESCR as per condition B, 10% IGEPAL requirement of F10 > 96 hrs is allowable | ASTM D1693                            |
| Hydrostatic Design Basis                         | “0” for Non-Pressure Rated Pipe   | ASTM D2837                            |
| UV Resistance<br>(Outdoor Conduit Only)          | Stabilize with at least 2% by weight carbon black or colored with UV Inhibitor  | ASTM D4218                            |

Ensure the HDPE conduit is resistant to benzene, calcium chloride, ethyl alcohol, fuel oil, gasoline, lubricating oil, potassium chloride, sodium chloride, sodium nitrate and transformer oil and is protected against degradation due to oxidation and general corrosion.

Furnish all HDPE conduits with internal longitudinal ribbing and that is factory lubricated with a permanent coextruded internal layer to provide a low coefficient of friction of 0.20 or less in accordance with Telcordia GR-356.

Furnish coilable conduit that is supplied on reels in continuous lengths for transportation and storage outside. Ensure that the process of installing the coilable conduit on the reel does not alter the properties or performance of the conduit for its intended purpose.

### **Conduit Color Schemes**

Ensure for traditional conduits and grouped microcell conduits that multiple conduit colors can be provided in accordance with the plan requirements. For conduits manufactured with stripes, ensure that a minimum of three stripes are uniformly spaced around the conduit with 120 degrees of separation. Do not use “Solid Yellow” or “Black with Yellow Stripes” conduit. Furnish conduits in the following colors (Blue, Orange, Green, Red, and White).

Furnish grouped microcell conduit assemblies with an “Orange” outer sheath unless otherwise noted in the plans developed by the Design-Build Team or these project special provisions. An

alternate grouped microcell conduit outer sheath color may be submitted for approval by the Engineer.

### **Traditional - HDPE Conduit**

On traditional conduits, where multiple conduits are to be placed at the same time, furnish minimum one HDPE locatable conduit manufactured with a minimum of a #14 AWG solid copper (soft drawn or annealed per ASTM B3) tracer wire attached to the outer shell of the conduit. Ensure the locatable conduit is manufactured to the material and dimensional specifications of NEMA TC-7 for the wall type to be certified by the manufacturer.

Ensure the non-locatable standard wall supplied HDPE conduit is printed in accordance with the requirements of UL Standard 651A and is listed by a Nationally Recognized Testing Laboratory (NRTL). Ensure all non-locatable standard wall HDPE conduits are marked with information a.-f. below at two feet or less intervals. For locatable standard wall HDPE conduit, ensure the conduit is marked with information a.-e. below at two feet or less intervals.

- a. Material: HDPE
- b. Trade Size: i.e., 2 inches
- c. Conduit Type: SDR 13.5 or EPEC-B
- d. Manufacturer's name or trademark
- e. Manufacturer's production code to identify manufacturing date, facility, etc.
- f. National Recognized Testing Laboratory (NRTL) symbol or listing number for the non-locatable wall types and manufacturer certified for the locatable wall types

### **Traditional – Mechanical Duct plugs, Mechanical Fiber/Conduit Duct Plugs**

Provide reusable mechanical duct plugs to seal traditional HDPE conduits that are designated as spare or unused at the time of installation. Ensure the mechanical duct plug is sized to slip inside the conduit and can be tightened using compression to expand a seal creating a snug fit to ensure debris cannot enter the conduit system. Conduit plugs and / or caps that require special adhesive glues that permanently adhere the device to the conduit will not be accepted.

Provide mechanical fiber / conduit sealing split duct plugs designed to slip over the fiber cable and inside the HDPE conduit. Ensure mechanical fiber / conduit sealing split duct plugs through the use of compression have an expandable seal to ensure a snug fit around the fiber's outside diameter and the inside diameter of the conduit so debris cannot enter the conduit system. The use of a duct and conduit sealer or mastic which is of a putty-like compound shall not be used.

Ensure any duct plug used to seal a conduit with or without a fiber cable is removable and reusable. Conduit plugs are not required to be listed electrical devices.

### **Grouped Microcell Conduits**

Furnish individual microduct conduits that are bound together within and outer extruded 0.070" sheath of high-density polyethylene to form a grouped microcell conduit assembly. Ensure the

individual 22/16 mm microducts that form the grouped microcell conduit assembly have a SDR number less than or equal to 7.3.

Furnish grouped microduct conduit assemblies with a minimum allowable flexural modulus of  $5,625 \text{ Kg/cm}^2$  (80,000 psi) and a minimum Pipe Stiffness of  $49.2 \text{ Kg/cm}^2$  (699 psi). Ensure the completed grouped microcell conduit assembly is furnished with a minimum of two ripcords located along the outer sheath. The outer sheath of the grouped microcell conduit assembly shall not be adhered (glued) to the internal microcell conduits to allow for easy removal of outer sheath.

Furnish grouped microcell conduits assemblies with a preinstalled 14 AWG THWN solid copper soft drawn per ASTM B3 tracer wire located within the interior of the outer sheath. Grouped Microcell conduit assemblies with and internal tracer wire located inside an individual microduct conduit will not be accepted.

For overriding applications, where a new single microduct will be installed in an existing conduit system, furnish a microduct conduit with an SDR number less than or equal to 11 to serve as the new carrier pipe. For override applications provide a microduct conduit sized as specified in the Plans developed by the Design-Build Team.

Ensure the individual microducts supplied by the manufacturer meet quality and verification testing in accordance with ASTM F2160 for materials and associated properties for cell classification PE 334480 C for black or E for color. Ensure the outer sheath of the group microcell conduit system is marked every two feet in accordance with ASTM F2160 standards to include the following a.-f. below:

- a. Material: HDPE
- b. Trade Sizes and # of microducts: i.e., 4-way 22/16 mm
- c. Conduit Type: SDR 7.3 or EPEC-7.3
- d. Manufacturer's name or trademark
- e. Manufacturer's production code to identify manufacturing date, facility, etc.
- f. Manufacturer certified meeting the material and dimensional microduct requirements

### **Microduct Couplers and End Caps**

Furnish gasketed couplers and gasketed end caps recommended by the manufacturer of the furnished microduct conduits for joining and sealing off of the microduct conduit ends. Couplers and end caps shall be sized specifically for the microduct conduits and designed to be easily removed by hand and re-useable.

At a minimum, couplers shall meet the required safety margins testing as outlined under Bell Core GR-356-CORE. Additionally, the couplers shall be tested to illustrate that the couplers are 100% airtight (no air loss) due to failure of couplers when pressure is raised from the 125 psi (maximum Bell Core GR-356-CORE pressure tested) to 175 psi  $23^0 \text{ C} \pm 5^0 \text{ C}$  ( $73^0 \text{ F} \pm 9^0 \text{ F}$ ) for 5 minutes.

## Pull Tape

Furnish pull tape manufactured out of ½-inch wide polyester material with a minimum of a #22 AWG solid PVC insulated tracer wire woven into the polyester material. Ensure the pull tape is pre-lubricated and has a minimum tensile strength of 1,250 lbs.

## Construction Methods

### General

Install traditional HDPE conduits and grouped microcell conduit assemblies utilizing the method identified in the plans developed by the Design-Build Team (trench, micro-trench, plow, directional drill, etc.) Comply with the following Sections in Article 1715-3 “Construction Methods” of the 2018 *Standard Specifications for Roads and Structures*, where applicable:

- Section 1715-3 (B) – Trenching
- Section 1715-3 (C) – Plowing
- Section 1715-3 (D) – Directional Drilling

| <b>MINIMUM CLEARANCE REQUIREMENTS</b>                            |   |
|--|---|
| <b>Man-made Structure or General Installations</b>               | <b>Minimum Clearance Requirement (all distances are “averages”)</b>   |
| Minimum/Maximum Conduit Depth Parallel to Interstate             | 30 inches / 36 inches   |
| Minimum/Maximum Conduit Depth crossing a Roadway (Perpendicular) | four feet or eight times the back reamer’s diameter, whichever is greater   |
| Bridge Foundation  | five feet horizontal and four feet vertical (clearances greater than minimum horizontal should continue to use the 4V:5H ratio,i.e., ten feet horizontal should be no deeper than eight feet) |
| Drainage Pipes 60 inches or Less                                 | 4 feet below (while maintaining a minimum depth of 30 inches below grade)   |
| Drainage Pipes Greater than 60 inches                            | four feet below (while maintaining a minimum depth of 30 inches below grade)  |
| Box Culverts   | four feet below (while maintaining a minimum depth of 30 inches below grade)  |
| Slope Protection (rip rap)                                       | two feet below  |
| Slope Protection Foundation Footing                              | five feet below   |
| Crossing Beneath Ditches   | 32 inches below bottom of ditch   |
| Navigable Waters / Stream Crossings                              | six feet below  |



Follow industry accepted practices for installing the conduit(s) when trenching, plowing and / or directional drilling operations are required. Use pulling eyes or external conduit grips sized in accordance with the manufacture's recommendations for directional drilling operations. Where external grips are to be used, the ends of the conduits shall be sealed to prevent debris from entering as the conduit is being installed.

For any installation practices that require pulling of the conduits, use a breakaway swivel rated to not exceed the manufactures recommended working tensile load. When a field bend or elevation change in the conduit is required to work around obstructions or obstacles, do not violate the manufacturer's recommend safe working tensile load and minimum allowable bend radius.

Backfill and tamp trenches in six inch lifts while removing any rocks or debris that could possibly damage the conduit system. Place non-detectable marker tape 12 inches below the final grade.

During installation of any conduit(s) temporarily install a mechanical duct plug (traditional) or end cap (microduct) on the exposed conduit ends to prevent any debris from entering the conduit. Install conduit(s) to enter and exit the junction boxes through the mouse holes, precast knockouts or field drilled conduit entrance holes. Sufficient slack conduit should be pulled into the junction box so the opposing ends overlap for joining. Adequate time should be given prior to joining to allow the conduit to relax and recover due to any elongation that may have occurred as it was being pulled into place. **Conduits installed for the purpose of jetting in fiber shall not enter or exit junction boxes through the bottom.**

Install quick setting, non-shrinking grout around the conduit openings to seal and hold the conduit in place as it enters and exits the junction boxes. Ensure the lowest conduit entering the junction box maintains a minimum of four inch separation from the bottom layer of crushed stone located inside the junction box.

Ensure the orientation for conduits of the same color enter and exit the junction box positioned opposite each other so that when mating the conduit of the same color the ends will be in direct line with one another. During initial installations of the conduits ensure the opposing conduits are pulled into the junction box so the opposing ends overlap for joining and are properly sealed.

Install conduits in one continuous length between junction boxes. Joining conduits shall only be performed within junction boxes, unless otherwise approved by the Engineer (see "Conduit Integrity Testing" section of this Project Special Provision).

When temporarily joining conduits inside junction boxes to increase fiber jetting distances use removable split couplers designed to be airtight to temporarily join the opposing ends. Prior to joining two conduits with a removable split coupler, use approved conduit shears to provide smooth, clean, square cuts on ends of the conduits. At the appropriate time during cable installation, the split couplers will need to be removed to allow for the specified slack loop length to be installed.

Final dressing of the conduits shall be done after the cable slack loops have been installed in each junction box. For the conduit sections where the cable has been installed, the conduit is to

be slit and removed to 4 inches from the junction box wall. Consult the conduit manufacturer for determining the appropriate tools to be used that will protect the installed cables. A split expandable seal is to be placed around the cable into the end of each conduit end, see the “Jetting Operations” section of this Project Special Provision.

For the spare conduits, the duct ends are to be left overlapped for future use. All ends should be sealed using an expandable duct plug which is to be removed during the conduit integrity testing. Once the conduit integrity testing has been completed, the ends are to be sealed as outlined in “Duct Sealing” section of this Project Special Provision.

### **Conduit Integrity Testing**

Immediately upon completing the conduit installation or prior to installation of the fiber cable, the Design Build Team shall ensure usability of the conduit system. This shall be done by conducting a mandatory “Conduit Integrity Tests” (CIT) on each individual conduit in the presence of the Engineer. The purpose of performing the CIT is to ensure there are no obstructions, leaks or other defects resulting from the conduits installation between access points (junction box locations). The CIT includes a series of three individual steps to be completed, prior to acceptance of the conduit system.

#### **CIT Steps**

- 1) Air Pressure Test
- 2) Shuttle / Mandrel Test
- 3) Sponge Test / Cleaning

#### **Air Pressure Test**

Seal the downstream end of the conduit with a pressure rated temporary end cap or plug and attach an airtight fitting with a quick connect air coupling and pressure gauge to compressor end of the conduit. Connect the compressor hose to the fitting with an inline pressure gauge and fill the conduit with compressed air raising the pressure to six bars (87 psi). Once the pressure has reached the designated level wait to see if the pressure drops slightly and add additional air to reach the desired pressure level. Once the pressure level appears to have stabilized at the prescribed level wait five minutes to see if the pressure remains stable. If the pressure reading remains stable or does not drop significantly (Minimal reductions of one to two pounds is acceptable) after a five minutes lapse of time, then there is no leakage in the duct and the section being tested has passed.

If the pressure reading shows a significant drop-in pressure, then determine where the leakage is occurring, and take corrective actions. Note, the loss of pressure may be occurring at the coupler if it has not been properly installed. If it is at the coupling, in a handhole for example, correct it and retest. If the problem is found to be in the conduit between access points, notify the Engineer and make arrangements to replace or repair that section of conduit at no additional expense to the Department (see “Repair of Conduit Segments” section of this Project Special Provision)

**Shuttle / Mandrel Test**

An obstruction or kink or some other defect in the installed conduit can be determined by a shuttle test. The test is conducted by using a shuttle that is 70-80% of conduits inner diameter that is either a sphere or a segment of fiber optic cable with a length of three times the diameter of the conduit being tested. The shuttle is to be inserted into the conduit and passed through the conduit by applying compressed air. The pulling option is to pull a segmented mandrel through the conduit, designed for proving duct runs.

Provided the shuttle or mandrel passes through from end to end of the conduit, then the duct is considered to be acceptable for cable installation. If the shuttle mandrel fails to pass from end to end, then the conduit is either kinked or blocked. It will be the Design-Build Team's responsibility to find the blockage or kinked location. For conduits that do not pass this test, notify the Engineer and make arrangements to replace or repair that section of conduit at no additional expense to the Department (see "Repair of Conduit Segments" section of this Project Special Provision).

**Sponge Test / Cleaning**

Installation of a test sponge as recommended by the jetting equipment or conduit manufacturer is to be used for cleaning and / or lubricating the conduits inner diameter from end to end, prior to cable installation. Two sponges are to be used for this purpose using the steps listed below:

1. From the jetting end blow one or two sponges through the conduit to the destination handhole. Inspect the sponges and repeat this step until the sponges are clean of dirt and debris after passing through the conduit system, then move to step 2.
2. At the jetting end of the conduit insert one sponge pushing it into the end of the conduit several inches.
3. Leave enough room to then pour in the lubricant at the manufacturer's suggested amount of lube for the diameter and distance the cable is to be jetted.
4. Lubricate and insert the second sponge into the end of the conduit.
5. Secure the conduit lead end to the jetting machine's sealed air block and apply compressed air to blow the sponge and lubricant through the conduit.
6. The last step is to jet the fiber cable into the conduit.

**Repair of Conduit Segments**

For HDPE Conduit segments (traditional and / or multicell), where the conduit failed to pass the CIT, notify the Engineer. The Engineer has the authority to require any of the following options regarding the damaged section of conduit:

- Replace the damaged section of conduit
- Allow the use of conduit couplers to replace the damaged section of the conduit
- Allow the damaged section to be repaired using the "HDPE pipe welding heat fusion" process.

## **Conduit Sealing**

Immediately upon completing the CIT, install an approved mechanical duct plug or gasketed end coupler over the ends of all conduits to guard against debris or water entering the conduit.

## **Spare Conduits and Pull Tape**

For conduits designated to be used as spares, install a continuous section of pull tape through the conduit. Place the embedded tracer wire of the pull tape under the gel filled wire nut along with the other conduit's internal tracer wire. (Reference the "Tracer Wire Bonding / Isolation Test Switch" Section of the *Junction Boxes (Limited Access Facilities)* Project Special Provision found elsewhere in this RFP)

## **Jetting Fiber**

### **A. General**

Furnish personnel trained in the operation of the fiber jetting machine and all safe operating procedures. Provide a fiber jetting machine complete with a head and feeder system with all necessary seals and nozzle attachments including a compressed air machine to facilitate installation of the fiber.

Provide couplers and split half couplers as necessary to make temporary joints of conduits to facilitate jetting of the fiber cable through midspan junction boxes. Ensure the couplers and split half couplers are designed to provide an airtight seal around the HDPE conduits and that they are reusable. Ensure split half couplers can be easily assembled and disassembled using standard wrenches and / or nut drivers and that couplers can easily be removed and reused.

Furnish a UL approved blowing lubricant recommended by the conduit manufacturer and approved by the fiber manufacturer that will not adversely affect the HDPE conduit nor the fiber optic cable both during and after the cable jetting installation process.

Ensure the lubricant is designed to meet or exceed all cable blowing requirements with respect to viscosity, cling, drag, wetting and designed for use in the temperature range indicative of the environmental temperature when the cable is installed. Ensure the lubricant is safe to use and is non-toxic, non-corrosive, non-flammable and does not stain, alter or cause a smearing effect to the required markings found on the outer sheath of the fiber optic cable.

## **Jetting Operations**

Upon successful completion of the CIT procedures begin jetting operations to install the fiber. Ensure the fiber reel and jetting machine are synchronized to minimize unnecessary pulling and jerking on the fiber cable as it is being removed from the reel during the installation process. Apply cable pulling lubricant as recommend by manufacturers to minimize the coefficient of friction and allow the cable to slide effortlessly through the conduit system.

During the jetting process provide spare fiber at junction boxes and / or cabinets as required by the plans developed by the Design-Build Team. After the jetted fiber is installed, ensure that all spare conduits are sealed off with a mechanical sealing plug or gasketed end cap. For conduits that contain a fiber cable, install a mechanical fiber / conduit sealing split duct plug to seal the fiber and conduit from debris. Ensure any conduits designated as spare have a mechanical duct plug (Traditional) or gasketed end cap (Microcell) installed in the open ends to seal against debris entering the conduit system. A Moldable Duct Seal shall not be acceptable for spare conduits or conduits containing fiber when those conduits are installed for the future installation of fiber using the "Fiber Jetting Process" and when the installation of the conduit system is along a "Limited Access" or "Controlled Access Facility".

## **PORTABLE CCTV CAMERA and TRAILER**

### **DESCRIPTION**

The Design-Build Team shall 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 (Protronix Video Pro) currently in use by NCDOT in this region and at the Statewide 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 developed by the Design-Build Team 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 shall 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).

### **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.

### **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 shall 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 shall include a two-inch ball hitch. The trailer shall tow level when attached to a two-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 shall 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 shall 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.

### **Lights / Reflectors and Safety Markings**

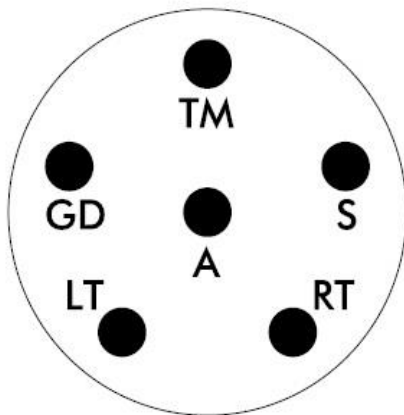
The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

An illuminated license plate holder shall 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 shall be three inches wide and installed in a repeating pattern of 11 inches long (red) followed by seven inches long (white).

Provide a standard six-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              |

### 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 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 assembly 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 shall have tempered glass faces and be sealed.

**The vendor, upon request, shall provide solar panel specifications including dimensions, voltage, wattage and the number of panels and cells to be used. Additionally, the vendor shall 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 shall 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 not exceed the dimensions of the trailer or cause the trailer GVWR (2,500 lb.) to be exceeded.

### **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

### **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 shall 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 two-inch diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

### **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.

### **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.

### **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.

### **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 (Protronix Video Pro) currently in use by NCDOT at the STOC.

### **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

### **Camera**

Furnish new 1/3-inch charged-coupled device (CCD) color cameras. The sensors shall use Complementary Metal-Oxide-Semiconductor (CMOS) technology. The camera shall 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.

## **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 shall be capable of both automatic and remote manual control iris and focus override operation. The lens shall 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 shall be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens shall be compatible with the outputs of the camera control.

## **Communications Standards**

The CCTV camera shall support the appropriate NTCIP 1205 communication protocol (version 1.08 or higher), ONVIF, or approved equal.

## **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.

### **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 shall be equipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure shall meet or exceed NEMA 4X ratings. The viewing area of the enclosure shall be tempered glass.

### **Pan and Tilt Unit**

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit shall be integral to the high-performance integrated dome system. The pan and tilt unit shall be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units shall 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

### **Video Ethernet Encoder**

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units shall be built into the camera housing and require no additional equipment to transmit encoded video over IP Networks.

Encoders shall 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

### **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 shall 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 shall 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 shall accept status information from the pan / tilt unit and motorized lens for preset positioning of those components. The control receiver / driver shall relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver / driver shall 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 shall consist of unique values for the desired pan, tilt, zoom, and focus positions.

### **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 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.

### **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, stand-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.

## **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.

## **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.

### **Training Materials**

In conjunction with the delivery of each unit, the Design-Build Team 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.

## **CONSTRUCTION METHODS**

### **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 two-inch diameter minimum (or acceptable equivalent) grommited entrance way shall be provided to feed wiring through mount into camera.

### **Deployment**

The Department will establish the location of each Portable CCTV camera trailer assembly to be deployed on the Preliminary Incident Management Routes provided by the Department. The Department will approve the location of each Portable CCTV camera trailer assembly recommended to be deployed on the alternate Incident Management Route Plans developed by the Design-Build Team. It shall be the Design-Build Team's responsibility to ensure proper

elevation, leveling, offset, and orientation of all Portable CCTV camera trailer assemblies. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

### **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 shall show each Portable CCTV camera trailer assembly location on a map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

### **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.

### **PORTABLE CHANGEABLE MESSAGE SIGN FOR INCIDENT MANAGEMENT**

#### **Description**

The Design-Build Team shall furnish, install, operate, maintain, relocate and remove Portable Changeable Message Signs that operate off a photovoltaic power source, that can be deployed as part of an Incident Management System, herein after referenced as a PCMS(IM). Furnish PCMS(IM) assemblies that are trailer mounted and designed to be towed by a ½ ton and ¾ ton pickup truck and erected in work zones and / or on roadside right of ways to relay Traffic Incident Management messages to the motoring public via a cellular interface.

PCMS(IM)s used for incident management on the State Highway System shall be compatible with the existing DMS Vanguard V4 Software deployed in the State. Furnish NTCIP compliant PCMS(IM)s that are fully compatible with Daktronics, Inc. Vanguard V4 software (also referred to hereinafter as the “Vanguard V4 Software”).

Deploy and configure the new PCMS(IM) in accordance with the Incident Management Plan using the Vanguard V4 Software and computer system. Furnish, install, test, integrate and make fully operational the new PCMS(IM) at the location described or shown in the plans developed by the Design-Build Team and / or as directed by the Engineer. Contact the Engineer to confirm the PCMS(IM) 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 shall 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 PCMS(IM) and the Statewide Traffic Operations Center (STOC).

## **TRAILER**

The trailer shall be specifically designed to support and secure the PCMS(IM) 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.

### **Trailer Construction**

The frame including the 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 the applicable American Welding Society (AWS) standards. If counterweights are required, they shall be incorporated as an integral part of the frame. Provide four (4) tie down rings with one (1) located near each corner. 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 incorporate a hydraulic surge braking system and shall include a two-inch ball hitch. The trailer shall tow level when attached to a two-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Furnish a hydraulic surge braking system built into the tongue with a manual lockout lever or pin that shall allow the trailer to be backed up. Ensure the lockout lever, if it is designed to fall out when the vehicle is in a forward motion shall be kept secure to the trailer by a lanyard. Ensure that during removal and reinstallation of the trailer tongue that the hydraulic brake lines can be connected / disconnected using hydraulic connectors and that upon reinstalling the tongue that the braking system does not have to be bled to provide normal braking operations. Additionally, 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 that is of a heavy-duty design with a swivel mount castor wheel designed to support 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 3,500 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.

The trailer shall include a leveling system to allow for the trailer to be in a stable and level position when the sign’s jack legs, and auxiliary support 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.

Provide additional stability by providing four stability legs, one attached in each corner that forms a 45-degree angle with the trailer and extend outward away from the trailer. Ensure the stability legs have means to lock the legs into place at one-inch increments along the entire length of the support leg. Each support leg shall extend a minimum of four feet laterally away from the trailer and each support leg shall have a large steel footpad to aid in stabilization. Ensure each stability leg can be locked into place for travel. Other options, such as swing out arms that rotate out a minimum of four feet away from the trailer with drop down stability legs is acceptable. Swing arms shall be able to be locked into multiple positions as they swing out from the trailer to accommodate obstructions encounter along the roadway.

### **Lights / Reflectors and Safety Markings**

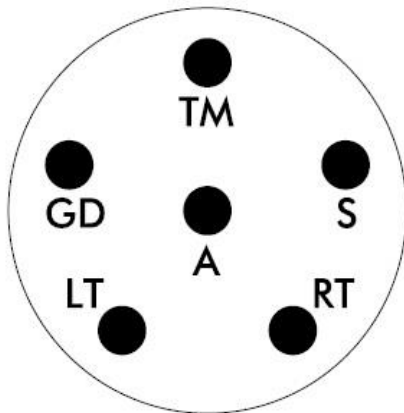
The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

An illuminated license plate holder shall 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 three inches wide and installed in a repeating pattern of 11 inches long (red) followed by seven 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              |

### Solar Power System

The PCMS(IM) 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 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 PCMS(IM) 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 PCMS(IM) load when the available operating power falls below a specified threshold voltage.

The photovoltaic panels shall be mounted to the trailer or top of the sign structure in a rigid steel frame. The photovoltaic panel assembly shall be designed with tilt and rotation capabilities. Ensure that the photovoltaic panel assembly does not obstruct the sign face when rotated or tilted. The panels and panel assembly shall be attached using anti-theft fasteners. Panels must have tempered glass faces and be sealed.

Design the field controller to monitor the operational status (normal or failed) of the power system and be able to display this information on the Client Computer screen.

**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 shall provide load calculations for the photovoltaic power system to operate the sign 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 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 PCMS(IM) 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 PCMS(IM) assembly.

The power system including solar panels shall be mounted onto the trailer and shall not exceed the dimensions of the trailer or cause the trailer GVWR (5,500 lb.) to be exceeded.

#### **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

**Sign Mast**

The sign shall be mounted on a self-supporting mast of either square or tube steel meeting ASTM A 513 requirements. Design the mast such that it can raise and lower the sign by having one section of the support slide inside of the other support. Ensure the mast design allows the sign (at its maximum height) to be raised such that the bottom of the sign is no less than seven feet above grade. Mount the sign in a vertical position for transporting. Ensure the sign and trailer are supplied with a positive locking device to secure the sign in position when it is in travel mode or operational mode.

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. Provide a mast lowering and raising system that uses an electrically powered hydraulic pump with a manual backup system should the electric pump become disabled. The sign shall be capable of being rotated 360 degrees in the raised position. It is permissible for the mast to be rotated 360 degrees to meet this requirement.

**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.

**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.

**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 plaques and safety decals / plaques shall be protected from being painted over.

## **CHANGEABLE MESSAGE SIGN**

Furnish and install sign assemblies described in these Project Special Provisions. All new signs and sign controllers shall be NTCIP compliant and shall be fully compatible with the DMS Vanguard V4 Software deployed in the State.

### **General**

Construct the PCMS(IM) and controller cabinet so the equipment within is protected against moisture, dust, corrosion, and vandalism. Ensure the completed sign assembly and trailer meets the following minimum requirements:

- Height (Raised) not to exceed 182 inches.
- Height (Travel Mode) not to exceed 113 inches
- Completed Display Panel Size not to exceed 83 inches tall by 145 inches long.
- Trailer weigh of complete assembly including the sign assembly: 2060 pounds (approximate)

### **Sign**

Construct the PCCMS(IM) to display messages that are visible from ½ mile away and legible with three lines of text to a person with 20/20 corrected vision from a distance of 1000 feet in advance of the PCMS(IM) at an eye height of 3.5 feet along the axis.

Provide a continuous matrix sign that is capable of displaying three (3) lines of text, each line must display at least nine (9) equally spaced and equally sized 18-inch-high individual alphanumeric characters. Ensure each character is scalable up to a maximum of 18 inches in height. Provide a message sign panel that consists of a minimum of 30 pixels high and 56 pixels wide.

#### **A. Discrete LED's**

Provide LED's that utilize an aluminum indium gallium phosphide (AlInGaP) substrate material that emit a true amber color at a wavelength of  $590 \pm 5$  nm. Provide LED's with a MTBF (Mean Time Before Failure) of at least 100,000 hours of permanent use at an operating point of 140° F or below at a specific forward current of 20mA.

#### **B. Pixel Compilation**

Design each pixel to consist of a cluster of four (4) or more LED's and produces a minimum luminous intensity of 40 candles.

#### **C. Display Modules**

- Display modules shall be 100% solid state with no moving parts and shall be identical to, and mutually interchangeable with, all other modules.

- No field hardware or programming modifications shall be required to exchange or replace individual display modules. Display modules shall be self-addressing within the matrix.
- Each display module shall contain the LED driver circuitry necessary to operate its associated LED's.
- There shall be no separate driver boards between the display modules and the CPU.
- Each individual module shall have the following layout characteristics specific to the sign type:
  - Pixel layout per module - 35 Standard, 7 Rows X 5 Columns
  - Pixel spacing (maximum) - 2.70" Wide (row) x 2.80" High (column)
  - LED angularity - 30 degrees
- Display modules shall be designed for plug and play operation.
- Furnish two (2) spare display modules per each PCMS(IM) for emergency restoration. Provide storage and a means to protect them from damage that could be experienced during sign transport.

### **Message Sign Panel Matrix**

Ensure the full matrix panel consists of a minimum of 28 to 30 pixels long x 50 to 56 pixels tall. Ensure the sign panel is scalable to provide as a minimum of the following:

- 3 lines of text with 9 characters per line (5 by 7 font)
- 3 lines of text with 12 characters per line (3 by 7 font)

Each panel matrix has built in circuitry to monitor and determine pixel failure and that the host software and local control system can identify the location of the failed pixel.

### **Sign Case**

Ensure the sign display face is covered by a clear polycarbonate material.

Protect the sign display face with multiple contiguous, weather-tight, removable panels. The panels must be a polycarbonate material that is ultraviolet protected, have an antireflection coating, and is a minimum of 3/16 inch thick.

Furnish polycarbonate panels with the following characteristics:

- Tensile Strength, Ultimate: 10,000 PSI
- Tensile Strength, Yield: 9,300 PSI
- Tensile Strain at Break: 125%
- Tensile Modulus: 330,000 PSI
- Flexural Modulus: 330,000 PSI
- Impact Strength, Izod (1/8", notched): 17 ft-lbs./inch of notch
- Rockwell Hardness: M75, R118
- Heat Deflection Temperature Under Load: 264 PSI at 270F and 66 PSI at 288F
- Coefficient of Thermal Expansion: 3.9X10<sup>-5</sup> in/in/F

- Specific Heat: 0.30 BTU/lb./F
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%

Ensure the border around the sign face is painted flat black to reduce glare so as not to effect viewing of the message caused by ambient solar illumination or from vehicle headlights. Construct the sign case support structure out of extruded aluminum meeting ASTM B 209 6063-T5 and 6061-T6 standards and aluminum panels / sheet material meeting ASTM 3003-H14 standards. Ensure all exterior housing surfaces, excluding the sign face, and all interior housing surfaces are a natural aluminum mill finish. Ensure signs are fabricated, welded, and inspected in accordance with the requirements of the current ANSI/AWS Structural Welding Code-Aluminum.

Over all dimensions of the completed sign case assembly shall not exceed 140" wide by 82' tall by 6 1/2" thick.

### **Sign Control System**

The operator's control console including all remote entry keyboard / keypad systems shall consist of the following:

- Keyboard / keypad
- Keyboard / keypad authorization key switch or password protected graphic touchscreen controller
- Three (3) line color LCD display which exactly duplicates the actual sign display
- Power start and stop
- Sign raise and lower
- Sign message selection
- Message flash rate
- Event time clock
- Battery voltage gauge
- Monitor the operational status (normal or failed) of the power system
- Messages shall be generated through the keyboard / keypad
- The keyboard / keypad shall enable the user to generate an infinite number of messages
- An electronic automatic dimming device shall be provided which senses ambient light conditions and automatically dims the brightness of LED pixels.
- A manual dimmer switch shall be provided to override the automatic dimming device
- Ensure the system can determine and identify via the host software and local control system software any pixel failures.
- Sign shall be capable of displaying all alphanumeric characters (numbers and letters), full size chevrons, dynamic moving arrows (left and right), small directional arrows, and 26 symbol messages as per Part VI of the MUTCD.

### **NTCIP Compliance / Compatibility**

The portable Changeable Message Sign controller hardware / firmware and Vanguard V4 Software shall comply with the most recent revision of the AASHTO-ITE-NEMA Joint Committee standards for NTCIP at the time of delivery:

- (1) 1201 - NTCIP Global Object Definitions
  - (2) 1203 - NTCIP Object Definitions for Dynamic Message Signs
  - (3) 2101 - NTCIP Subnet Profile for PMPP over RS-232
  - (4) 2104 - NTCIP Subnet Profile for Ethernet
  - (5) 2201 - NTCIP Transport Profile
  - (6) 2202 - NTCIP Internet Transport Profile
  - (7) 2301 - Simple Transportation Management Framework
- All mandatory objects applicable to portable PCMS(IM) operations including battery status shall be implemented with Full Standardized Object Range Support (FSORS).
  - A complete list of all objects to be implemented shall be submitted for review and approval to NCDOT prior to any PCMS(IM) delivery.

### **Functions**

- Message editing / input into memory from a remote location utilizing a computer, application software and any method described in the section above.
- The sign controller shall be equipped with at least two (2) 10/100bT Ethernet ports and one (1) RS-232 port to allow for on-site and remote access using a communication method defined in section above.
- A Department supplied cellular modem shall be furnished with a cell antenna, GPS antenna and surge protection. Ensure the equipment enclosure provides for mounting the cellular modem inside the cabinet and means of egress for the antennas.
- The sign controller shall have the capability to store 230 three page pre-programmed and user generated messages with a 5-year battery backup.
- The sign controller shall be located inside the sign control cabinet and all its communications ports shall be readily accessible.
- Design the controller to display a message on the sign sent by the Vanguard V4 Software, a message stored in the sign controller memory, or a message created on site by an operator using the controller keypad.

### **Sign Controller Address**

Assign the PCMS(IM) controller a unique address. Preface all commands from the Vanguard V4 Software with a particular PCMS(IM) controller address. The PCMS(IM) controller compares its address with the address transmitted; if the addresses match, then the controller processes the accompanying data. IP address shall support IPv4 and IPv6.



## **Wiring Diagrams**

Provide a wiring diagram for each PCMS(IM) detailing the power system, including but not limited to, Solar charge controller, photovoltaic panels, batteries, standby generator / land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram includes the sign controller and all other supporting devices and systems that comprise the whole system.

Provide complete and detailed schematic diagrams to component level for all PCMS(IM) assemblies and subassemblies such as driver boards, control boards, PCMS(IM) controller, power supplies, LED display modules and etc. Ensure that each schematic enables an electronics technician to successfully identify any component on a board or assemblies and trace its incoming and outgoing signals.

## **Routine Operation**

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.

## **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. Trainers shall be representatives of the manufacturer's technical service personnel or a factory trained authorized representative.

## **Training Materials**

In conjunction with the delivery of each unit, Design-Build Team 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.

## **CONSTRUCTION METHODS**

### **Description**

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Portable Changeable Message Signs for incident Management activities along with auxiliary equipment requirements. 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.

## **Deployment**

The Department will establish the location of each PCMS(IM) assembly to be deployed on the Preliminary Incident Management Routes provided by the Department. The Department will approve the location of each PCMS(IM) assembly recommended to be deployed on the alternate Incident Management Route Plans developed by the Design-Build Team. It shall be the Design-Build Team's responsibility to ensure proper elevation, leveling, offset, and orientation of all PCMS(IM) assemblies. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

## **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 shall show the PCMS(IM) location on a map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

## **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 delivery 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.

## **AUTOMATED MACHINE GUIDANCE**

(1-2-11)

801

DB8 R01

## **General**

This Special Provision contains requirements to be followed if the Design-Build Team elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the 2018 *Standard Specifications for Roads and Structures*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that meet the 2018 *Standard Specifications for Roads and Structures* requirements. The Design-Build Team shall perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, the Design-Build Team shall conform to the requirements for conventional stakeout.

The Design-Build Team shall be responsible for all errors resulting from the use of AMG and shall correct deficiencies to the satisfaction of the Engineer at no cost to the Department.

**Submittals**

If the Design-Build Team elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed and submitted to the Engineer for review and acceptance.

At least 90 days prior to beginning grading operations, the Design-Build Team shall submit to the Engineer an AMG work plan to include, but not be limited to, proposed equipment, control software manufacturer and version, types of work to be completed using AMG, project site calibration report, repetitive calibration methods for construction equipment and rover units to be used for the duration of the project, and local GPS base station to be used for broadcasting differential correction data to rover units (this may include the NC Network RTK). All surveys must be tied to existing project control as established by NCDOT.

**Inspection**

The Engineer will perform quality assurance checks of all work associated with AMG. If it is determined that work is not being performed in a manner that will assure accurate results, the Engineer may require corrective action at no cost to the Department.

The Design-Build Team shall provide the Engineer with one GPS rover unit for use during the duration of the contract. The rover shall be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Design-Build Team. The rover will be kept in the possession of the Engineer and will be returned to the Design-Build Team upon completion of the contract. All maintenance and repairs required for the rover shall be the responsibility of the Design-Build Team. The Design-Build Team shall provide at least eight hours of formal training to the Engineer on the use of the proposed AMG system.

**Subgrade and Base Controls**

If the Design-Build Team elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

- Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.
- Provide control points and conventional survey grade stakes at 500-foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

- Provide hubs at the top of the finished subgrade at all hinge points on the cross section at 500-foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of construction.

## **HORIZONTAL DRAINS**

(11-7-19)

DB8 R17

### **Description**

Construct horizontal drains for slopes, rock cuts and retaining walls in accordance with the contract and Geotechnical Engineering Unit Standard Detail No. 817.01. A horizontal drain typically consists of a slotted PVC pipe placed in a drilled hole inclined at an angle above horizontal, but in some holes, the pipe may be omitted. Horizontal drains shall be required to drain water from slopes and rock cuts, and from behind retaining walls at locations and elevations shown in the plans developed by the Design-Build Team and as directed by the Engineer.

### **Materials**

Refer to Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b> | <b>Section</b> |
|-------------|----------------|
| PVC Pipe    | 1044-6         |

As shown in the plans developed by the Design-Build Team, use solid and slotted PVC Schedule 40 or Schedule 80 pipes for drain pipe. Provide slotted PVC pipe with 0.01-inch wide horizontal slots in the direction perpendicular to the pipe length and evenly spaced around and along the pipe so that the open area is at least one square inch per linear foot of pipe.

### **Construction Methods**

The Engineer will determine the number, location, elevation, inclination and length of horizontal drains required. The approximate known drain locations, elevations, inclination and lengths shall be shown in the plans developed by the Design-Build Team. Drain pipe requirements including those drains without pipes will also be determined by the Engineer and known pipe information shall be shown in the plans developed by the Design-Build Team.

Use drill rigs of the sizes necessary to install horizontal drains and with sufficient capacity to drill through whatever materials are encountered. Drilling through boulders, cobbles and rock lenses may be required, but drilling in continuous intact weathered or hard rock, as determined by the Engineer, will not be required unless the drain pipe is omitted. Drill straight and clean holes with the dimensions and orientations shown in the plans developed by the Design-Build Team or as directed by the Engineer. Drill holes within six inches of planned locations and elevations and 2° of required inclination.

For horizontal drains with drain pipes, do not insert PVC pipes into drill holes until hole locations, elevations, dimensions, inclination and cleanliness are approved by the Engineer. Insert drain pipes through hollow stem augers or into open clean drill holes. Do not vibrate, drive or otherwise force pipes into holes. If a drain pipe cannot be completely and easily inserted into a drill hole, remove the pipe and clean or re-drill the hole.

Extend solid PVC sections of drain pipes out past slope face far enough to connect to a drainage system or discharge water as directed by the Engineer. Seal all around drain pipe at collar of drill holes with a method acceptable to the Engineer. For each horizontal drain, record horizontal drain number, location, elevation, installation date, description of drilling conditions and completed drain pipe, if applicable, and drill hole diameter, length and inclination, and provide this information to the Engineer.

### **PORTABLE CONSTRUCTION LIGHTING**

3-22-22

1413

DB14 R13

Revise the *2018 Standard Specifications for Roads and Structures* as follows:

**Page 14-24, Article 1413-3 TOWER LIGHT, Lines 2-7**, delete and replace the first and second sentence in the first paragraph with the following:

Use tower lights which consist of mercury vapor, metal halide, high pressure sodium, low pressure sodium or light emitting diode (with correlated color temperature of 4000 Kelvin or less) fixtures mounted on a tower approximately 30 feet in height. Use tower light fixtures which are heavy duty flood, area, or roadway style with wide beam spread, have sufficient output to provide the minimum illumination for the Work Category, are weatherproof and supplied with attached waterproof power cord and plug.

**Page 14-24, Article 1413-3 TOWER LIGHT, Lines 11-12**, delete and replace the second paragraph with the following:

Provide tower lights of sufficient wattage or quantity to provide the minimum average maintained horizontal illuminance over the work area based on the Work Category as shown in Table 1413-1. For any work not covered in Table 1413-1, provide a minimum average maintained horizontal illuminance of 20.0 footcandles over the work area.

| <b>TABLE 1413-1<br/>MINIMUM ILLUMINATION REQUIREMENTS FOR PORTABLE CONSTRUCTION<br/>LIGHTING</b> |  |  |
|--|--|--|
| <b>Work<br/>Category</b>   | <b>Description of Construction and Maintenance Task</b>  | <b>Minimum<br/>Average<br/>Maintained<br/>Horizontal<br/>Illuminance</b> |
| I  | Excavation; Embankment, Fill and Compaction; Maintenance of Embankment; Asphalt Pavement Rolling; Subgrade, Stabilization and Construction; Base Course Rolling; Sweeping and Cleaning; Landscaping, Sod and Seeding; Reworking Shoulders.   | 5.0 footcandle   |
| II   | Barrier Wall and Traffic Separators; Milling, Removal of Pavement; Asphalt Paving and Resurfacing; Concrete Pavement; Base Course Grading and Shaping; Surface Treatment; Waterproofing and Sealing; Sidewalk Construction; Guardrails and Fencing; Striping and Pavement Marking; Highway Signs; Bridge Decks; Drainage Structures and Drainage Piping; Other Concrete Structures; Repair of Concrete Pavement; Pothole Filling; Repair of Guardrail and Fencing. | 10.0 footcandle  |
| III  | Traffic Signals; Highway Lighting Systems; Crack Filling.  | 20.0 footcandle  |

**Page 14-24, Article 1413-4 MACHINE LIGHTS, Lines 18-21**, delete and replace the first and second sentence in the first paragraph with the following:

Use machine lights which have mercury vapor, metal halide, high pressure sodium, low pressure sodium or light emitting diode (with correlated color temperature of 4000 Kelvin or less) fixtures mounted on supports attached to the construction machine at a height of approximately 13 feet.

**Page 14-24, Article 1413-5 CONSTRUCTION METHODS, Lines 33-34**, delete and replace the third and fourth sentence in the first paragraph with the following:

Submit photometric calculations showing the minimum average maintained horizontal illuminance over the work area and the tower spacing to the Engineer for review and approval prior to installation.

### **HIGH VISIBILITY DEVICES**

(10/25/2019) (Rev. 5/10/2021)

#### **Description**

In accordance with this RFP, the Design-Build Team shall furnish and install high visibility devices on US 70. High visibility devices include drums, skinny drums, stationary work zone signs and portable work zone signs. All of these devices shall be new. Used devices shall not be acceptable.

## Materials

### A) General

Use materials in accordance with the manufacturer's recommendations that will retain both durability and retroreflectivity as described elsewhere in this project special provision for a period of at least 36 months.

The following are required high visibility devices to be used for Work Zone Performance applications.

- Drums
- Skinny Drums (daytime use only)
- Stationary Work Zone Signs
- Rigid Portable Work Zone Signs

All drums and skinny drums shall be new and meet the existing requirements of Section 1089-5 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and shall have Grade B flexible fluorescent orange sheeting that meets the retroreflective requirements of Section 1092-2 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

All stationary work zone signs shall be new and meet the existing requirements of Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Legend overlays shall be prohibited and shall not be accepted on US 70 or associated intersecting roadways. Vertical sign post reflector strips shall be added to all stationary sign supports. Use Grade B fluorescent orange for work zone sign supports and Grade B fluorescent yellow for exit sign supports. Install strips a minimum of six inches in length on sign supports with one sign mounted at a minimum of 4.5 feet in length for sign supports with two or more signs mounted vertically.

All portable work zone signs shall be new and have composite substrates as described in Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Roll-up signs shall not meet the requirements of the project special provision. The remainder of the existing requirements of Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures* remain. Used sign stands will be acceptable.

### B) Material Qualifications / Certifications

Only use materials as listed above that are on the NCDOT Approved Products List. In addition, provide a Type 3 Material Certification for all materials in accordance with Section 106-3 and Section 1087-4 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

### (C) Performance

Poor performance of any device or sign at any site, whether or not related to a specific contract may be grounds for removing the material from the NCDOT Approved Products List and / or removing from any project under contract.

### **Construction Methods**

All requirements of Section 1110-3 and Section 1130-3 of the 2018 NCDOT *Standard Specifications for Roads and Structures* shall apply except roll-up signs shall not be permitted for use.

The use of skinny drums shall be prohibited for all nighttime lane closures on US 70.

### **Maintenance**

Replace any sign or drum that prematurely fails due to any damage or defect that causes it to perform unsatisfactorily with an “in kind” device of similar quality and age according to the guidelines set forth in the American Traffic Safety Service Association’s (ATSSA) Quality Guidelines for Work Zone Traffic Control Devices. An “in kind” replacement sign or drum is not required to be new, however, it shall be less than one year old and have 100% of its original sheeting area and at least 85% of the retroreflective qualities of a new device, so that it is undetectable adjacent to the original devices and signs placed on the project.

### **SEQUENTIAL FLASHING WARNING LIGHTS**

(10/08/2016) (Rev. 5/10/2021)

#### **Description**

In accordance with this RFP, the Design-Build Team shall furnish and install Sequential Flashing Warning Lights on drums used for merging tapers during nighttime lane closures on all multilane roadways with posted speed limits of 55 mph or higher.

#### **Materials**

The Sequential Flashing Warning Lights shall meet all of the requirements for warning lights within the current edition of the *Manual of Uniform Traffic Control Devices (MUTCD)*.

Each light unit shall be capable of operating fully and continuously for a minimum of 200 hours when equipped with a standard battery set.

Each light in the sequence shall be flashed at a rate of not less than 55 times per minute and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout the sequence.



Supply a Type 3 Certification (Independent Test Lab results) documenting all actual test results for the specified parameters contained in the Institute of Transportation Engineer's (ITE's) *Purchase Specification for Flashing and Steady Burn Warning Lights*. The laboratory shall also identify all manufacturer codes and part numbers for the incandescent lamp or LED clusters, lenses, battery, and circuitry, and the total width of the light with the battery in place. The complete assembly shall be certified as crashworthy when firmly affixed to the channelizing device.

All Sequential Flashing Warning Lights shall be on the NCDOT Approved Products List.

### **Construction Methods**

Sequential Flashing Warning Lights are to be used for night time lane closures on all multilane roadways with posted speed limits of 55 mph or higher.

These lights shall flash sequentially beginning with the first light and continuing until the final light.

The Sequential Flashing Warning Lights shall automatically flash in sequence when placed on the drums that form the merging taper.

The number of lights used in the drum taper shall equal the number of drums used in the taper.

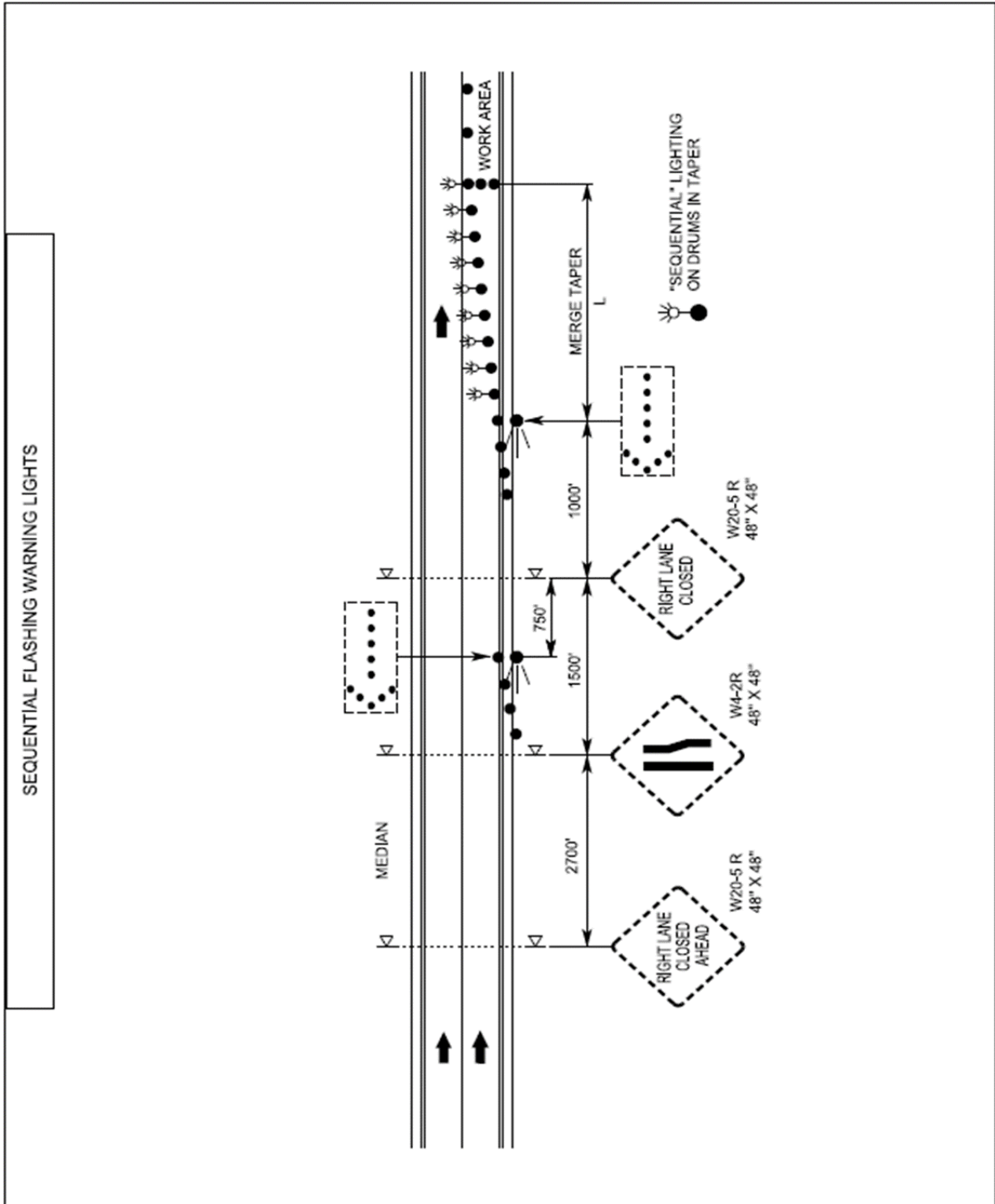
Sequential Flashing Warning Lights shall only be mounted on drums.

The Sequential Flashing Warning Lights shall be weather independent and visual obstructions shall not interfere with the operation of the lights.

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of ten to 100 feet.

If one light fails, the flashing sequence shall continue. If more than one light fails, all of the lights are to be automatically turned to the "off" mode. Non-sequential flashing is prohibited.

When lane closures are not in effect, the Sequential Flashing Warning Lights shall be deactivated.



**WORK ZONE PRESENCE LIGHTING**

(10/14/19) (Rev. 5/10/2021)

**Description**

The Design-Build Team shall furnish and install Work Zone Presence Lighting during nightly lane closures on multilane roadways with speed limits of 55 mph or greater.

**Materials**

Anti-glare lighting systems shall be required. Work Zone Presence Lighting shall be in addition to the Design-Build Team's Portable Construction Lighting. Work Zone Presence Lighting shall be installed in accordance with the detail below and the manufacturer's recommendations.

All Work Zone Presence Lighting shall be supplied with a power source to provide the light output as described in the chart below.

Each light unit shall be capable of providing a minimum of 14,000 lumens illuminating a minimum area of approximately 3,000 square feet. The light shall be capable of being elevated to a height of 14 feet above the pavement.

Each light unit support base or mounting stand shall have the capability of being leveled so that the light mast is plumb.

Provide Work Zone Presence Lighting listed on the NCDOT Approved Products List.

**Construction Methods**

Work Zone Presence Lighting may be prestaged (up to one hour prior to single lane closures and up to two hours prior to double and triple lane closures) along with other traffic control devices or installed within one hour after the necessary traffic control devices have been installed for the lane closure(s). At the end of the work night, the Work Zone Presence Lighting shall be removed within one hour before or one hour after the lane closure(s) is removed.

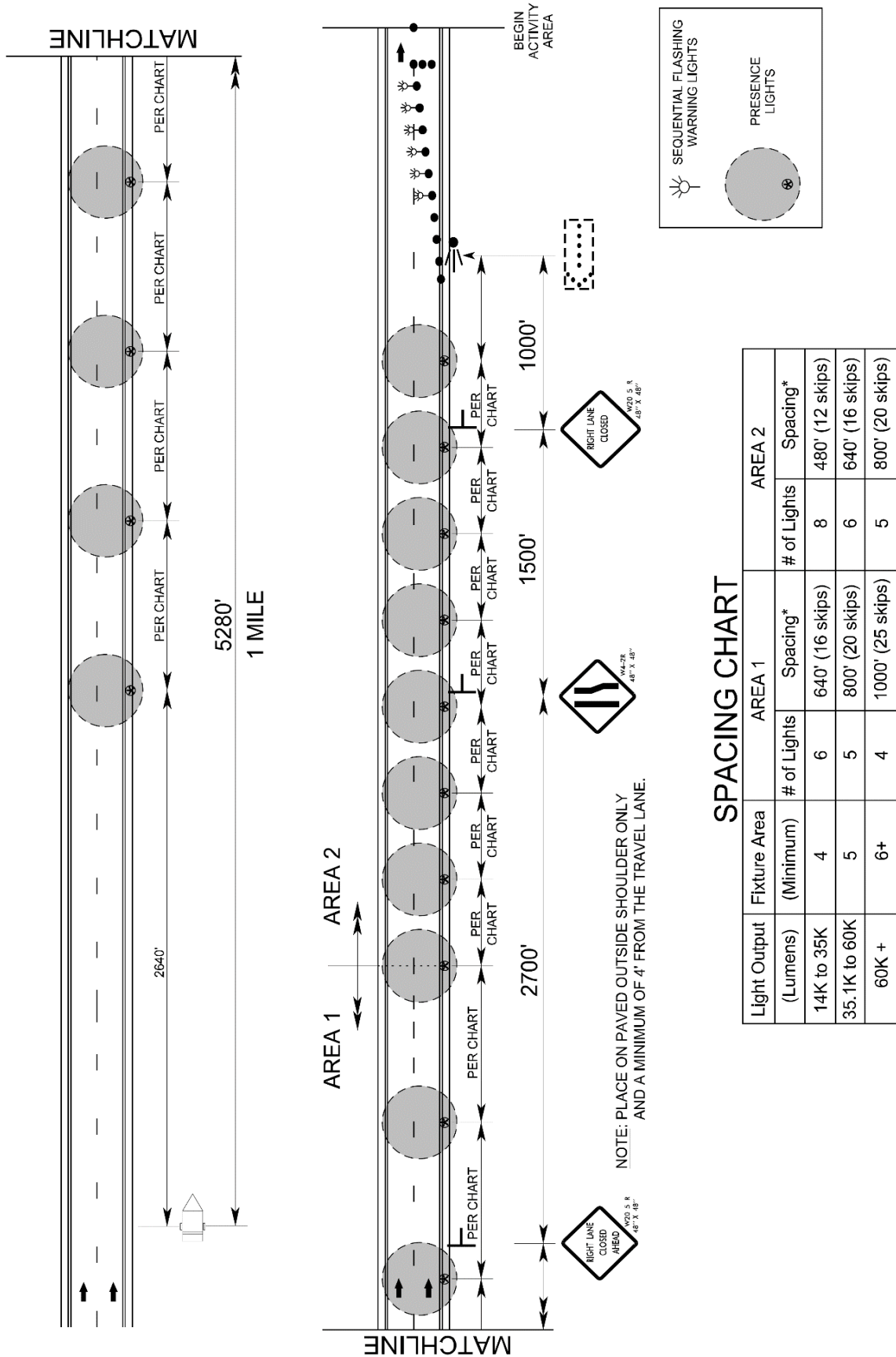
Whenever possible, each light unit shall be placed on the outside paved shoulder, a minimum of four feet from the travel lane, and spaced according to the chart for the amount of light output for each unit.

Work Zone Presence Lighting will be permitted to supplement the Portable Construction Lighting inside the lane closure. At no time shall Work Zone Presence Lighting be used in lieu of required Portable Construction Lighting.

If there is sufficient existing overhead lighting, in the Department's sole discretion, Work Zone Presence Lighting may be eliminated.

**Lighting Unit Installation Requirements**

The lighting units shall be installed and spaced in accordance with the detail below:



\*SKIPS REFER TO TRADITIONAL 10' PAVEMENT MARKING LINES WITH 30' GAPS.

AREA 1: BEGINS 2,640' DOWNSTREAM FROM CMS; EXTENDS TO JUST PAST 1ST LANE CLOSURE SIGN

AREA 2: BEGINS JUST PAST THE 1ST LANE CLOSURE SIGN; EXTENDS TO JUST PAST THE LAST LANE CLOSURE SIGN

**WORK ZONE DIGITAL SPEED LIMIT SIGNS**

(5/10/2021)

**Description**

In accordance with this RFP, The Design-Build Team shall furnish and install Work Zone Digital Speed Limit Signs on interstates and freeways with speed limits of 55 mph or greater. These signs are regulatory speed limit signs with LED displays for the speed limit numbers.

**Materials**

Work Zone Digital Speed Limit Signs shall be a minimum 36” wide x 48” high. The speed limit sign (R2-1) shall be black on white with high intensity white prismatic sheeting.

The Work Zone Digital Speed Limit Sign shall be mounted such that the bottom of the sign is seven feet above the roadway.

The LED panel shall be a minimum of 28” wide x 18” high. The display on the LED panel shall be amber or white.

The LED numbers shall have a minimum 5 wide by 7 high pixel array with a minimum height of 18”.

The LED panel shall have auto brightness / dimming capability.

The black on orange “WORK ZONE” sign shall be mounted above the speed limit sign. It shall be 36” wide x 24” high with high intensity prismatic orange sheeting.

The black on white “\$250 FINE” sign shall be mounted below the speed limit sign. It shall be 36” wide x 24” high with high intensity prismatic white sheeting.

All digital speed limit systems shall have operational software and wireless communications that allow remote operation and data monitoring. It shall be configured to allow access by the Engineer or their designee to change each sign independently or change the speed limit on all signs at once from a PC, tablet or cellular phone application.

Work Zone Digital Speed Limit Signs may be trailer mounted or stationary mounted. The unit shall be solar powered and have the ability to operate continuously. It shall be supplemented with a battery backup system which includes a 110/120 VAC powered on-board charging system.

When fully charged, the batteries shall be capable of powering the display for 20 continuous days with no solar power. The unit shall be capable of being powered by standard 110/120 VAC power source.

Store the battery bank and charging system in a lockable, weather and vandal resistant box.

Radar equipment to detect approaching speeds on the digital speed limit systems is optional. However, if the systems have radar, they will be equipped to store the detected speed data, this information should be available in a spreadsheet format that can be accessed remotely from a secure cloud location.

The Work Zone Digital Speed Limit systems shall have flashing beacons. The beacons shall be a minimum of eight-inch diameter LED circular yellow. They shall be mounted above and below the sign assemblies and shall be centered. The beacons shall alternately flash at rates not less than 50 or more than 60 times per minute.

In addition, the flashing beacons shall be mounted in such a manner that the \$250 Speeding Fine sign is not obscured when in operation.

All Work Zone Digital Speed Limit equipment shall be on the NCDOT Approved Products List.

### **Digital Speed Limit Displays**

The speed limit shall be continuously displayed on the signs. All other stationary speed limit signs shall be covered when Digital Speed Limit systems are in operation.

### ***Reduced Speed Limit Displays***

The Digital Speed Limit systems shall have beacons activated when the work zone speed limit is reduced. Otherwise, the beacons shall remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The Digital Speed Limit Signs shall display the reduced work zone speed limit without flashing the LED speed limit number unless approaching speeds are detected to be 6 mph or higher than the displayed speed limit. If speeds are detected 6 mph or higher than the displayed speed limit, the LED shall flash the speed limit until the speeds are within 6 mph of the displayed speed limit.

### ***Existing Speed Limit Displays***

When the existing speed limit is displayed on the Digital Speed Limit Signs, the beacons shall remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The speed limit number shall not flash unless the approaching speeds are detected to be 6 mph or higher than the displayed speed limit.

### **Construction Methods**

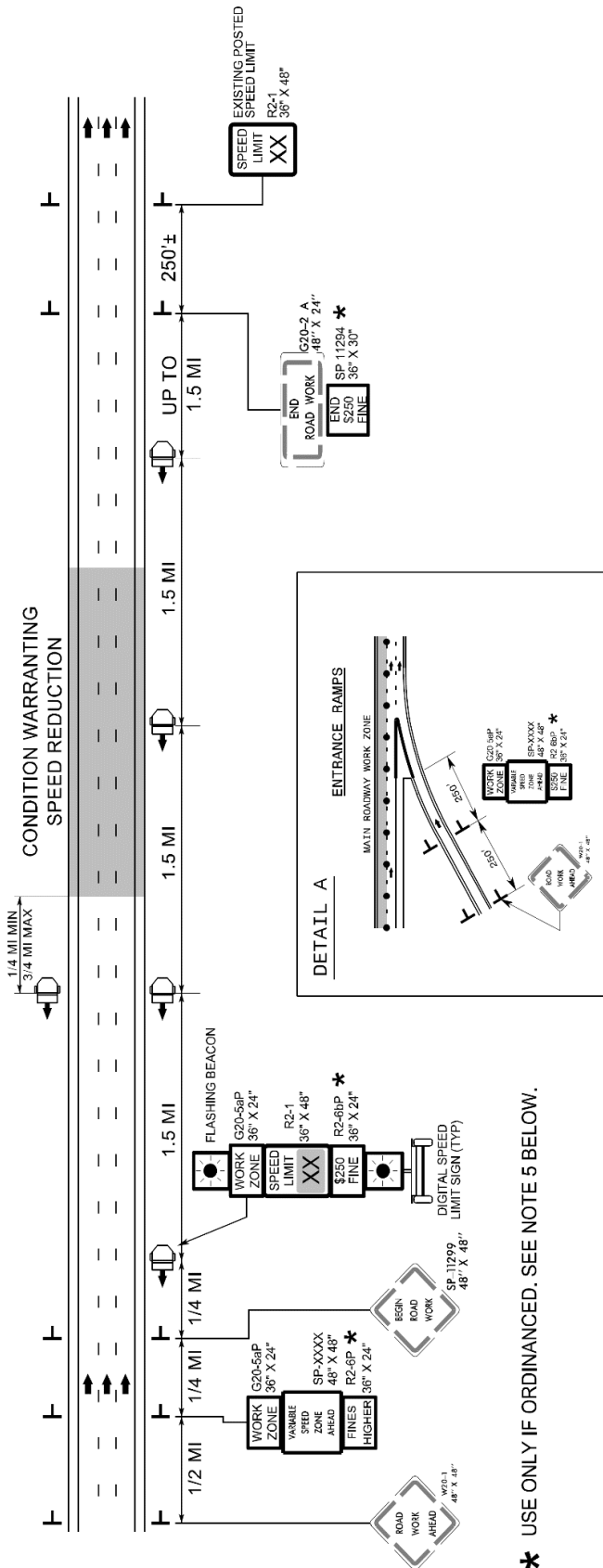
The speed limits shall be the sole authority of the NCDOT. An ordinance by the State Traffic Engineer is required for all speed limits in order to have a lawfully enforceable speed limit.

The Regional Traffic Engineering Office and the Division Construction Engineer in coordination with the Work Zone Traffic Control Section will provide all work zone speed limit recommendations based on activities and conditions.

The Design-Build Team shall be responsible for coordinating with the Engineer when the work zone speed limits are to be changed and shall obtain approval by the Engineer or their designee before the speed limit is changed.

Whenever possible, each trailer mounted unit shall be placed on the paved shoulder. All trailer mounted units shall have the capability of being leveled.





\* USE ONLY IF ORDINANCED. SEE NOTE 5 BELOW.

| WORK ZONE CONDITIONS  | SPEED TO DISPLAY (SEE NOTE 6 & 7) |
|---|-----------------------------------|
| 2 LANES REDUCED TO 1 LANE                                   | 55                                |
| 3 LANES REDUCED TO 1 LANE                                   | 55                                |
| 3 LANES REDUCED TO 2 LANES                                  | 60                                |
| 4 LANES REDUCED TO 1 LANE                                   | 55                                |
| 4 LANES REDUCED TO 2 LANES                                  | 60                                |
| 4 LANES REDUCED TO 3 LANES                                  | 65                                |
| 1 OPEN LANE WITH CONTINUOUS BARRIER ON BOTH SHOULDERS       | 95                                |
| 1 OPEN LANE WITH CONTINUOUS BARRIER ON 1 SHOULDER           | 60                                |
| 3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON BOTH SHOULDERS | 60                                |
| 3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON 1 SHOULDER     | 65                                |
| 4 OPEN LANES WITH BARRIER CONTINUOUS ON BOTH SHOULDERS      | 65                                |
| 4 OPEN LANES WITH BARRIER CONTINUOUS ON 1 SHOULDER          | EXISTING                          |
| UNEVEN LANES  | 60                                |

- LANE CLOSURES
- CONTINUOUS BARRIER (LENGTH OF BARRIER GREATER THAN 1 MILE)
- NOTES**
- THE DIGITAL SPEED LIMIT SIGNS WILL BE INSTALLED (TRAILER MOUNTED OR STATIONARY MOUNTED) IN ADVANCE OF AND SPACED APPROXIMATELY 1.5 MILES THROUGHOUT THE PROJECT LIMITS, UNLESS DIRECTED OTHERWISE.
  - WITHIN 1/4 TO 3/4 MILE UPSTREAM OF CONDITION WARRANTING A SPEED REDUCTION, PLACE A DIGITAL SPEED LIMIT SIGN ON BOTH THE INSIDE AND OUTSIDE SHOULDERS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. AT ALL OTHER LOCATIONS DOWNSTREAM, PLACE A SINGLE DIGITAL SPEED LIMIT SIGN ON THE OUTSIDE SHOULDER. IF SIGNS ARE NOT HIGHLY VISIBLE TO ALL MOTORISTS, SUPPLEMENTAL DIGITAL SPEED LIMIT SIGNS ARE PERMITTED ON THE MEDIAN SHOULDER.
  - THE DIGITAL SPEED LIMIT SIGNS TAKE PRECEDENCE OVER EXISTING SPEED LIMIT SIGNS AND SHOULD REMAIN UPRIGHT AND VISIBLE AT ALL TIMES. ALL EXISTING SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED FOR DURATION OF THE PROJECT.
  - NC DOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
  - THE WORK ZONE VARIABLE SPEED LIMIT AND THE \$260 SPEEDING PENALTY ARE SEPARATE ORDINANCES THAT MUST BE SIGNED BY THE STATE TRAFFIC ENGINEER TO BE VALID AND ENFORCEABLE. WITHOUT SIGNED ORDINANCES, THE SPEED LIMIT ON A FACILITY SHALL REMAIN UNCHANGED AND/OR HIGHER FINES SIGNS SHALL NOT BE USED.
  - THE REDUCED SPEED SHALL BE DISPLAYED A MINIMUM OF 1/4 MILE AND A MAXIMUM OF 3/4 MILE IN ADVANCE OF AND THROUGHOUT THE AREA MEETING CONDITIONS LISTED IN THE CHART. THE EXISTING SPEED LIMIT SHALL BE DISPLAYED ON ALL OTHER DIGITAL SPEED LIMIT SIGNS.
  - THE SPEED DISPLAYED SHALL BE THE LOWER OF THE EXISTING SPEED LIMIT OR THE SPEED IN THE WORK ZONE CONDITION CHART.
  - THE BEACONS ON THE DIGITAL SPEED LIMIT SIGNS SHALL ONLY FLASH DURING TIMES THE SPEED IS REDUCED, AND REMAIN OFF AT ALL OTHER TIMES.

| <p><b>SIGN NUMBER:</b> WZTC      <b>BACKG COLOR:</b> Fluorescent Orange<br/> <b>TYPE:</b> STATIONARY      <b>COPY COLOR:</b> Black<br/> <b>QUANTITY:</b> SEE PLANS</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> <p><b>SIGN WIDTH:</b> 4'-0"<br/> <b>HEIGHT:</b> 4'-0"<br/> <b>TOTAL AREA:</b> 16.0 Sq.Ft.</p> <p><b>BORDER TYPE:</b> INSET<br/> <b>RECESS:</b> 0.47"<br/> <b>WIDTH:</b> 0.63"<br/> <b>RADII:</b> 1.5"</p> <p><b>NO. Z BARS:</b> 2      <b>MAT'L:</b> 0.080" (2.0 mm) ALUMINUM<br/> <b>LENGTH:</b> 40.0</p>   | SYMBOL | X   | Y   | WID | HT  |     |      |     |     |  |  |                            |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     | <p><b>DESIGN BY:</b> J.Navarrete<br/> <b>PROJECT ID:</b>      <b>CHECKED BY:</b>      <b>May 13, 2019</b><br/> <b>LOCATION:</b>      <b>DIV:</b> DIV</p> <div style="text-align: center;"> <p><b>BORDER</b> 5.4" 37.3" 5.3"<br/> <b>R</b>=1.5"<br/> <b>TH</b>=0.63"<br/> <b>IN</b>=0.47"</p> </div> | <p><b>USE NOTES:</b> 1,2</p> <p>1. Legend and border shall be direct applied black non-reflective sheeting.<br/> 2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.</p> <p style="text-align: right;">Spacing Factor is 1 unless specified otherwise</p> |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| SYMBOL   | X      | Y   | WID   | HT  |     |     |      |     |     |  |  |                            |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p><b>LETTER POSITIONS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="12" style="text-align: center;">Letter spacings are to start of next letter</th> <th style="text-align: center;">Series/Size<br/>Text Length</th> </tr> <tr> <th>V</th> <th>A</th> <th>R</th> <th>E</th> <th>I</th> <th>A</th> <th>B</th> <th>L</th> <th>E</th> <th>D</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>5.4</td> <td>4.9</td> <td>6</td> <td>5.1</td> <td>1.9</td> <td>6</td> <td>5.1</td> <td>4.6</td> <td>3.7</td> <td>5.3</td> <td></td> <td></td> <td></td> <td>D 2000</td> </tr> <tr> <td></td> <td>S</td> <td>P</td> <td>E</td> <td>E</td> <td>D</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>37.3</td> </tr> <tr> <td></td> <td>12.2</td> <td>5.1</td> <td>5</td> <td>4.7</td> <td>4.7</td> <td>4.1</td> <td>12.1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>D 2000</td> </tr> <tr> <td></td> <td></td> <td>Z</td> <td>O</td> <td>N</td> <td>E</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>23.6</td> </tr> <tr> <td></td> <td>14.2</td> <td>5</td> <td>5.6</td> <td>5.5</td> <td>3.7</td> <td>14</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>D 2000</td> </tr> <tr> <td></td> <td></td> <td>A</td> <td>H</td> <td>E</td> <td>A</td> <td>D</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>19.8</td> </tr> <tr> <td></td> <td>11.2</td> <td>6</td> <td>5.5</td> <td>4.2</td> <td>6</td> <td>4.1</td> <td>11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>D 2000</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>25.8</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> 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   |     |     |  |  |                            |   |  | Series/Size<br>Text Length | V | A | R | E | I | A | B | L | E | D |  |  |  |  | 5.4 | 4.9   | 6  | 5.1 | 1.9 | 6 | 5.1 | 4.6 | 3.7 | 5.3 |  |  |  | D 2000 |  | S | P | E | E | D |  |  |  |  |  |  |  | 37.3 |  | 12.2 | 5.1 | 5 | 4.7 | 4.7 | 4.1 | 12.1 |  |  |  |  |  | D 2000 |  |  | Z | O | N | E |  |  |  |  |  |  |  | 23.6 |  | 14.2 | 5 | 5.6 | 5.5 | 3.7 | 14 |  |  |  |  |  |  | D 2000 |  |  | A | H | E | A | D |  |  |  |  |  |  | 19.8 |  | 11.2 | 6 | 5.5 | 4.2 | 6 | 4.1 | 11 |  |  |  |  |  | D 2000 |  |  |  |  |  |  |  |  |  |  |  |  |  | 25.8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| Letter spacings are to start of next letter  |        |     |   |     |     |     |      |     |     |  |  | Series/Size<br>Text Length |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| V  | A      | R   | E   | I   | A   | B   | L    | E   | D   |  |  |                            |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5.4  | 4.9    | 6   | 5.1   | 1.9 | 6   | 5.1 | 4.6  | 3.7 | 5.3 |  |  |                            | D 2000  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | S      | P   | E   | E   | D   |     |      |     |     |  |  |                            | 37.3  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 12.2   | 5.1 | 5   | 4.7 | 4.7 | 4.1 | 12.1 |     |     |  |  |                            | D 2000  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |        | Z   | O   | N   | E   |     |      |     |     |  |  |                            | 23.6  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 14.2   | 5   | 5.6   | 5.5 | 3.7 | 14  |      |     |     |  |  |                            | D 2000  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |        | A   | H   | E   | A   | D   |      |     |     |  |  |                            | 19.8  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 11.2   | 6   | 5.5   | 4.2 | 6   | 4.1 | 11   |     |     |  |  |                            | D 2000  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |        |     |   |     |     |     |      |     |     |  |  |                            | 25.8  |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |        |     |   |     |     |     |      |     |     |  |  |                            |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |        |     |   |     |     |     |      |     |     |  |  |                            |   |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p><b>FILENAME:</b> Special Signs 7</p>  |        |     |   |     |     |     |      |     |     |  |  |                            | <p><b>NORTH CAROLINA D.O.T. SIGN DETAIL</b></p> |  |                            |   |   |   |   |   |   |   |   |   |   |  |  |  |  |     |   |  |     |     |   |     |     |     |     |  |  |  |        |  |   |   |   |   |   |  |  |  |  |  |  |  |      |  |      |     |   |     |     |     |      |  |  |  |  |  |        |  |  |   |   |   |   |  |  |  |  |  |  |  |      |  |      |   |     |     |     |    |  |  |  |  |  |  |        |  |  |   |   |   |   |   |  |  |  |  |  |  |      |  |      |   |     |     |   |     |    |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**WORK ZONE PERFORMANCE PAVEMENT MARKINGS**

(10/08/2016) (Rev. 01/05/21)

**Description**

The Design-Build Team shall furnish and install Work Zone Performance pavement markings that delineate the travel way for work zone traffic patterns on high speed (55 mph or greater) facilities and or facilities that have traffic volumes greater than 50,000 ADT. The purpose of Work Zone Performance pavement marking is to provide a more durable work zone pavement marking that shall last the full duration of a traffic pattern without requiring replacement or reapplication for a period of up to 12 months. The Work Zone Performance pavement markings shall also provide a higher retroreflectivity performance level, throughout the required 12-month duration, than standard traffic paints to improve nighttime work zone visibility.

**Materials****a) General**

Use materials in accordance with the manufacturer's recommendations that shall retain both durability and a minimum retroreflectivity, as described elsewhere in this RFP, for a period of at least 12 months.

The Work Zone Performance pavement markings shall be manufactured to bond successfully to both concrete and asphalt pavements. The pavement marking materials shall be applied in a single application. The following are approved materials to be used for Work Zone Performance pavement markings:

- Polyurea (for use on concrete pavement only)
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type 4)

When using Cold Applied Plastic Type 4 pavement markings, place temporary raised markers half on and half off edge lines and centerlines to help secure the tape to the roadway. Markers shall be spaced the appropriate distance apart as described by the 2018 Roadway Standard Drawing No. 1250.01, Sheet 1 of 3.

**b) Material Qualifications / Certifications**

The Design-Build Team shall only use Work Zone Performance pavement marking materials, as listed above, that are on the NCDOT Approved Products List at the time of installation. In accordance with Article 106-3, and Section 1087-4 of the 2018 NCDOT *Standard Specifications for Roads and Structures*, the Design-Build Team shall provide a

Type 3 Material Certification for all materials, and a Type 3 and Type 4 certification for all reflective media.

### c) Performance

Poor performance of Work Zone Performance pavement marking materials at any site, whether or not related to a specific contract, may be grounds for removing the material from the NCDOT Approved Products List.

### Construction Methods

The Design-Build Team shall not use hand applied methods or any other non-truck mounted application equipment / device to install Work Zone Performance pavement markings for applications longer than 1000 feet.

All Work Zone Performance pavement markings shall be installed in a single application. Multiple passes shall not be allowed.

### a) Testing Procedures.

All Work Zone Performance pavement markings will be tested by the Department through an independent Mobile Retroreflective Contractor. The Work Zone Performance pavement markings will be scanned to ensure the retroreflectivity requirements in **Section c** below are met.

### b) Application Equipment

Application equipment shall be in accordance with Section 1205 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

### c) Material Application

The Work Zone Performance pavement marking material shall be applied at the following minimum thicknesses:

- Polyurea = 20 mils wet
- Epoxy = 20 mils wet
- Thermoplastic (Extruded or Sprayed) = 50 mils wet
- Polymer = 20 mils wet
- Cold Applied Plastic (IV) = Manufacturer's recommendation

The Work Zone Performance pavement marking line widths for interstates and freeways shall be as follows:

- Edge lines, Solid Lane Lines, Skip and Mini-Skip Lines = 6"
- Gorelines = 12"

The Work Zone Performance pavement marking line widths for all other facilities shall be four inches.

“No track” dry times for the liquid systems shall be ten minutes or shorter. Traffic shall not be placed on any material until it is sufficiently dry / cured to eliminate wheel tracking.

The minimum level of retroreflectivity for all Work Zone Performance pavement marking system selected shall be as follows:

**Reflectometer Requirements for Work Zone “Performance” Pavement Markings**

| <b>Color</b> | <b>Initial</b>             | <b>6 Months</b>            | <b>12 Months</b>           |
|--------------|----------------------------|----------------------------|----------------------------|
| White        | 375 mcd/lux/m <sup>2</sup> | 275 mcd/lux/m <sup>2</sup> | 150 mcd/lux/m <sup>2</sup> |
| Yellow       | 250 mcd/lux/m <sup>2</sup> | 150 mcd/lux/m <sup>2</sup> | 100 mcd/lux/m <sup>2</sup> |

For the initial installation and the durations noted in the chart above, the Work Zone Performance pavement markings shall adhere to the corresponding retroreflectivity levels.

The Design-Build Team shall notify the Engineer, in writing, a minimum of 7 - 10 days prior to the installation of Work Zone Performance pavement markings. The Department will measure initial retroreflectivity levels with a mobile retroreflector within 30 days after placement to ensure compliance with the reflectivity levels in the chart above.

Work Zone Performance pavement markings shall maintain the retroreflectivity levels for the durations noted above. If the markings appear to be non-performing, in the Engineer’s sole discretion, the Engineer may request additional retroreflectivity readings to be performed by the Department. If and when this becomes necessary, the same notification procedure as described above shall be used to have Work Zone Performance pavement markings measured by a Mobile Retroreflective Contractor.

If measured and found to be noncompliant, the Design-Build Team shall replace the Work Zone Performance pavement markings at no cost to the Department.

All Work Zone Performance pavement markings shall be durable enough to withstand a single snow event without showing excessive fatigue in either bonding or retroreflectivity. The Design-Build Team shall replace the Work Zone Performance pavement markings if a single snowplow event results in more than 25% of the pavement marking edgelines or skips being physically removed and / or the Work Zone Performance pavement markings do not meet the following minimum retroreflectivity values:

### **Reflectometer Requirements for Work Zone Performance Pavement Markings after a Single Snowplowed Event**

| <b>Color</b> | <b>MINIMUM</b>             |
|--------------|----------------------------|
| White        | 150 mcd/lux/m <sup>2</sup> |
| Yellow       | 100 mcd/lux/m <sup>2</sup> |

Unless the temporary traffic pattern is to be modified within 30 days, the Design-Build Team shall replace all non-compliant Work Zone Performance pavement markings within 30 days of determining they are non-compliant.

If the work zone experiences more than one snow event requiring snowplowing, the retroreflectivity values in the chart above will no longer apply. The Engineer will determine if the pavement markings are performing adequately and / or if replacement is necessary due to excessive damage caused solely by snowplow activities. If the Work Zone Performance pavement markings are found to be deficient, solely in the Engineer's discretion, they shall be replaced. In such case, the Work Zone Performance pavement markings will be paid for as extra work in accordance with Subarticle 104-8-(A) of the NCDOT *Standard Specifications for Roads and Structures* at the unit price of \$0.40 per linear foot. Unless the temporary traffic pattern is to be modified within 30 days, the Design-Build Team shall replace all Work Zone Performance pavement markings damaged due to multiple snowplow events within 30 days.

If the Work Zone Performance pavement markings need to remain in place longer than 12 months, the markings shall be scanned by a Mobile Retroreflective Contractor. If the Work Zone Performance pavement markings meet or exceed the 12-month retroreflectivity requirements noted above, the markings can remain in place. If the Work Zone Performance pavement markings do not meet or exceed the 12-month retroreflectivity requirements noted above, the Design-Build Team shall replace the Work Zone Performance pavement markings within 15 days of the 12-month duration date at no cost to the Department. If and when this becomes necessary, the same notification procedure as described above shall be used to have Work Zone Performance pavement markings measured by a Mobile Retroreflective Contractor.

#### **d) Surface Preparation**

Prior to installation, all pavement surfaces to receive Work Zone Performance pavement markings shall be swept clean and prepared in accordance with the Manufacturer's recommendation.

#### **e) Temperature and Weather Limitations**

Work Zone Performance pavement markings shall only be applied when the ambient air temperature and the pavement temperature are 50° F or higher for thermoplastic and are 40° F or higher for all other materials. The Design-Build Team shall not install Work Zone Performance pavement markings unless the pavement surface is completely dry. The Design-

Build Team shall not install Work Zone Performance pavement markings within four hours of a heavy rain event, (rainfall intensities equal to or greater than 1 inch / per hour).

In the event a traffic shift must occur when the air and / or pavement temperatures are below the aforementioned minimums and / or a rain event occurs four hours prior to or during a planned traffic shift, the Design-Build Team may install temporary pavement marking paint, at the Engineer's sole discretion. Temporary pavement marking paint shall be applied in one application and shall produce a four-inch wide line at 15 mils (wet). Beads that provide the following minimum retroreflectivity shall be applied to the temporary pavement marking paint:

|         |                                |
|---------|--------------------------------|
| White:  | 225 mcd / lux / m <sup>2</sup> |
| Yellow: | 200 mcd / lux / m <sup>2</sup> |

The temporary pavement marking paint with beads shall maintain the minimum retroreflectivity noted above until placement of the Work Zone Performance pavement markings.

The Design-Build Team shall replace / reapply temporary pavement marking paint with beads that does not adhere to the retroreflectivity requirements noted above at no cost to the Department. The Design-Build Team shall apply the Work Zone Performance pavement markings within 90 days of installing the temporary pavement marking paint with beads.

Excluding damage due solely to snowplow events, the Design-Build Team shall replace all Work Zone Performance pavement material that debonds and / or does not adhere to the retroreflectivity levels for the corresponding durations noted above at no cost to the Department.

## **TYPICAL MEDIAN ACCESS AREAS**

(12/18/18)

### **Description**

Perform the work covered by this section including, but not limited to, constructing, maintaining, and removing Typical Median Access Areas for construction vehicle ingress to and egress from the median to / from active travel lanes on US 70.

Typical Median Access Areas are not required when construction vehicle ingress and egress is conducted using lane closures as shown on 2018 Roadway Standard Drawing No. 1101.05, Sheet 2 of 2.

### **Materials**

Refer to Divisions 6, 10, 11, 12, and 17 in the 2018 *Standard Specifications for Roads and Structures*.

Provide temporary traffic control devices listed on the NCDOT Approved Products List (APL).

Provide Work Zone Performance Pavement Markings (Reference the *Work Zone Performance Pavement Markings* Project Special Provision found elsewhere in this RFP)

Provide High Visibility Devices (Reference the *High Visibility Devices* Project Special Provision found elsewhere in this RFP)

### **Flashing Beacon and Detection System**

#### **(A) General**

Provide flashing beacon and detection system components listed on the NCDOT ITS and Signals Qualified Products List (QPL).

Provide a trailer mounted flashing beacon and warning sign assembly that meets or exceeds the physical and operational requirements of the MUTCD, or other mounting method approved by the Department. The following specifications supplement those basic requirements.

- Provide a totally mobile complete unit capable of being located as traffic conditions demand.
- The warning sign height shall comply with 2018 Roadway Standard Drawing No. 1110.01, Sheet 1 of 3, when raised in the upright position.
- The flashing beacon housing assembly shall be of weather resistant construction.

#### **(B) Power System**

Provide a unit that is solar powered and supplemented with a battery backup system that includes a 110/120 VAC powered on-board charging system.

The unit shall also be capable of being powered by standard 110/120 VAC power source.

The batteries, when fully charged, shall be capable of powering the display for 20 continuous days with no solar power.

Store the battery bank and charging system in a lockable, weather, and vandal resistant box.

#### **(C) Controller**

Provide automatic brightness / dimming of the display and a manual override dimming switch.

The controller shall provide a battery-charge status indicator.



Mobile radio or any other radio transmissions shall not affect the controller.

Store the controller in a lockable, weather and vandal resistant box.

#### **(D) Trailer**

Finish all exterior metal surfaces with Federal orange enamel per Federal Standard 595a, color chip ID# 13538 or 12473 respectively. The trailer shall be able to support a 100 mph wind load with the display fully extended.

The trailer shall be equipped with leveling jacks capable of stabilizing the unit in a horizontal position when located on slopes 6:1 or flatter.

The trailer shall be properly equipped in compliance with North Carolina Law governing motor vehicles.

Provide a minimum four-inch wide strip of fluorescent orange retroreflective sheeting to the frame of the trailer. Apply the sheeting to all sides of the trailer. The retroreflective sheeting shall be Grade B that conforms to Article 1092-2 in the 2018 *Standard Specifications for Roads and Structures*. Drums may be supplemented around the unit in place of the sheeting.

#### **(E) Reliability**

Provide a sign unit, flashing beacons, and detection system with all components rated to operate at temperatures ranging from -30° F to 165° F.

#### **Construction Methods**

See Typical Median Access Detail below.

#### **Temporary Acceleration Lane**

Construct a temporary acceleration lane with a minimum length of 1720 feet and a minimum clear width of 12 feet from the face of the positive protection to the active travel lanes. At least 920 feet of parallel merge / diverge area shall be required adjacent to the active travel lanes, in addition to a 300-foot merging taper and a 500-foot channelized acceleration area that includes a 100-foot detection area. The channelized acceleration and detection areas shall have positive protection separating them from the active travel lanes and shall not overlap the 920 feet of parallel merge / diverge area.

For the proposed traffic volumes and durations in areas of temporary median access for construction traffic, the Design-Build Team shall 1) evaluate and upgrade the existing pavement structure, as needed, and 2) design all temporary pavement, in accordance with the Pavement Management Scope of Work found elsewhere in this RFP

Using Work Zone Performance Pavement Markings, install 12-inch yellow diagonal lines (2:1 slope) at 100-foot intervals throughout the upstream half of the parallel merge / diverge area, and at 55-foot intervals throughout the downstream half of the parallel merge / diverge area. Remove any conflicting markings in accordance with Section 1205 of the 2018 *Standard Specifications for Roads and Structures*.

#### Flashing Beacons and Detection System

Provide High Visibility advance warning signage as shown in the details below. Provide a flashing beacon system with two (2) flashing lights per sign to alert motorists in the active travel lanes of work vehicles entering from the median.

Provide a non-intrusive detection system capable of detecting vehicles in the work area at least 400 feet in advance of the parallel merge / diverge area. The detection system shall be programmed such that passing public traffic in active travel lanes and vehicles in the work area not intending to use the parallel merge / diverge area are not detected.

Once detection occurs, the beacons on the advance warning sign(s) shall begin flashing immediately at a rate of not less than 50 or more than 60 times per minute. The beacons on the advance warning sign(s) shall flash continuously in an alternating pattern at all times that work vehicles are detected. The beacons shall continue flashing for thirty (30) seconds after detection ceases before turning off, and personnel on site shall have the ability to adjust this time based on field conditions. The flashing beacon system shall remain dark when idle.

Expedite repairs due to failure, malfunction or damage to the flashing beacons and / or detection system. Furnish another flashing beacon system or detection system approved by the Department during the repair time. Repair or replace flashing beacon system and / or detection systems immediately; otherwise, suspend all construction activities requiring the use of the Median Access Area until the flashing beacon system and / or detection system is restored to operation.

Perform all maintenance operations recommended by the manufacturer of the flashing beacon system and detection system.

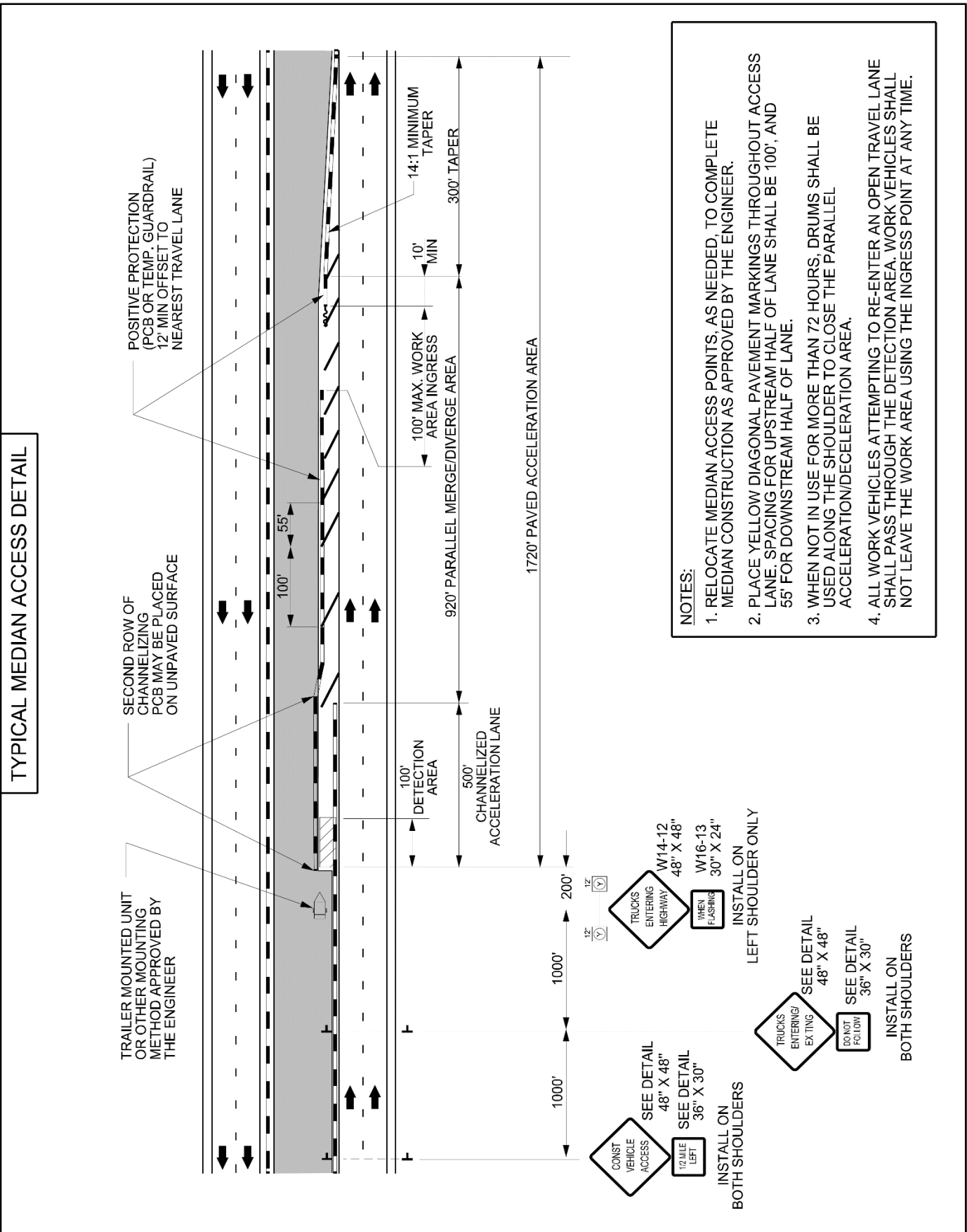
#### **Location, Placement, and Use**

Typical Median Access Areas shall not be located within one-half (1/2) mile of any interchange acceleration or deceleration lanes, unless approved by the Department. All proposed locations for Typical Median Access Areas shall be reviewed and approved by the Department prior to installation.

Work vehicles using a particular Median Access Area shall not utilize any interchange ramp (on-ramp or off-ramp) within one (1) mile of the Median Access area.

Typical Median Access Areas installed in accordance with this section will not require the use of temporary lane closures for ingress / egress of work vehicles.

The Design-Build Team shall comply with multiple and single vehicle hauling restrictions as shown in the TMP when performing hauling of equipment or materials to or from the project while using Typical Median Access Areas.



- NOTES:**
1. RELOCATE MEDIAN ACCESS POINTS, AS NEEDED, TO COMPLETE MEDIAN CONSTRUCTION AS APPROVED BY THE ENGINEER.
  2. PLACE YELLOW DIAGONAL PAVEMENT MARKINGS THROUGHOUT ACCESS LANE. SPACING FOR UPSTREAM HALF OF LANE SHALL BE 100', AND 55' FOR DOWNSTREAM HALF OF LANE.
  3. WHEN NOT IN USE FOR MORE THAN 72 HOURS, DRUMS SHALL BE USED ALONG THE SHOULDER TO CLOSE THE PARALLEL ACCELERATION/DECELERATION AREA.
  4. ALL WORK VEHICLES ATTEMPTING TO RE-ENTER AN OPEN TRAVEL LANE SHALL PASS THROUGH THE DETECTION AREA. WORK VEHICLES SHALL NOT LEAVE THE WORK AREA USING THE INGRESS POINT AT ANY TIME.

| SIGN NUMBER: WZTC<br>TYPE: STATIONARY<br>QUANTITY: SEE PLANS<br>SIGN WIDTH: 5'-6"<br>HEIGHT: 5'-6"<br>TOTAL AREA: 30.3 Sq.Ft.<br>BORDER TYPE: INSET<br>RECESS: 0"<br>WIDTH: 0"<br>RADII: 0"<br>NO. Z BARS: 2<br>LENGTH: 58.0 | BACKG COLOR: Fluorescent Orange<br>COPY COLOR: Black<br>SYMBOl: <table border="1"> <thead> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> MAT'L: 0.080" (2.0 mm) ALUMINUM | SYMBOL | X   | Y  | WID | HT |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | DESIGN BY: J. Navarrete<br>PROJECT ID: I5922<br>CHECKED BY:<br>LOCATION: | Mar 14, 2018<br>DIV: WZTC |
|--|---|--------|-----|----|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---------------------------|
| SYMBOL   | X   | Y      | WID | HT |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                           |
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Spacing Factor is 1 unless specified otherwise

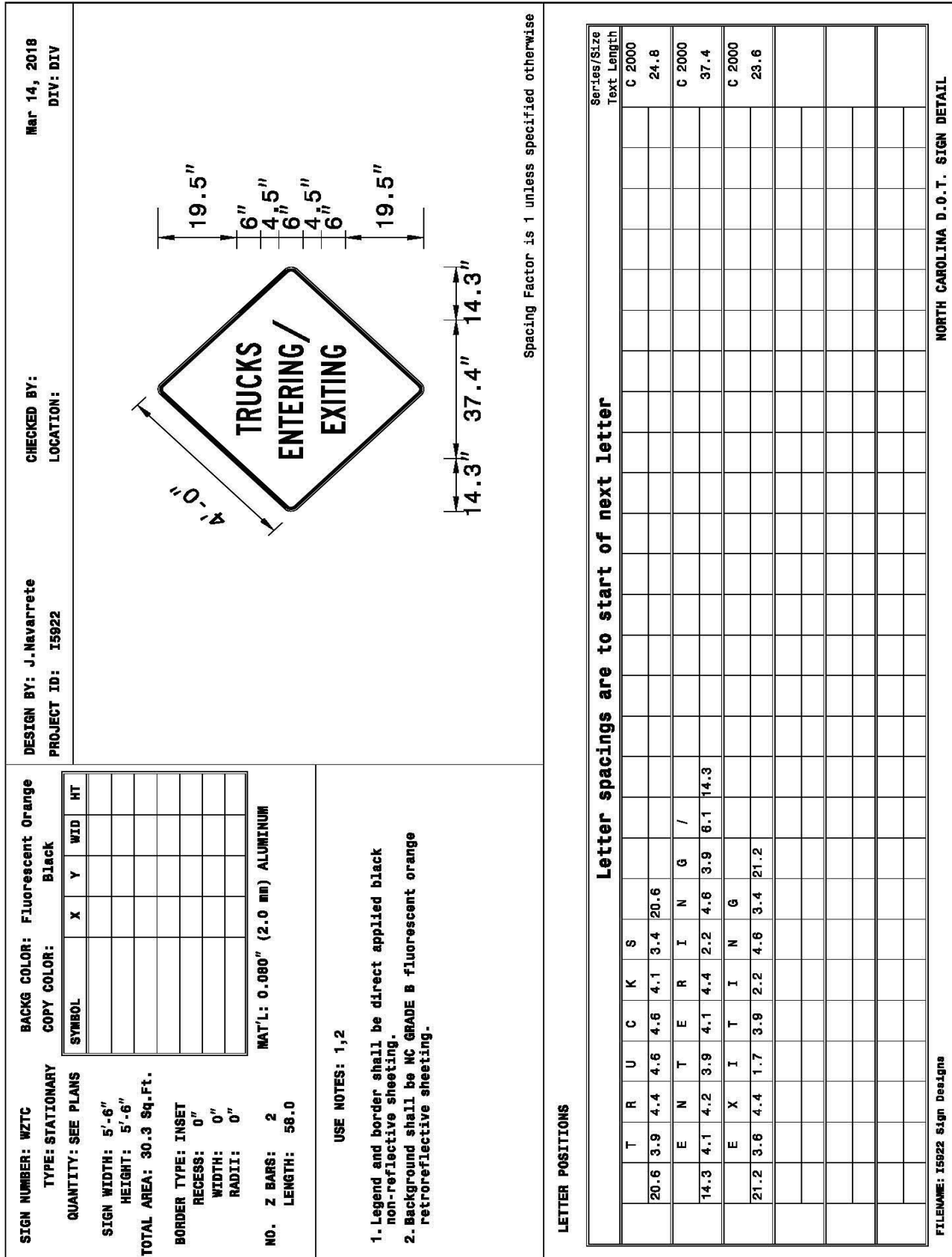
USE NOTES: 1,2

- Legend and border shall be direct applied black non-reflective sheeting.
- Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

| LETTER POSITIONS |     |     |     |     |   |      |      |      |  |  |  |  |                            |
|------------------|-----|-----|-----|-----|---|------|------|------|--|--|--|--|----------------------------|
| C                | O   | N   | S   | T   | Letter spacings are to start of next letter |      |      |      |  |  |  |  | Series/Size<br>Text Length |
| 22.7             | 4.4 | 4.7 | 4.4 | 3.9 | 3.1   | 22.7 |      |      |  |  |  |  | C 2000                     |
|                  |     |     |     |     |   |      |      |      |  |  |  |  | 20.5                       |
|                  |     |     |     |     |   |      |      |      |  |  |  |  | C 2000                     |
| 19.6             | 4.6 | 4.1 | 4.7 | 2   | 4.6   | 3.9  | 3.1  | 19.6 |  |  |  |  | 26.9                       |
|                  |     |     |     |     |   |      |      |      |  |  |  |  | C 2000                     |
| 20.6             | 4.6 | 4.4 | 4.6 | 3.8 | 4.1   | 3.4  | 20.6 |      |  |  |  |  | 24.8                       |
|                  |     |     |     |     |   |      |      |      |  |  |  |  |                            |
|                  |     |     |     |     |   |      |      |      |  |  |  |  |                            |
|                  |     |     |     |     |   |      |      |      |  |  |  |  |                            |
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FILENAME: I5922 Sign Designs  
 NORTH CAROLINA D.O.T. SIGN DETAIL

| <p><b>SIGN NUMBER:</b> WZTC<br/> <b>TYPE:</b> STATIONARY<br/> <b>QUANTITY:</b> SEE PLANS</p>   | <p><b>BACKG COLOR:</b> Fluorescent Orange<br/> <b>COPY COLOR:</b> Black</p> <table border="1"> <thead> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> | SYMBOL   | X   | Y   | WID | HT  |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     | <p><b>DESIGN BY:</b> J.Navarrete<br/> <b>PROJECT ID:</b> I5922<br/> <b>CHECKED BY:</b><br/> <b>LOCATION:</b><br/> <b>Mar 14, 2018</b><br/> <b>DIV:WZTC</b></p> |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| SYMBOL   | X   | Y  | WID | HT  |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p><b>SIGN WIDTH:</b> 3'-0"<br/> <b>HEIGHT:</b> 2'-6"<br/> <b>TOTAL AREA:</b> 7.5 Sq.Ft.</p> <p><b>BORDER TYPE:</b> INSET<br/> <b>RECESS:</b> 0.47"<br/> <b>WIDTH:</b> 0.63"<br/> <b>RADII:</b> 1.5"</p> <p><b>NO. Z BARS:</b><br/> <b>LENGTH:</b></p>   |   | <p><b>USE NOTES:</b> 1,2</p> <ol style="list-style-type: none"> <li>Legend and border shall be direct applied black non-reflective sheeting.</li> <li>Background shall be NC GRADE B fluorescent orange retroreflective sheeting.</li> </ol> |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>Spacing Factor is 1 unless specified otherwise</p>  |   |  |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>LETTER POSITIONS</b></p>   |   |  |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Letter spacings are to start of next letter</b></p>  |   |  |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th></th> <th></th> <th>M</th> <th>I</th> <th>L</th> <th>E</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Series/Size<br/>Text Length</th> </tr> </thead> <tbody> <tr> <td>1/2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>C 2000</td> </tr> <tr> <td>6.6</td> <td>5.9</td> <td>5</td> <td>4.4</td> <td>1.8</td> <td>3.3</td> <td>2.6</td> <td>6.6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>22.9</td> </tr> <tr> <td></td> <td></td> <td>L</td> <td>E</td> <td>F</td> <td>T</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>C 2000</td> 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|  |   | M  | I   | L   | E   |     |     |   |  |  |  |  |  |  |  |  |  |  |  | Series/Size<br>Text Length |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1/2  |   |  |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  | C 2000                     |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.6  | 5.9   | 5  | 4.4 | 1.8 | 3.3 | 2.6 | 6.6 |   |  |  |  |  |  |  |  |  |  |  |  | 22.9                       |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |   | L  | E   | F   | T   |     |     |   |  |  |  |  |  |  |  |  |  |  |  | C 2000                     |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 12  | 3.3  | 3.4 | 2.8 | 2.8 | 12  |     |   |  |  |  |  |  |  |  |  |  |  |  | 12.1                       |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>FILENAME: I5922 Sign Design NORTH CAROLINA D.O.T. SIGN DETAIL</p>   |   |  |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |  |  |                            |  |  |                            |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |     |     |   |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |    |     |     |     |     |    |  |  |  |  |  |  |  |  |  |  |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



| <p><b>SIGN NUMBER:</b> WZTC      <b>BACKG COLOR:</b> Fluorescent Orange<br/> <b>TYPE:</b> STATIONARY      <b>COPY COLOR:</b> Black<br/> <b>QUANTITY:</b> SEE PLANS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <p><b>SIGN WIDTH:</b> 3'-0"<br/> <b>HEIGHT:</b> 2'-6"<br/> <b>TOTAL AREA:</b> 7.5 Sq.Ft.</p> <p><b>BORDER TYPE:</b> INSET<br/> <b>RECESS:</b> 0.47"<br/> <b>WIDTH:</b> 0.63"<br/> <b>RADII:</b> 1.5"</p> <p><b>NO. Z BARS:</b><br/> <b>LENGTH:</b></p> <p><b>MAT'L:</b> 0.080" (2.0 mm) ALUMINUM</p>   | SYMBOL | X   | Y   | WID | HT  |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <p><b>BORDER</b><br/> <b>R=1.5"</b><br/> <b>TH=0.63"</b><br/> <b>IN=0.47"</b></p> | <p><b>CHECKED BY:</b> Mar 14, 2018<br/> <b>LOCATION:</b> DIV:WZTC</p> <p><b>DESIGN BY:</b> J. Navarrete<br/> <b>PROJECT ID:</b> 15922</p> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| SYMBOL  | X      | Y   | WID   | HT  |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>USE NOTES:</b> 1,2</p> <p>1. Legend and border shall be direct applied black non-reflective sheeting.<br/>                 2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.</p>   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>Spacing Factor is 1 unless specified otherwise</p>   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>LETTER POSITIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="7">Letter spacings are to start of next letter</th> <th>Series/Size<br/>Text Length</th> </tr> </thead> <tbody> <tr> <td>7.2</td> <td>3.7</td> <td>3</td> <td>5</td> <td>3.8</td> <td>3.6</td> <td>2.6</td> <td>7.2</td> <td>C 2000<br/>21.6</td> </tr> <tr> <td>7.9</td> <td>3.1</td> <td>3.9</td> <td>3.3</td> <td>3.2</td> <td>3.6</td> <td>3.8</td> <td>7.2</td> <td>C 2000<br/>20.9</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> |        |     | Letter spacings are to start of next letter |     |     |     |                            |                |  | Series/Size<br>Text Length | 7.2 | 3.7 | 3 | 5 | 3.8 | 3.6 | 2.6 | 7.2 | C 2000<br>21.6 | 7.9 | 3.1 | 3.9 | 3.3 | 3.2 | 3.6 | 3.8 | 7.2 | C 2000<br>20.9 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Letter spacings are to start of next letter   |        |     |   |     |     |     | Series/Size<br>Text Length |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7.2   | 3.7    | 3   | 5   | 3.8 | 3.6 | 2.6 | 7.2                        | C 2000<br>21.6 |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7.9   | 3.1    | 3.9 | 3.3   | 3.2 | 3.6 | 3.8 | 7.2                        | C 2000<br>20.9 |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| <p>FILENAME: 15922 Sign Designs<br/>                 NORTH CAROLINA D.O.T. SIGN DETAIL</p>  |        |     |   |     |     |     |                            |                |  |                            |     |     |   |   |     |     |     |     |                |     |     |     |     |     |     |     |     |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



**SOUND BARRIER WALL**

(3-6-15) (Rev. 9-11-17)

**(A) DESCRIPTION**

This work consists of furnishing precast panels, structural steel, concrete columns, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans developed by the Design-Build Team, the 2018 *Standard Specifications for Roads and Structures* and this Project Special Provision.

Unless otherwise approved by the Engineer, the Design-Build Team has a choice of ten or 15-foot pile spacing. Pile spacing greater than 15 feet will not be permitted. Provide consistent pile spacing the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points, as approved by the Engineer.

A maximum one-foot drop or rise in top of wall elevation between wall sections will be permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance shall not be allowed. Unless otherwise approved by NCDOT, the wall shall adhere to the Design Noise Report developed by the Design-Build Team.

**(B) ALTERNATE PILE SPACING**

As an alternate, the Design-Build Team may submit plans for pile spacing greater than ten feet and less than 15 feet for review and approval. A submittal reducing the post spacing shall include the material and design specifications. The submittal shall also include an elevation view depicting the revised post spacing and proposed top of wall elevations. The proposed top of wall elevations shall be equal to or greater than the dimensions shown in the Design Noise Report developed by the Design-Build Team. The excavated hole diameter, excavation depth and reinforcing steel shall be equal to the amount required for 15-foot pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans developed by the Design-Build Team, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina Registered Professional Engineer check, seal and date the aforementioned plans.

**(C) ALTERNATE WALL TYPE**

Walls that have been assigned “Approved” or “Approved for Provisional Use” status by the Product Evaluation Program will be considered for substitution to the detailed Standard Sound Barrier Wall only when approved by the Department in writing. Alternate walls shall meet all design and construction requirements of this RFP. Alternate wall structural

stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and acceptance. Include material specifications for all components. Once preliminary plans are accepted, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina Registered Professional Engineer check, seal and date the plans developed by the Design-Build Team and, when requested, calculations.

### **MATERIALS AND FABRICATION**

Provide materials and fabricate members in accordance with the *Architectural Concrete Surface Treatment* Project Special Provision found elsewhere in this RFP, and the requirements of Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

Provide precast panels that are nominally four inches  $\pm$  ¼ inch thick with a simulated stone masonry textured surface on both faces. All texture shall extend outward from the nominal panel thickness. Furnish three 24" x 24" samples for approval which establish the acceptable variations in color, texture and uniformity. After the color, texture and uniformity of the furnished samples are approved, produce a full-scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining approval of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels.

### **CONSTRUCTION METHODS**

Complete the final survey of existing ground profile after clearing the sound barrier wall area, but prior to submitting any Working Drawings. Submit the final groundline survey with the Working Drawings.

Excavate holes with the diameters shown on the plans developed by the Design-Build Team. Perform pile excavation to the depths shown on the aforementioned plans and install piles as shown on the plans developed by the Design-Build Team with a tolerance of ½-inch per foot from vertical. Backfill excavations with concrete after placing piles.

#### **1. Pile Excavation**

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting shall not be permitted to advance the excavation. Blasting for core removal shall only be permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the 2018 *Standard Specifications for*

*Roads and Structures* and as directed by the Engineer. Drilling spoils shall consist of all excavated material, including but not limited to water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings shall consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼-inch.

## 2. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than six inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than six inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing any concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the 2018 *Standard Specifications for Roads and Structures*, except as modified herein. Provide concrete with a slump of six to eight inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

## WORKING DRAWINGS

In accordance with Article 1077-2 of the 2018 *Standard Specifications for Roads and Structures*, submit casting drawings for the precast face panels for approval prior to casting. Show the inserts, method of handling, and support details used for transportation on casting drawings. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. Submit an erection plan and concrete face panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings for review and acceptance.

## **CONTINUOUS FLIGHT AUGER PILES FOR SOUND BARRIER WALLS**

SP

### GENERAL

Continuous flight auger (CFA) piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid

grout. At the Design-Build Team's option, construct CFA piles for sound barrier walls instead of pile excavation. Install CFA piles with the required depth in accordance with the contract and accepted submittals. Use a prequalified CFA Pile Subcontractor for CFA pile work. Define "pile" as a CFA pile and "reinforcement" as pile extending out of CFA pile.

#### **INSTALLATION PLAN SUBMITTAL**

Provide 4 copies and a PDF copy of the CFA pile installation plan developed by the Design-Build Team. Submit the installation plan at least 15 days before starting CFA pile construction. Do not begin pile construction until the CFA pile installation plan is accepted by the Department.

Provide detailed project specific information in the CFA pile installation plan that includes the following:

- List and sizes of proposed equipment including CFA drilling rigs, augers and other drilling tools and grouting equipment
- Step-by-step description of CFA pile installation and sequence of pile construction
- Methods for placing reinforcement with procedures for supporting and positioning the reinforcement
- Minimum grout volume factor
- Equipment and procedures for monitoring and recording grout volume
- Examples of construction records that meet the Construction Records Section of this project special provision
- Procedures for containment and disposal of drilling spoils and waste grout
- Approved packaged grout or grout mix design that meets Section 1003 of the 2018 NCDOT *Standard Specifications for Roads and Structures*
- Other information shown in the plans developed by the Design-Build Team or requested by the Engineer

If alternate installation procedures are proposed or necessary, a revised CFA pile installation plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend CFA pile construction until a revised plan developed by the Design-Build Team is accepted by the Department.

**MATERIALS**

Use Type 2 grout that meets Section 1003 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

Use piles extending out of CFA piles that meet the *Sound Barrier Wall* Project Special Provision found elsewhere in this RFP.

**PRECONSTRUCTION MEETING**

Before starting CFA pile construction, hold a preconstruction meeting to discuss the installation and monitoring of the piles. Schedule this meeting after the CFA Pile Subcontractor mobilizes to the site. If this meeting occurs before all CFA pile submittals have been accepted, additional preconstruction meetings may be required before beginning construction of CFA piles without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Design-Build Team and CFA Pile Subcontractor Superintendent and Project Manager shall attend all preconstruction meetings.

**CONSTRUCTION METHODS**

Use equipment and methods accepted in the CFA pile installation plan developed by the Design-Build Team or approved by the Engineer. Inform the Engineer of any deviations from the plan developed by the Design-Build Team and accepted by the Department.

Dispose of drilling spoils and waste grout as directed and in accordance with Section 802 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Drilling spoils consist of all excavated material and fluids removed from boreholes.

**Drilling**

Use CFA piling rigs capable of drilling to the dimensions and depths shown in the plans developed by the Design-Build Team or required otherwise by the Engineer. Install CFA piles with tip elevations no higher than shown in the plans developed by the Design-Build Team or approved by the Engineer.

Use single helix hollow stem augers with uniform diameters and continuous flights from the top of the auger to the bottom tip of the cutting face. Provide augers with flights and teeth that cut the bottom of the borehole flat. Augers with outside diameters at least 97% of the pile design diameter shall be required. Augers capable of installing piles to a depth 20% greater than the depth shown on the plans developed by the Design-Build Team shall also be required.

Unless piles are installed with a hydraulic fixed mast installation platform and the stem to which the auger is fixed has an outside diameter 10" or greater, at least one guide connected to the leads of the CFA piling rig shall be required. Prevent the leads from rotating during drilling and grouting.

Seal the grout injection port to prevent entry during drilling. Keep the hollow stem of augers clean when drilling. Clearly mark augers or leads every foot along their length with markings visible to the unaided eye from the ground. Check for correct pile location and alignment before beginning drilling. Do not begin drilling until enough grout to complete the pile is on the project site.

Advance the auger into the ground at a continuous rate. Do not raise the auger until beginning grout placement. Control the auger rotation speed to prevent excess spoil from being transported to the ground surface and surrounding soil being drawn laterally into the borehole.

If muck, organics, soft soil or other unsuitable materials are encountered within five feet of the ground surface, contact the Engineer as these materials can cause problems with top of pile construction. If auger refusal is encountered before reaching the depth shown on the plans developed by the Design-Build Team, stop the auger rotation and inform the Engineer. Unless it is determined otherwise, define refusal as less than one foot of auger penetration per minute.

#### Grouting

Remove oil, rust inhibitors, residual drilling slurries and similar foreign materials from holding tanks / hoppers, stirring devices, pumps and lines and all other equipment in contact with grout before use.

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than  $\frac{3}{4}$ ".

Use a positive displacement piston type pump with a known volume per stroke that can develop peak pressures at the pump of at least 350 psi. Size the pump to maintain a smooth continuous delivery of grout while limiting pressure variations (particularly pressure drops) due to pump strokes. At the beginning of construction, provide the grout volume delivered by each pump stroke and verify this value is within 3% of the actual volume. Recalibrate the grout volume per pump stroke during construction as necessary or directed.

Measure grout temperature and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform flow field tests in the presence of the Engineer in accordance with ASTM C939 (Flow Cone).

Place grout in accordance with the contract and accepted submittals. Pump grout without difficulty to fill any soft or porous zones and with sufficient pressure to ensure a continuous monolithic pile with at least the cross section shown on the plans developed by the Design-Build Team from the maximum borehole depth to the top of the grout column. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Begin placing grout within five minutes after the auger has reached the depth shown on the plans developed by the Design-Build Team. At the beginning of grout placement, lift

the auger 6" to 12" and remove the sealing device by applying grout pressure or with a steel bar. Do not lift the auger beyond this range in order to minimize soil movement. After initiating grout flow, reinsert the auger to the original depth.

Pump grout continuously while extracting the auger at a smooth steady rate. Maintain a positive grout pressure at the auger injection point at all times. If rotation occurs while removing the auger, rotate the auger in the same direction as during drilling. If grout placement is suspended for any reason, inform the Engineer and redrill the CFA pile.

Monitor the depth of the auger injection point while counting pump strokes during grouting. Record the grout volume and factor versus depth of the auger injection point in increments of five feet or less. The grout volume factor is the grout volume placed divided by the theoretical grout volume for each depth increment. A grout volume factor of at least 1.15 shall be required.

#### Top of Pile Finishing and Protection

After placing grout, remove all excess grout and spoil and place a temporary form within the top of the grout column. Use a form three feet to five feet long with a diameter equal to or larger than the pile diameter. Place the form with equal lengths above and below the ground surface. Recheck the top of the grout and remove any foreign material. After the Engineer determines that grout reaches initial set, remove the form without disturbing the ground surface around the pile.

After inserting reinforcement, square the top of the CFA pile with the pile axis while grout is still fluid or by cutting off hardened grout. Construct the top of CFA pile to the elevation shown in the plans developed by the Design-Build Team.

#### Reinforcement

Provide reinforcement for CFA piles consisting of piles shown in the plans developed by the Design-Build Team and accepted submittals. Insert reinforcement as a unit while the grout is still fluid. Lower or gently push reinforcement into the grout. Do not vibrate or drive the reinforcement. Support the reinforcement at the ground surface until the grout strength reaches 2,500 psi. Contact the Engineer if reinforcement cannot be properly inserted to the required depth.

### **CONSTRUCTION RECORDS**

Provide 2 copies of CFA pile construction records after completing each pile. Include the following in construction records:

- Names of CFA Pile Subcontractor, Superintendent, Drill Rig Operator and Project Manager
- Project description, county, Department's contract, TIP and WBS element number
- Wall station and number and pile location and identifier
- The grout volume and factor versus depth of the auger injection point in increments of five feet or less

- CFA pile diameter, length and tip elevation, top of pile and ground surface elevations
- Auger diameter and theoretical volume of the borehole
- Grout temperature and flow records
- Size, length, top elevation and grade of reinforcement
- Date and time drilling begins and ends, grout is mixed and arrives on-site, pumping grout begins and ends and reinforcement is placed
- Weather conditions including air temperature at time of grout placement
- All other pertinent details related to CFA pile construction

After completing CFA piles for each sound barrier wall, provide a PDF copy of all corresponding construction records.

### **CFA PILE ACCEPTANCE**

CFA pile acceptance shall be based in part on the following criteria:

- Grout volume factor is greater than the minimum required for any five-foot depth increment.
- Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
- CFA pile and reinforcement location, alignment and elevations are within tolerances for sound barrier walls for pile excavation and reinforcement is in accordance with the contract and accepted submittals.

If the Engineer determines a CFA pile is unacceptable, additional testing, remedial measures or replacement piles shall be required at no additional cost to the Department. Do not begin remediation work until remediation plans developed by the Design-Build Team are accepted by the Department.

### **ARCHITECTURAL CONCRETE SURFACE TREATMENT**

(1-28-15) (Rev. 11-16-17)

#### **1.0 GENERAL**

The work covered by this Project Special Provision shall consist of constructing a stained, simulated stone masonry textured surface on both faces of pre-cast concrete panels used in sound barrier walls and exposed faces of retaining walls as indicated on the plans developed by the Design-Build Team and herein. The Design-Build Team shall furnish all materials, labor, equipment and incidentals necessary for the construction of architectural concrete surface treatment using simulated stone masonry form liners (molds) and a compatible concrete coloring system.

The Design-Build Team shall use the same source of form liner and color stains for all sound barrier wall panels and retaining walls. The architectural concrete surface treatment shall match the appearance (stone size, stone shape, stone texture, pattern and



relief) of natural stone to resemble an ashlar stone pattern with panel staining **on both sides** of pre-cast concrete panels used in sound barrier walls, and exposed faces of retaining walls to match the Gray Palette Color # AMS-STD 36270 found in the *AMS-STD-595 – Colors Used in Government Procurement*. All texture shall be in addition to the nominal thickness of the pre-cast sound barrier wall panel thickness and retaining wall face thickness,  $\pm \frac{1}{4}$  inch. Maximum relief of the textured surface shall be  $1\frac{1}{4}$  inch or less. The top 1'-0" of the top panel within each sound barrier wall segment shall have a smooth, non-textured and non-stained finish to resemble faux coping. Concrete columns shall remain unstained in their natural concrete color. There shall be an appreciable contrast between the colors of the unstained concrete columns and the stained panels. For information purposes only, sources of form liners in the ashlar stone pattern include, but are not limited to:

Scott System, Inc.  
10777 E. 45th Avenue  
Denver, Colorado 80239  
<http://www.scottsystem.com/>  
Pattern: Ashlar Stone # 167B

Architectural Polymers, Inc.  
1220 Little Gap Road  
Palmerton, Pennsylvania 18071  
<http://www.architecturalpolymers.com/>  
Pattern: Ashlar Stone # 904A

Fitzgerald Form Liners  
1500 East Chestnut Avenue  
Santa Ana, California 92701  
<http://formliners.com/>  
Pattern: Georgia Ashlar # 16999

The Design-Build Team has the option of supplying an alternative pattern of simulated stone form liner, as long as the pattern selected is approved, in writing, as an equal or approved alternative by the Engineer.

## 2.0 SUBMITTALS

**Shop Drawings** - The Design-Build Team shall submit for review and acceptance, plan and elevation views and details showing overall simulated stone pattern, joint locations, form tie locations, and end, edge or other special conditions. The drawings shall include typical cross sections of applicable surfaces, joints, corners, stone relief, stone size, pitch / working line, mortar joint and bed depths. If necessary, the Design-Build Team shall revise the shop drawings until the proposed form liner patterns and arrangement have been accepted by the Engineer. Shop drawings shall be of sufficient scale to show the

detail of all stone and joint patterns. The size of the sheets used for the shop drawings shall be 22" x 34".

The form liner shall be patterned such that long continuous horizontal or vertical lines do not occur on the finished exposed surface. The line pattern shall be random in nature and shall conceal construction joint lines. Special attention shall be given to details for wrapping form liners around corners.

Shop drawings shall be reviewed and accepted prior to fabrication of any form liners.

**Sample Wall Panels** - After shop drawings have been reviewed and accepted by the Engineer, the Design-Build Team shall construct three 24" x 24" transportable sample panel(s) at the project site. The materials used in construction of the sample panel(s) shall comply with Section 420 of the 2018 *Standard Specifications for Roads and Structures*. The sample panel(s) shall be constructed using form liners approved by the Engineer. Any sample panel that is not approved by the Engineer shall be removed from the project site and a new sample panel produced at no additional expense to the Department.

After the color, texture and uniformity of the furnished samples are approved by the Engineer, produce a full-scale unit meeting the design requirements. This mock-up and the furnished samples shall establish the standard quality for determining the panel approval.

Architectural surface treatments and patterns of the finished work shall achieve the same final effect as demonstrated on the approved sample panel(s). Upon approval by the Engineer, the sample panel(s) shall be used as the quality standard for the project. After the approval of the completed structure, the Design-Build Team shall dispose of the sample panels, as directed by the Engineer.

### 3.0 MATERIAL REQUIREMENTS

**Form Liner** - The form liner shall be a high quality, reusable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system and shall not compress more than 1/4-inch when concrete is poured at a rate of ten vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

**Form Release Agent** - Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product. Form release agents shall be compatible with the color system applied and any special surface finish.

**Form Ties** - Form ties shall be set back a minimum of two inches from the finished concrete surface. The ties shall be designed so that all material in the device to a depth of at least two inches back of the concrete face (bottom of simulated mortar groove) can be

disengaged and removed without spalling or damaging the concrete. The Design-Build Team shall submit the type of form ties to the Engineer for approval.

**Concrete Color System / Stain** - Special surface color system shall be performed using approved coloring systems / stains suitable for the purpose intended and applied in a manner consistent with the design intent of the project. The approved sample panel shall be the basis for determining the appropriate color / stain application.

Color stains shall be a special penetrating stain mix as provided by the manufacturer and shall be medium to dark gray to achieve a full, natural color in the finished surface. The stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight, and / or weathering. Stain mix shall meet the requirements for mildew resistance of Federal Test Method Standard 144, Method 6271, and requirements for weathering resistance of 1,000 hours accelerated exposure measures by Weatherometer, in accordance with ASTM G 26. Color samples shall be submitted for approval by the Engineer. Final coloring system and the Gray Palette Color # AMS-STD 36270 shall be subject to approval by the Engineer.

**Anti-Graffiti Coating** - The Design-Build Team shall apply anti-graffiti coating that is compatible with the concrete color system / stain. After application, the anti-graffiti coating shall be dry to the touch within one hour and shall achieve a final cure within three hours. The color of the anti-graffiti shall be clear after full cure. The Design-Build Team shall provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the North Carolina Department of Transportation Materials and Tests Unit, Chemical Testing Engineer.

**Quality Standards** - Manufacturer of simulated stone masonry form liners and custom coloring system shall have at least five years' experience making stone masonry molds and color stains to create formed concrete surfaces to match the natural stone shapes, surface textures and colors.

The Design-Build Team shall schedule a pre-installation conference with a manufacturer representative and the Engineer to assure understanding of simulated stone masonry form liner use, color application, requirements for construction of sample panel(s), and to coordinate the work. The Design-Build Team shall disclose their source of simulated stone masonry manufacturer and final coloration contractor at the Preconstruction Conference.

#### 4.0 CONSTRUCTION

**Form Liner Preparation** - Prior to each concrete pour, the form liners shall be clean and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in accordance with the manufacturer's recommendations. Repairs shall be approved by the Engineer before being used. Form liner panels that do not perform as intended or are no longer repairable shall be replaced.

**Form Liner Attachment** - Form liners shall be securely attached to forms in accordance with the manufacturer's recommendations, with less than a 1/4-inch seam. Blend form liner butt joints into the stone pattern and finish off the final concrete surface. Create no visible vertical or horizontal seams or conspicuous form liner butt joint marks. At locations where the form liners are joined, carefully blend to match the balance of the stone pattern. Form liners shall be installed to withstand anticipated concrete placement pressures without leakage and without causing physical or visual defects. Wall ties shall be coordinated with the form liner system. The Design-Build Team shall have a technical representative from the form liner manufacturer on site for technical supervision during the installation and removal of form liners. Unless allowed by the Engineer, installation and removal of form liners shall not be permitted if the aforementioned technical representative is not present.

**Form Release Agent** - Form release agent shall be applied in accordance with the manufacturer's recommendations. The material shall be compatible with the form liner material and the concrete coloring system and in accordance with this Project Special Provision. Form release agent shall be worked into all areas, especially pattern recesses.

**Patching** - Using patching materials and procedures in accordance with the manufacturer's recommendations, all form tie holes and other defects in finished uncolored surface shall be filled or repaired within 48 hours of form removal.

**Surface Finish** - All surfaces that are to receive coloring agent application shall be free of all laitance, dirt, dust, grease, efflorescence, paint or any other foreign material prior to the application of coloring agent. Cleaning of surfaces shall be accomplished by pressure washing with water set at 3000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of one to two feet. Sandblasting shall not be permitted.

Final surface shall be free of blemishes, discolorations, surface voids, and other irregularities. All patterns shall be continuous without visual disruption.

Reinforced concrete shall be finished in accordance with the 2018 *Standard Specifications for Roads and Structures*, except that curing of concrete shall be done to accommodate the application of coloring and surface finish treatment.

**Grout Pattern Joints** - Grout pattern joints shall be constructed to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

**Color / Stain Application** - Finished concrete and patches shall stand in place 30 days after form liners are removed prior to application of coloring / staining agent. Maintain the concrete temperature between 40° F and 85° F during color / stain application and for 48 hours after color / stain application. Consult the manufacturer's recommendations for preparation, application, curing and storage of coloring agents / stains. The Design-Build Team shall provide a Color Application Artist who is trained in the special techniques to

achieve realistic surface appearances, if requested by the Engineer. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

**Anti-Graffiti Coating Application** - The Design-Build Team shall apply anti-graffiti coating after full cure of the color coating. The anti-graffiti coating shall be applied by brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

Following the completion of all work, repairs of any damage made by other construction operations shall be made to the form lined and colored surfaces, as directed by the Engineer.

**Experience and Qualifications** - The Design-Build Team shall have a minimum of three consecutive years' experience in architectural concrete surface treatment construction on similar types of projects. The Design-Build Team shall furnish to the Engineer five references who were responsible for supervision of similar projects and will testify to the successful completion of these projects. Include name, address, telephone number, and specific type of application.

#### **AASHTO TYPE IV / NCDOT STANDARD BEAD - DOUBLE DROPPED GLASS BEADS**

(12-7-21) (Rev. 1-12-22)

##### **Description**

This work shall consist of applying NCDOT approved standard glass beads along with the application of AASHTO Type IV glass beads on extruded thermoplastic and polyurea pavement markings. Use NCDOT standard glass beads that are on the NCDOT Approved Products List and conform to Sections 1087 and 1205 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Except for gradation requirements, use AASHTO Type IV glass beads that conform to Sections 1087 and 1205 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and contain 80% true spheres. Prior to application, an independent lab test shall confirm both categories of glass beads.

##### **Application**

This combination of glass beads shall be applied concurrently. Two separate passes over the pavement marking binder will not be allowed. Extruded thermoplastic shall contain intermixed glass beads conforming to the 2018 NCDOT *Standard Specifications for Roads and Structures*. Glass beads shall be applied at the manufacturer's rate to meet the retroreflectivity requirements below within 30 days after application.

**MINIMUM REFLECTOMETER REQUIREMENTS  
FOR AASHTO Type IV / NCDOT Standard Glass Beads**

| Item                   | Color  | Reflectivity               |
|------------------------|--------|----------------------------|
| AASHTO Type IV / NCDOT | White  | 450 mcd/lux/m <sup>2</sup> |
| Standard Glass Beads   | Yellow | 350 mcd/lux/m <sup>2</sup> |

**NATIONAL FOREST LANDS**

(6-20-22)

Throughout this RFP, references to the National Forest Service (NFS) Lands shall denote property owned by the United States Forest Service (USFS), including but not limited to all NCDOT perpetual right of way easements and other easements on property owned by USFS.

**EQUIPMENT CLEANING FOR NATIONAL FOREST SERVICE LANDS**

(2-4-19)

All construction equipment, including but not limited to cranes, graders, pans, excavators, loaders, and dump trucks, shall be cleaned prior to being brought into the National Forest Service (NFS) Lands to ensure they are free of seeds, rhizomes, or other propagules. Cleaning may be done with pressure washing or other acceptable methods sufficient to remove this material. Prior to moving any equipment from delineated non-native invasive species sites, the equipment shall be visually inspected for vegetation and cleaned, if necessary, to ensure seeds or other propagules are not transported outside of those areas. The Design-Build Team shall assure that all subcontracts also have this Project Special Provision in their contracts.

**MANAGEMENT OF NON-NATIVE INVASIVE SPECIES**

(11-6-18)

Minimize removal of native vegetation on NFS Lands to prevent the encroachment of non-native invasive species (NNIS) onto NFS lands. To control the spread of NNIS on NFS lands, NCDOT in consultation with the USFS, will identify NNIS areas with flagging for targeted removal of NNIS. NNIS delineated areas within the proposed fill shall be cleared and grubbed and the material disposed of outside the limits of the NFS lands. Within identified areas of NNIS in proposed cuts, excavation of material shall include the actual thickness of root mat or other defined amount as determined by the Engineer and shall be disposed of outside the limits of the NFS lands.

The Design-Build Team shall notify the Design-Build Unit, in writing, when they are ready to begin earthwork operations on NFS Lands. The Department will require 30 days from the date of written notification to flag NNIS areas. Flagging of the NNIS areas shall be completed prior to the Design-Build Team beginning earthwork operations on NFS Lands.

Use of mowing as a control method for NNIS shall be timed to avoid spreading seeds (e.g. before seed set) to the extent possible.

**HERBICIDE APPLICATION ON NATIONAL FOREST LANDS**

(02-04-19)

Herbicide application shall comply with section 1060-13 of NCDOT's *Standard Specification for Roads and Structures* as well as all guidelines and mitigation measures presented in Forest Manual 2150, *Pesticide-Use Management and Coordination*, and Forest Service Handbook 2109.14, *Pesticide Use Management and Coordination Handbook*. United States Forest Service (USFS) approval is required for herbicide application on NFS Lands. Prior to herbicide application, a herbicide treatment plan shall be submitted for review and approval by USFS forest resource specialists in areas of wildlife biology, botany, aquatics, soils, recreation, and heritage resources.

The use of broadcast sprays for herbicides and pesticides on NFS Lands is not permitted. Herbicides and pesticides shall only be used in specific areas on NFS Lands in consultation with the USFS.

Herbicide application within NFS Lands shall also conform to the following:

- A) Along stream edges and banks, wide-angle cone tip nozzle guards shall be used on the end of herbicide applicator wands. All herbicides shall be sprayed away from any water in ephemeral and perennial streams, vernal pools, or lakes. Aquatic-labeled herbicides shall be used within 150 feet of any live water. Only surfactants / adjuvants with low toxicity to aquatic species shall be used in these areas.
- B) When conducting chemical control of targeted NNIS within 10 feet of any identified USFS rare plant species populations, the following guidelines apply:
  - All rare plant species occurrences shall be flagged or marked prior to treatment sufficient to avoid any off-target effects and "No Treatment" signs shall be posted at rare plant sites along the roadway.
  - No chemical treatment shall occur within one foot of the rare plant. Cover rare plants or place an appropriate barrier adjacent to them prior to applying herbicide within 10 feet of the plants. For vining species, pull the vines outside one foot of adjacent rare plants.
  - For larger woody stems with diameters one inch or greater, apply herbicide to cut stem surfaces. Apply herbicides to cut stems with a small wick applicator or with a spray bottle to minimize drift.
  - For smaller woody NNIS stems, broadcast treatment will only be allowed if no other viable option is available and approved by the Engineer and USFS. Stems shall be cut and herbicide applied only after re-sprouting from six inches to one foot in height. While spraying the re-sprouting foliage, place a barrier (such as an appropriately sized cardboard sheet) next to the rare plant species or cover the rare plant species with an appropriate container.

**Application**

Apply herbicides following approved treatment plan to targeted NNIS at delineated sites in accordance with this provision. Reapply as directed until targeted NNIS have been eliminated.

**REMOVAL OF NNIS VIA MECHANICAL METHODS ON NFS LANDS**

The Design-Build Team shall coordinate with and obtain approval from USFS for any mechanical methods used to remove NNIS. When conducting mechanical control by hand, NNIS capable of starting new plants (seeds, rhizomes, root mats, etc.) shall be bagged and properly disposed in a landfill approved by the North Carolina Division of Waste Management. For large woody bushes that would be difficult to move, treatments shall be scheduled prior to seed let.

**NATURAL FIBER MATTING**

(11-2-18)

**Description**

This work consists of furnishing, installing and maintaining *Natural Fiber Matting*, of the type specified, in locations shown on the plans developed by the Design-Build Team or in locations as directed by the Engineer. Work includes providing all materials, placing and securing natural fiber matting with stakes or staples as directed by the Engineer.

**Materials**

The product shall be a temporary erosion control mat and shall be constructed of weed free 100% grain straw, a combination of coir and grain straw, or curled wood excelsior fibers evenly distributed throughout the mat between a biodegradable bottom and top netting made of jute or cotton fibers or other biodegradable organic material. The matting shall be stitched together with a degradable thread. The mat shall meet following physical properties:

- (A) Straw Natural Fiber Matting shall consist of a machine produced mat of 100% grain straw. The straw natural fiber matting shall have a width of at least 48 inches and no more than 90 inches and weighing at least 0.50 lb/sy and no more than 0.75 lb/sy. Evenly distribute the straw over the entire area of the blanket between a woven biodegradable bottom and top netting made of jute, cotton fibers or other biodegradable organic material with a maximum mesh (netting) size of 0.75 inch x 0.75 inch (or maximum opening of 0.60 square inches) sewn together with a degradable thread. The grain straw shall contain no weed seeds.
- (B) Straw-Coir Natural Fiber Matting shall be a blend of no more than 70% grain straw of consistent thickness with the straw and coir evenly distributed over the entire area of the mat. The straw-coir natural fiber matting shall have a width of at least 48 inches and no more than 90 inches and weighing at least 0.50 lb/sy. The blanket shall be covered on the top and bottom sides with a woven biodegradable bottom and top netting made of jute, cotton fibers or other biodegradable organic material with a maximum mesh (netting) size of 0.75 inch x 0.75 inch (or maximum opening of 0.60 square inches) sewn together with a degradable thread. The grain straw shall contain no weed seeds.



- (C) Excelsior Natural Fiber Matting shall be made of weed free, curled wood excelsior fibers with 80% of the fibers six inches or greater length. The excelsior natural fiber matting shall have a width of at least 48 inches and no more than 90 inches and weighing at least 0.975 lb/sy. Evenly distribute the excelsior over the entire area of the blanket between a woven biodegradable netting made of jute, cotton fibers or other biodegradable organic material with a maximum mesh (netting) size of 1.0 inch x 1.0 inch sewn together with a degradable thread. Netless excelsior fiber matting is acceptable for slopes 3:1 or shallower meeting a minimum weight of 0.70 lb/sy (+/- 10%) with stitch spacing no more than 2 inches on center.

### **Construction Methods**

Matting shall be installed in accordance with Subarticle 1631-3 of the *Standard Specifications*. All areas to be matted shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

### **SPECIAL REQUIREMENTS FOR WORK IN NATIONAL FOREST**

(7-1-95)

DB1 G40

In addition to other requirements in this RFP with respect to clearing, erosion control, protection of environment, etc., the Design-Build Team shall comply with the following requirements when working on NFS Lands:

- (A) Comply with the sections of this project special provision, titled *Fire Protection, Clearing and Landscape and Erosion Control*. **Note:** merchantable timber to be cleared on NFS Lands shall become the property of the Design-Build Team.
- (B) Comply with the following recommendations of the State Fish and Game Department and Forest Service for wildlife and fish management:
- (1) Take all necessary precautions to avoid damage to fish habitat and exercise every reasonable precaution to prevent muddying or silting live streams.
  - (2) Do not deposit material removed from the roadway or channel changes in live streams or into the streams or stream channel where it would be washed away by high stream flows.
  - (3) Do not haul materials, including logs, brush, and debris, by fording live streams. Instead, provide temporary bridges or other structures for this purpose.
- (C) Treat sections of existing road to be abandoned as a result of the proposed new construction, as designated by the Forest Supervisor, to restore them to their natural state. The necessary treatment shall be determined during a joint review between the Forest Service and the State and may include ripping of roadbed, removal of drainage structures,

and opening drainage channels. Plans and specifications as mutually deemed appropriate to accomplish the objective shall become a part of this Project Special Provision.

- (D) Permanently monument the perpetual right of way easement prior to completion of construction in accordance with State requirements for such right of way, but in any event the minimum requirements shall be to place permanent monuments at the intersection of the perpetual right of way easement and all NFS Land property lines, section lines, and at intervals of not more than 1,000 feet along the perpetual right of way easement limits within NFS Lands.
- (E) Re-establish or restore public land monuments disturbed or destroyed by construction, reconstruction, or maintenance according to instructions of the Bureau of Land Management, Department of the Interior. Do not damage, destroy, or obliterate other land monuments and property corners or witness markers without the prior permission of the Regional Forester. Relocate or re-establish these land monuments, property corners, and witness markers in accordance with standards satisfactory to the Regional Forester.
- (F) Do not fuel or lubricate mechanical equipment near aquatic habitats.

### **Fire Protection**

During the period of construction, perform both independently and in cooperation with the Forest Service everything that is reasonable and practical to prevent and suppress forest fires on NCDOT perpetual right-of-way easements or other easements within NFS Lands and in their immediate vicinity. The Design-Build Team shall assure that all subcontracts also have this Project Special Provision in their contracts. At a minimum, the Design-Build Team shall conform to the following fire protection requirements:

- (A) Take immediate independent or cooperative action to control and extinguish any fire, regardless of cause, on NCDOT perpetual right-of-way or other easements within NFS lands and its vicinity.
- (B) Maintain at readily available sites one or more boxes of firefighting tools to be furnished by the Forest Service for forest fire fighting purposes only.
- (C) Perform debris burning only after a 20-foot strip around each pile is cleared to mineral soil.
- (D) Keep fires compact by throwing in the larger material as it burns. If piles are too close together or burn hot, light every second or third pile; allow these to cool down before firing the others. On slopes start burning at the top and work down. Confine fires to piles at all times.
- (E) Do not leave fires unattended.

- (F) Discontinue burning upon notification by the District Forest Ranger or his representative that fire danger is such that there is abnormal risk.
- (G) Whenever a fire escapes, notify the District Ranger immediately even if the fire is suppressed without Forest Service assistance.
- (H) The Design-Build Team shall bear all costs, including Forest Service direct costs and value of resources damages, incurred by the Forest Service in controlling and extinguishing any fire on or threatening NFS Lands which they or their employees caused with or without negligence in connection with construction operations.
- (I) Contact the District Ranger 24 hours in advance of burning.

### **Clearing**

At a minimum, conform to the following clearing requirements:

- (A) Dispose of unmerchantable materials including tops, branches, etc., by piling and burning as directed by the Forest Service or use in brush barriers. Alternate methods of disposal, including any of the following methods or combinations of methods (lop and scatter, chip, remove, pile only) shall be approved in advance and in writing, by the Forest Service.
- (B) The maximum clearing and grubbing limits shall be as shown on the plans developed by the Design-Build Team except that cutting of hazard trees outside these limits may be done with approval from NCDOT and the Forest Service. Confine construction machinery within the clearing limits.
- (C) Prior to clearing any trees on NFS Lands, the Design-Build Team shall flag (with ribbon) all trees that need to be removed and submit a clearing request to the Design-Build Unit. The clearing request shall include a cover letter verifying the requested clearing limits have been coordinated with all utility owners and all trees within the clearing limits have been flagged with ribbon. The clearing request shall also include plan sheets and a shape file showing the maximum clearing limits. The Design-Build Team shall submit one clearing request for all clearing on NFS Lands, including any needed clearing for utilities. The Design Build Team shall not submit multiple requests to develop a “staged clearing” process to expedite construction activities in a phased fashion.

The Design-Build Teams shall assume it will take the Department and USFS a minimum of 90 days to review and assess the merchantable timber within the clearing limits. No trees shall be cleared on NFS Lands without approval from the Department and USFS. No requests for additional contract time or compensation will be allowed if the Department and USFS provide clearing approval within this 90-day period. The Department will only consider requests for contract time extensions for the Department and USFS’s review if the 90-day period has been exceeded. If time were granted, it would be only for that time exceeding the 90-day period. The 90-day period is considered

to begin on the date the Department receives a fully complete and 100% accurate clearing request.

### **Landscape and Erosion Control**

The erosion control plan shall be designed and implemented to prevent visible sediment, as defined by NC Department of Environmental Quality regulations, from reaching any defined stream channel.

At a minimum conform to the following landscape and erosion control requirements:

- (A) Prevent visible sediment from entering any stream channel. If an erosion control practice must be sited in a channel, it shall stop further down-channel transport of visible sediment.
- (B) Bear responsibility for the prevention and control of soil erosion and gullyng on NFS Lands resulting from the construction of or maintenance of the road. Revegetate with grass (not Love Grass) or herbaceous plants all ground where the soil has been exposed. Accomplish revegetation within 20 working days following final grading.
- (C) Round the ends of cut sections and the tops of back slopes.
- (D) Vegetate all front and back slopes by liming, fertilizing, mulching and seeding. Mulch critical areas if they are to be exposed greater than five working days of probable inclement weather during seasons when seeding is impracticable. Critical areas shall include all bare soils within 100 feet (slope distance) of perennial and intermittent streams. Mulch these as soon as practical and after final seeding.
- (E) Maintain all erosion control practices in a timely manner to prevent visible sediment from entering any stream channel, until such time that the final revegetation stabilizes the site and prevents erosion and off-site movement of sediment.

**GENERAL**

The State will not be bound by oral explanations or instructions given at any time during the bidding process or after award. Only information that is received in response to this RFP will be evaluated; reference to information previously submitted will not suffice as a response to this solicitation.

**NO CONTACT CLAUSE**

To ensure that information is distributed equitably to all short-listed Design-Build Teams, all questions and requests for information shall be directed to the State Contract Officer through the Design-Build e-mail address. This precludes any Design-Build team member, or representative, from contacting representatives of the Department, other State Agencies or Federal Agencies either by phone, e-mail or in person concerning the Design-Build Project.

**USE OF TERMS**

Throughout this RFP and all manuals, documents and standards referred to in the RFP the terms Contractor, Bidder, Design-Builder, Design-Build Team, Team, Firm, Company and Proposer are synonymous.

Throughout this RFP and all manuals, documents and standards referred to in the RFP, the terms NCDOT, Department, Engineer and State are synonymous.

Throughout this RFP and all documents referred to in the RFP, references to the Technical Proposal include all Technical Proposal supplemental information that may be submitted in response to a Best and Final Offer RFP.

**DESIGN REFERENCES**

Design references developed and published by NCDOT and those developed and published by other agencies and adopted for use by NCDOT which are to be used in the design of this project may be obtained by contacting the Contract Standards and Development Unit within the Field Support Division. Standard prices for materials, which the Department normally sells for a fee, will be in effect. The Design-Build Team shall be responsible for designing in accordance with the applicable documents and current revisions and supplements thereto.

**REVIEW OF SUBMITTALS**

Major design milestones and required design submittals shall be identified as activities on a CPM, bar chart or other scheduling tool. This schedule shall be submitted to the Design-Build Unit and Resident Engineer concurrently with the first design submittal, or within 30 days of the contract award, whichever is earlier. The schedule shall be revised and resubmitted as design milestones change or as directed by the Design-Build Unit. Unless stipulated otherwise in the Scope of Work, submittals will be reviewed within the timeframe the Design-Build Team indicates on the design submittal or ten working days (15 days for temporary structures, overhead sign assemblies, MSE walls, FEMA compliance documents, curved steel girder working drawings and temporary shoring), whichever is greater. All review timeframes, including but not limited to the

aforementioned ten-day and 15-day review timeframes, shall begin on the first working day after the Department receives the submittal, regardless of the time the submittal is received. All submittals shall be prepared and submitted in accordance with the *Design-Build Submittal Guidelines*, which by reference are incorporated and made a part of this contract. All submittals shall be made simultaneously to the Design-Build Unit and the Resident Engineer. The Department will not accept subsequent submittals until prior submittal reviews have been completed for that item. The Design-Build Team shall prioritize multiple submittals that are submitted concurrently. All submittals shall include pertinent Special Provisions. No work shall be performed prior to Department review and acceptance of the design submittals.

For all design disciplines, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed changes / revisions to the NCDOT preliminary design, the Design-Build Team's Technical Proposal and / or previously reviewed / accepted submittals, including but not limited to changes / revisions to RFC Plans, and obtain approval prior to incorporation. Failure to provide the aforementioned written notification of changes / revisions with the appropriate design submittal could result in the Department 1) suspending the design submittal until documentation is provided and extending the contractual design submittal review timeframe by an amount of time equal to the time it takes for the Department to receive the required documentation, or 2) returning the unreviewed design submittal to the Design-Build Team and requiring a resubmittal. Unless noted otherwise elsewhere in this RFP, all proposed design changes / revisions shall be subject to the Department's review and acceptance, including but not limited to changes to RFC Plans.

## OVERVIEW

The R-5777C Design-Build Project upgrades US 70 to interstate standards from the Havelock Bypass to east of SR 1116 (Thurman Road) in Craven County. The approximately 6.4-mile project provides a four-lane divided facility with three new interchanges.

Project services shall include, but are not limited to:

- **Design Services** - completion of construction plans
- **Construction Services** - necessary to build and ensure workmanship of the designed facility
- **Intelligent Transportation System** - design and construction of ITS components, including CCTV cameras, fiber-optic communications cable and conduit, and ITS integration
- **Permit Preparation / Application** - development of all documents for required permits
- **Right of Way** - acquisition of right of way necessary to construct project
- **As-Constructed Drawings**
- **As-Built Plans**

**Construction Engineering Inspection** will be provided by the NCDOT Division personnel or will be performed under a separate contract.

The following project planning documents have been completed:

- The R-5777C Type III Categorical Exclusion (CE) was approved on June 1, 2021.

## GENERAL SCOPE

The scope of work for this project includes design, construction and management of the project. The design work includes all aspects to upgrade approximately 6.4 miles of US 70 to interstate standards and provide three new interchanges. Unless allowed otherwise elsewhere in this RFP, the designs shall meet all appropriate latest versions of AASHTO *Policy on Geometric Design of Highways and Streets*, AASHTO *LRFD Bridge Design Specifications*, *Manual of Uniform Traffic Control Devices* and all NCDOT design policies that are current as of the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Unless noted otherwise elsewhere in this RFP, all documents referenced herein shall be the edition / version, including all interim revisions, effective on the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Construction shall include, but not be limited to, all necessary clearing, grading, roadway, drainage, structures, utility coordination and relocation, and erosion and sediment control work items for the proposed four-lane facility and installation of the control of access fence. Construction engineering and management shall be the responsibility of the Design-Build Team. Construction shall comply with 2018 NCDOT *Standard Specifications for Roads and Structures* and any special provisions.

Areas of work required for this project shall include, but are not limited to the following items:

- Roadway Design
- Structure Design
- Permit Application
- Hydraulic Design
- Railroad Coordination
- Geotechnical Engineering
- GeoEnvironmental
- Foundation Design for Structures and Roadway
- Erosion and Sedimentation Control Design and Implementation
- Transportation Management Plan Design and Implementation
- Pavement Marking Design
- Intelligent Transportation Systems (ITS) Design
- Sign Design
- Construction
- Project Management
- Design and Construction Management
- Utility Construction
- R/W Utilities, Conflicts and / or Construction
- Construction Surveying
- Location and Surveys
- Right of Way Acquisition
- Public Involvement and Information

All designs shall be in Microstation format using Geopak software (current version used by the Department) or Bentley Open Roads Designer (ORD). If the Design-Build Team elects to use

ORD, the Department will not honor any requests for additional contract time or compensation for any effort required to complete the designs using ORD.

### **DESIGN AND CONSTRUCTION PERFORMED BY DESIGN-BUILD TEAM**

The design work consists of the preparation of all construction documents to upgrade approximately 6.4 miles of US 70 to interstate standards and provide three new interchanges, as outlined in the Scope of Work section of this RFP. The Design-Build Team shall prepare final designs, construction drawings and special provisions.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall acknowledge that project documents furnished by the Department are preliminary and provided solely to assist the Design-Build Team in the development of the project design. The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of all work performed under this contract and shall save the State harmless and shall be fully liable for any additional costs and all claims against the State which may arise due to errors, omissions and negligence of the Design-Build Team in performing the work required by this contract.

There shall be no assignment, subletting or transfer of the interest of the Design-Build Team in any of the work covered by the Contract without the written consent of the State, except that the Design-Build Team may, with prior written notification of such action to the State, sublet property searches and related services without further approval of the State.

The Design-Build Team shall certify all plans, specifications, estimates and engineering data furnished by the Design-Build Team.

All work by the Design-Build Team shall be performed in a manner satisfactory to the State and in accordance with the established customs, practices, and procedures of the North Carolina Department of Transportation, and in conformity with the standards adopted by the American Association of State Highway Transportation Officials, and approved by the U.S. Secretary of Transportation as provided in Title 23, U.S. Code, Section 109 (b). The decision of the Engineer / State / Department shall control in all questions regarding location, type of design, dimension of design, and similar questions.

The Design-Build Team shall be solely responsible for all design and construction methods adhering to all requirements herein, as well as all applicable guidelines, standards and policies. If the applicable guidelines, standards and / or policies have desirable and / or minimum values, the Design-Build Team shall use the desirable values unless noted otherwise elsewhere in this RFP. Similarly, in the event of conflicting design parameters in the requirements herein and / or the applicable guidelines, standards and policies, the proposed design shall adhere to the most conservative values. The Department's acceptance of plans, reports, calculations, analyses, etc. shall not relieve the Design-Build Team of any and all obligations to design and construct the project in accordance with the RFP requirements and all applicable guidelines, standards and policies.

Alternate designs, details and / or construction practices (such as those employed by other states, but not standard practice in NC) are subject to Department review and approval, and will be evaluated on a case by case basis.



The Design-Build Team shall not change team members, subconsultants or subcontractors identified in the Statement of Qualifications (SOQ) or Technical Proposal without written consent of the Engineer or the State Contract Officer. In addition, subconsultants and subcontractors not identified in the SOQ or Technical Proposal shall not perform any work without written consent by the Engineer. Individual offices of the Design-Build Team not identified in the Statement of Qualifications or the Technical Proposal submitted shall not perform any work without written consent by the Engineer. Failure to comply with this requirement may be justification for removing the Team from further consideration for this project and disqualification from submitting on future Design-Build Projects.

All firms shall be prequalified by the Department for the work they are to perform. Joint Ventures, LLCs or any legal structure that are different than the existing prequalification status must be prequalified prior to the Price Proposal submittal deadline. Subcontractors need only be prequalified prior to performing the work. Design firms should be prequalified prior to the Technical Proposal submittal deadline. If not prequalified at the time of the Technical Proposal submittal deadline, the prime contractor shall be solely responsible for either (1) ensuring that the design firm is prequalified prior to its first design submittal or (2) replacing that firm with a prequalified firm.

#### **ACCESS TO PROVIDED MATERIALS**

To facilitate distribution of documents that may be helpful to the Design-Build Teams in their development of a Technical and Price Proposal and subsequent designs, project material will be made accessible through a secure web portal. Access to the web portal will be given to each short-listed prime contractor and lead design firm. No distribution of Provided Materials will be possible prior to the Department announcing the short-listed Design-Build Teams and establishing the access privileges.

Access privileges will only be given to the individuals listed in the prime contractor's and lead design firm's Active Directory Group. It shall be solely the prime contractor's and lead design firm's responsibility to maintain their Active Directory Group. Once access has been established, individuals may enter the "Connect" site and login with their NCID account. Once logged in, the Teamsite "R-5777C" link will be apparent on the left side of the webpage.

Please note that all material provided, including the material provided through this portal, is provided for informational purposes only and is provided solely to assist the Design-Build Team in the development of the project design unless noted otherwise elsewhere in this RFP. By submitting a Technical Proposal and Price Proposal, the Design-Build Team acknowledges that they are fully and totally responsible for the project design, including the use of portions of the Department design, modification of such design, or other designs as may be submitted by the Design-Build Team, unless noted otherwise elsewhere in this RFP. The Design-Build Team further acknowledges that they are fully and totally responsible for the accuracy and completeness of all work performed, including the determination of the accuracy of the information provided through this portal, and to the extent that the Design-Build Team chooses to rely on such information.

## **ELECTRONIC PLAN SUBMITTALS AND E-SIGNATURES**

The Design-Build Team shall submit all Release for Construction Plans in accordance with the NCDOT e-Signature requirements, including but not limited to providing signed and sealed searchable .pdf files. Reference the website noted below for additional information:

**<https://connect.ncdot.gov/business/consultants/Pages/Guidelines-Forms.aspx>**

## **ETHICS POLICY**

Employees employed by the Design-Build Team or employees employed by any subconsultant for the Design-Build Team to provide services for this project shall comply with the Department's Ethics Policy. Failure to comply with the Ethics Policy will result in the employee's removal from the project and may result in removal of the Company from the Department's appropriate prequalified list.

## **APPROVAL OF PERSONNEL**

The Department will have the right to approve or reject any personnel, assigned to a project by the Design-Build Team.

In the event of engagement of a former employee of the Department, the Design-Build Team and their subcontractors shall restrict such person or persons from working on any Design-Build procurement / project in which the person or persons were "formerly involved" while employed by the State. The restriction period shall be for the duration of the Design-Build procurement / project with which the person was involved. *Former Involvement* shall be defined as active participation in any of the following activities:

- Developing the Request for Proposals / Design-Build contract, including any Supplemental Agreements
- Selecting or evaluating the Design-Build Team, including evaluating any document submitted by a Design-Build proposer
- Developing or negotiating the contract / Supplemental Agreement cost, including calculating manhours or fees
- Administering the Design-Build contract

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

The Design-Build Team and their subconsultants / subcontractors shall restrict all personnel embedded within the Department, including but not limited to Design Units and Divisions, from working on any Design-Build procurement / project. Except as allowed otherwise below, the Design-Build Team shall provide a list of all embedded personnel to the Department and a signed Confidentiality Agreement for each embedded employee, as well as their employer and NCDOT Unit Manager. If the Design-Build Team has previously provided a signed Confidentiality Agreement for an embedded employee who's employer and / or NCDOT Unit Manager have not changed, the Design-Build Team shall 1) indicate on the aforementioned list when the original

Confidentiality Agreement was provided to the Design-Build Unit (date and TIP Project), 2) provide a copy of the original signed Confidentiality Agreement, or 3) provide a new signed Confidentiality Agreement. The Design-Build Team shall submit the aforementioned list and Confidentiality Agreements to Mr. Ronald E. Davenport, Jr., P.E., State Contract Officer, within ten business days of the issuance of the Industry Draft RFP, and provide updated lists and Confidentiality Agreements, as appropriate, throughout the project procurement / duration.

Failure to comply with the terms stated above in this section may be grounds for termination of this contract and / or not being considered for selection of work on future contracts for a period of one year.

## **SUBMITTAL OF TECHNICAL AND PRICE PROPOSALS**

**Technical and / or Price Proposals that do not adhere to all the requirements noted below may be considered non-responsive and may result in the Department not considering the Design-Build Team for award of the contract or reading their Price Proposal publicly.**

### **TECHNICAL PROPOSAL**

Technical Proposals will be accepted until **4:00 p.m. Local Time on Tuesday, December 20, 2022**, at the office of the State Contract Officer:

Mr. Ronald E. Davenport, Jr., PE  
Contract Standards and Development  
1020 Birch Ridge Drive  
Century Center Complex - Building B  
Raleigh, NC 27610

**No Technical Proposals will be accepted after the time specified.**

### **TECHNICAL PROPOSAL - Hard Copies**

Hard copies of the Technical Proposal shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Technical Proposal - Hard Copies  
Submitted By: (Design-Build Team's Name)  
Design-Build Team Address  
Contract Number C204695  
TIP Number R-5777C  
Craven County

US 70 from the Havelock Bypass to east of SR 1116 (Thurman Road)

If delivered by mail, the sealed package shall be placed in another sealed package that is addressed to the Contract Officer as stated in the Request for Proposals. The outer package shall also bear the statement "Technical Proposal for the Design-Build of State Highway Contract No. C204695". (Reference the *Submittal of Quantities, Fuel Base Index Price and Opt-Out Option* Project Special

Provision found elsewhere in this RFP for additional requirements that are concurrent with the Technical Proposal submittal.)

### **Technical Proposal Requirements**

12 Copies

8 ½-inch by 11-inch pages

No fold out sheets allowed - maximum 24-inch by 36-inch fold out sheets shall only be allowed to present interchange plans in the 11-inch by 17-inch plan sheets

Printed on one side only

Double-spaced

Font size 12 - Within embedded tables, charts, and graphics only, minimal font size 10 is permissible

Excluding the introductory letter to Mr. Ronald E. Davenport, Jr., P.E. (two-page maximum length), a copy of the Department's approval letter for each incorporated Formal ATC, and the 11-inch by 17-inch appropriate plan sheets, the maximum number of allowable pages shall be 50 pages.

The aforementioned introductory letter to Mr. Ronald E. Davenport, Jr., PE shall include a statement acknowledging that the NCDOT may destroy all Technical Proposals not retained by the Department, **or** a statement that the NCDOT should return all Technical Proposals not retained by the Department.

Project team members, identified in the Statement of Qualifications, shall not be modified in the Technical Proposal without written approval of the Department. Any such request should be sent to the attention of Mr. Ronald E. Davenport, Jr., PE, at the address below:

NCDOT- Contract Standards and Development  
Century Center Complex - Building B  
1020 Birch Ridge Drive  
Raleigh, NC 27610

**TECHNICAL PROPOSAL - Electronic Copy**

An electronic copy of the Technical Proposal shall be submitted in a sealed package. The electronic copy 1) shall be in a searchable .pdf format, 2) shall not contain any hyperlinks, 3) shall be scaled to reproduce to the appropriate page format, as defined above, and 4) shall be created by converting the original MicroStation / GeoPak files. The outer wrapping shall clearly indicate the following information:

Technical Proposal - Electronic Copy  
Submitted By: (Design-Build Team's Name)  
Design-Build Team Address  
Contract Number C204695  
TIP Number R-5777C  
Craven County  
US 70 from the Havelock Bypass to east of SR 1116 (Thurman Road)

If delivered by mail, the sealed package shall be placed in another sealed package that is addressed to the Contract Officer as stated in the Request for Proposals. The outer package shall also bear the statement "Technical Proposal for the Design-Build of State Highway Contract No. C204695"

**PRICE PROPOSAL**

Price Proposals will be accepted until **4:00 p.m. Local Time on Tuesday January 10, 2023**, at the office of the State Contract Officer:

Mr. Ronald E. Davenport, Jr., PE  
Contract Standards and Development  
1020 Birch Ridge Drive  
Century Center Complex - Building B  
Raleigh, NC 27610

**No Price Proposals will be accepted after the time specified.**

Price Proposals shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Price Proposal  
Submitted by (Design-Build Team's Name)  
Design-Build Team Address  
Contract Number C204695  
TIP Number R-5777C  
Craven County  
US 70 from the Havelock Bypass to east of SR 1116 (Thurman Road)

The Price Proposal shall be submitted by returning the Request for Proposals with the item sheets completed, and all required signatures and bonds. Failure to execute the required documents may render the Price Proposal non-responsive.

Price Proposals delivered in person shall be delivered to Door B3 of the Century Center Complex - Building B. The delivery person shall call Ms. Marsha Sample at (919) 707-6915 or Mr. Ken Kennedy, PE at (919) 707-6919 to accept delivery. If delivered by mail, the sealed package shall be placed in another sealed package that is addressed to the Contract Officer as stated in the Request for Proposals. The outer package shall also bear the statement "Price Proposal for the Design-Build of State Highway Contract No. C204695".

### **EVALUATIONS**

Decisions based on cost alone will not establish the design standards for the project. Technical Proposals shall address the technical elements of the design and construction of the project. The Technical Review Committee will consider the understanding of the project, the anticipated problems and the solutions to those problems, in addition to other evaluation criteria identified herein.

The Design-Build Team's Technical Proposal shall be developed using narratives, tables, charts, plots, drawings and sketches as appropriate. The purpose of the Technical Proposal is to document the Design-Build Team's understanding of the project, demonstrate the Design-Build Team's capabilities to complete the project, document their selection of appropriate design criteria and state their approach and schedule for completing all design and construction activities.

The review of design plans by the Department is not intended to reflect a reviewer's personal preferences, but rather to ensure that all contract requirements are met, sound engineering judgment is exercised by the Design-Build Team, and that the Design-Build Team adheres to all referenced documents, including but not limited to, design standards, codes, memos and manuals. As such, the Award of the Design-Build contract does not in any way imply that the NCDOT accepts the details of the Technical Proposal submitted by the Design-Build Team.

The Technical Proposal will be evaluated in each of the following major categories:

| <b>EVALUATION FACTORS</b>                 | <b>POINTS</b> |
|---|---------------|
| 1. Design-Build Team                      | 5             |
| 2. Responsiveness to Request for Proposal | 32            |
| 3. Schedule and Milestones                | 25            |
| 4. Innovation / Added Value               | 10            |
| 5. Maintenance of Traffic and Safety Plan | 25            |
| 6. Oral Interview                         | 3             |

### **TECHNICAL PROPOSAL EVALUATION CRITERIA**

#### **1. Design-Build Team - 5 points**

Provide a comprehensive Organizational Chart that identifies the design, quality and construction team members, and the relationships with subconsultants / subcontractors. The Organizational Chart shall identify all firms and personnel changes (additions, substitutions, deletions) to the Design-Build Team since submittal of the Statement of Qualifications.

- Confirm that the key personnel identified in the Statement of Qualifications have not changed and identify all team member additions.
- If different firms and / or offices will develop designs for the project, indicate how the designs will be integrated / consistent.
- Describe the work categories that the Design-Build Team anticipates will be performed by the Design-Build Team's own direct labor force and those categories that will be performed by subcontractors.
- Describe how the Design-Build Team will implement design and construction quality control for this project.
- Describe any significant design and / or construction quality control issues experienced on NCDOT projects in the last ten years and how those issues will be addressed for this project.
- Describe all project / construction related Notice of Violations (NOVs) received by any team member within the last five years on projects in the United States and the disposition of each listed NOV.

## **2. Responsiveness to RFP - 32 points**

### ***Natural Environmental Responsibility***

- Identify efforts to minimize impacts on wetlands, streams, riparian buffers, and other environmentally sensitive areas. Describe any temporary impacts and associated minimization approaches.
- Describe the Design-Build Team's understanding of the overall approach to permitting.
- Identify methods of construction in wetlands, streams and riparian buffers.
- Describe the Design-Build Team's approach to Sedimentation and Erosion Control for the project.
- Describe efforts to minimize excavation within the contaminated sites and associated disturbance to underlying soil. If applicable, specify the extent of impacts to properties with contaminated soils, indicating the anticipated contamination excavation limits.

### ***Design Features***

- Show plan view of design concepts with key elements noted.
- Identify preliminary horizontal and vertical alignments of all roadway elements.
- Identify the appropriate design criteria for each feature, if not provided herein.
- Identify proposed design exceptions and justify why the design exception is necessary.
- Identify proposed deviations to the preliminary design provided by the Department, not required herein.
- Show mainline typical sections.
- Specify the mainline pavement Alternate chosen. The pavement Alternate chosen for the mainline will not be a part of the Technical Proposal evaluation and the selection thereof will not impact the Technical Scores.
- Specify the base option chosen (ABC or asphalt) for all -Y- Lines, ramps, loops, service roads and roundabouts.

- If applicable, specify where all underlying longitudinal joints will be located and demonstrate how the underlying longitudinal joint location will minimize reflective cracking.
- Indicate how longitudinal joints will be located on a lane line or lane midpoint.
- Identify drainage modifications and designs to be implemented.
- Provide a brief summary of the mainline hydroplaning risk assessment and proposed mitigation.
- Provide a *Box Culverts and Cross Pipes Hydraulic Assessment Table* that contains the box culvert and cross pipe attributes noted in the Hydraulics Scope of Work found elsewhere in this RFP.
- Identify the months the Department should schedule the interagency hydraulic design review meeting and the interagency permit impacts meeting.
- Provide the approximate easement and right of way acreage that will be needed from each State and Federally owned property, including National Forest Lands.
- Identify all bridge types to be constructed, including any special design features or construction techniques needed.
- Indicate how the future SR 1104 (Fisher Avenue) symmetrical widening can be accomplished without the need to 1) reconstruct any of the substructure elements of the US 70 bridges over SR 1104 (Fisher Avenue) or 2) obtain a future design exception.
- Indicate the type and number of bridge expansion joints.
- For roadways being widened and transitions required to tie to existing, identify all locations where a three-foot vertical separation between the groundwater table and the bottom of the pavement structure was not provided, and indicate why it was not practicable to provide the separation.
- Identify types of any retaining walls and / or sound barrier walls, if applicable.
- Describe any geotechnical investigations to be performed by the Design-Build Team and note any deviations to NCDOT requirements for subsurface investigations noted in the Geotechnical Engineering Scope of Work found elsewhere in this RFP.
- Identify the approximate location of new permanent ITS devices and when they will be installed and operational in their permanent location.
- Identify any aesthetic considerations not required herein that will be part of the design.
- Describe how the Design-Build Team's design and construction methods avoid and / or minimize impacts to the North Carolina Railroad right of way.
- Describe how utility conflicts will be addressed and any special utility design considerations. Describe how the Design-Build Team's design and construction methods minimize the Department's utility relocation costs.
- Describe how the design will affect the Department's right of way costs.
- Provide a Preliminary Signing Concept Map that includes, at a minimum, all proposed ground mounted Type A and B guide signs.
- Describe any proposed special materials, designs and / or construction methods, not referenced elsewhere in this RFP, that will reduce long term maintenance costs.



### 3. Schedule and Milestones - 25 points

- Provide a brief narrative description of the Design-Build Team’s proposed plan for performing construction on the project. The description shall include at least the following:
  - Indicate if, and how, the Design-Build Team intends to divide the project into work segments to enable optimum construction performance.
  - Describe the Design-Build Team’s plans and procedures to ensure timely deliveries of materials to achieve the project schedule.
- Provide a detailed schedule for the project including both design and construction activities. The schedule shall show the sequence and continuity of operations, as well as the month of delivery of usable segments of the project.
- Indicate the specific construction activities that will occur outside jurisdictional resources prior to obtaining the environmental permits and their anticipated start date.
- Indicate how the Design-Build Team will maintain the project schedule if the right of way acquisition process, railroad agreements and / or utility relocations are delayed.
- Identify any self-imposed liquidated damages and associated Intermediate Contract Time(s), if applicable.
- The schedule shall also include the Design-Build Team’s final completion date and, if proposed, their substantial completion date. **These dates shall be clearly indicated on the Project Schedule and labeled “Final Completion Date” and “Substantial Completion Date”.**

### 4. Innovation / Added Value - 10 points

- Identify any aspects of the design or construction elements that the Design-Build Team considers innovative.
- If applicable, describe design parameters / constructions methods that provide added value to the Department.
- Provide a summary of all Alternative Technical Concepts (ATC) submitted, regardless of inclusion or approval status. At a minimum, include innovative and / or added value details associated with each ATC in the aforementioned summary. It is recommended, but not required, that this summary be provided as part of the 11-inch by 17-inch plan sheets.

### 5. Maintenance of Traffic and Safety Plan - 25 points

#### *Maintenance of Traffic*

- Provide a Transportation Management Phasing Concept (TMPC).
- Identify the type of positive median cross-over protection proposed and replacement / resetting requirements.
- Describe any traffic control measures that will be used for each construction phase.
- Describe how traffic will be maintained as appropriate and describe the Design-Build Team’s understanding of any time restrictions noted in the RFP.

- Describe the Design-Build Team’s approach to site access and material staging.
- Specifically describe how business, school and residential access will be maintained, if applicable.
- Address how hauling will be conducted, including but not limited to, hauling of materials to and from the site and hauling of materials within NCDOT right of way.
- Describe the Design-Build Team’s approach to providing the public access to project personnel for inquiries on vehicular and pedestrian traffic impacts.
- If a temporary portable barrier system will be utilized, provide the type and why it is needed.
- If temporary shoring will be required to maintain traffic, provide the type and why it is required.
- Include all proposed road closures, detour routes, durations and justifications.
- Address where and how law enforcement officers will be used.
- Identify a Traffic Control Supervisor and briefly describe their qualifications for this role.

### ***Safety Plan***

- Describe the safety considerations specific to the project.
- Describe any proposed improvements that will be made prior to or during construction that will enhance the safety of the work force and / or travelling public both during and after the project construction.

### **6. Oral Interview - 3 points**

- The Design-Build Team’s Project Management Team shall present a brief introduction of the project team and design / construction approach.
- Introductory comments shall be held to no more than 30 minutes.
- The Department will use this interview to ask specific questions about the Design-Build Team’s Technical Proposal, background, philosophies and project approach.
- Presentation, questions, and answers shall not exceed 90 minutes. No more than ten people from the Design-Build Team may attend.

The Department will use the information presented in the oral interview to assist in the Technical Proposal evaluation, including but not limited to impacting the other evaluation criteria both positively and negatively.

### **Additional Warranty and / or Guarantee**

- **The Extra Credit for this project shall be a Maximum of 5 Points.**

A twelve-month guarantee, as outlined in the *Twelve-Month Guarantee* Project Special Provision found elsewhere in this RFP, is required for this project. However, the Design-Build Team may provide additional warranties and / or guarantees at their discretion. The Design-Build Team may be awarded additional points as “extra credit” to be added to the Technical Score.

The Design-Build Team may provide warranties and / or guarantees for major components of the project. Examples of major components are pavements, bridge components and sign structures. If additional warranties and / or guarantees are offered, the Design-Build Team shall indicate in the Technical Proposal the general terms of the warranties and / or guarantees, a list of the items covered, performance parameters, notification and response parameters for corrective action, and evaluation periods. The Department will be responsible for annual inspections of the components covered by all warranties and / or guarantees offered by the Design-Build Team that extend beyond the required twelve-month guarantee. The warranties and / or guarantees shall also define how disputes will be handled.

No direct payment will be made for warranties and / or guarantees. Payment will be considered incidental to the lump sum price for the contract.

### ***SELECTION PROCEDURE***

There will be a Technical Review Committee (TRC) composed of five or more senior personnel from involved engineering groups that will evaluate the Technical Proposal on the basis of the criteria provided in the Request for Proposals.

The selection of a Design-Build Team will involve both technical quality and price. The Technical Proposals will be presented to the TRC for evaluation. The TRC shall first determine whether the Technical Proposals are responsive to the Request for Proposals requirements. The Department reserves the right to ask for clarification on any item in the Technical Proposal. A written response to this request for clarification shall be provided to the Department prior to the opening of the Price Proposals. The contents of the written response may affect the Technical Review Committee's determination of the Technical Proposal's responsiveness and / or the overall evaluation of the Technical Proposal. If any commitments or clarifications provided in the written response conflict with the contents of the Technical Proposal, the contents of the written response shall govern and be incorporated into the contract.

Each responsive Technical Proposal shall be evaluated based on the rating criteria provided in the Request for Proposals. The TRC will submit an overall consensus Technical Score for each Design-Build Team to the State Contract Officer.

The State Contract Officer will use a table based on the maximum quality credit percentage to assign a Quality Credit Percentage to each Technical Proposal based on that proposal's overall consensus Technical Score. The maximum quality credit percentage for this project will be **30%**. The Technical Review Committee may elect to assign point values to the nearest one-half of a point (e.g. 90.5). In this event, the Quality Credit Percentage will be determined by linearly interpolating within the table entitled "Quality Credit Percentage for Technical Proposals".

**Quality Credit Percentage for Technical Proposals**

| Technical Score | Quality Credit (%) | Technical Score | Quality Credit (%) |
|-----------------|--------------------|-----------------|--------------------|
| 100             | 30.00              | 84              | 14.00              |
| 99              | 29.00              | 83              | 13.00              |
| 98              | 28.00              | 82              | 12.00              |
| 97              | 27.00              | 81              | 11.00              |
| 96              | 26.00              | 80              | 10.00              |
| 95              | 25.00              | 79              | 9.00               |
| 94              | 24.00              | 78              | 8.00               |
| 93              | 23.00              | 77              | 7.00               |
| 92              | 22.00              | 76              | 6.00               |
| 91              | 21.00              | 75              | 5.00               |
| 90              | 20.00              | 74              | 4.00               |
| 89              | 19.00              | 73              | 3.00               |
| 88              | 18.00              | 72              | 2.00               |
| 87              | 17.00              | 71              | 1.00               |
| 86              | 16.00              | 70              | 0.00               |
| 85              | 15.00              |                 |                    |

**The maximum Technical Score, including any extra credit given for warranties or guarantees, shall not exceed 100 points in determining the Quality Credit percentage.**

If any of the Technical Proposals are considered non-responsive, the State Contract Officer will notify those Design-Build Teams of that fact. The State Contract Officer shall publicly open the sealed Price Proposals and multiply each Design-Build Team's Price Proposal by the Quality Credit Percentage earned by the Design-Build Team's Technical Proposal to obtain the Quality Value of each Design-Build Team's Technical Proposal. The Quality Value will then be subtracted from each Design-Build Team's Price Proposal to obtain an Adjusted Price based upon Price and Quality combined. Unless all Technical Proposals are non-responsive or the Department elects to proceed with the Best and Final Offer process, the Department will recommend to the State Transportation Board that the Design-Build Team having the lowest adjusted price be awarded the contract. The cost of the Design-Build contract will be the amount received as the Price Proposal.

The following table shows an example of the calculations involved in this process.

### **An Example of Calculating Quality Adjusted Price Ranking**

| <b>Proposal</b>  | <b>Technical Score</b> | <b>Quality Credit (%)</b> | <b>Price Proposal (\$)</b> | <b>Quality Value (\$)</b> | <b>Adjusted Price (\$)</b> |
|--|------------------------|---------------------------|----------------------------|---------------------------|----------------------------|
| A  | 95                     | 25.00                     | 3,000,000                  | 750,000                   | 2,250,000                  |
| B  | 90                     | 20.00                     | 2,900,000                  | 580,000                   | 2,320,000                  |
| C *  | 90                     | 20.00                     | 2,800,000                  | 560,000                   | 2,240,000                  |
| D  | 80                     | 10.00                     | 2,700,000                  | 270,000                   | 2,430,000                  |
| E  | 70                     | 0.00                      | 2,600,000                  | 0                         | 2,600,000                  |
| * Successful Design-Build Team - Contract Cost \$2,800,000 |                        |                           |                            |                           |                            |

### **Opening of Price Proposals**

Prior to opening the Price Proposals, the State Contract Officer will provide to each Design-Build Team their Technical Score in a sealed envelope. The sealed envelope will only contain that Design-Build Team's Technical Score.

At the time and date specified, the State Contract Officer will open the Price Proposals and calculate the percentage difference between the Price Proposals submitted and the Engineer's Estimate.

Should all of the Price Proposals be within an acceptable range or below the Engineer's Estimate, the State Contract Officer will proceed to calculate the quality credit and publicly read the Price Proposals, Technical Scores and Adjusted Prices as outlined in the selection procedure above.

Should any one or more of the Price Proposals be within an acceptable range or below the Engineer's Estimate and the remaining Price Proposals exceed an acceptable range of the Engineer's Estimate, the State Contract Officer will go to a separate location to calculate the quality credit and determine if the Design-Build Team with the lowest Adjusted Price is within an acceptable range of the Engineer's Estimate. Should the Price Proposal of the Design-Build Team with the lowest Adjusted Price be within an acceptable range of the Engineer's Estimate or below the Engineer's Estimate, the State Contract Officer will proceed to publicly read the Price Proposals, Technical Scores and Adjusted Prices. Should the Price Proposal of the Design-Build Team with the lowest Adjusted Price exceed an acceptable range of the Engineer's Estimate, the State Contract Officer will publicly read the Price Proposals only and the Department will then determine whether to proceed to request a Best and Final Offer (BAFO) as outlined below.

Should all Price Proposals submitted exceed an acceptable range of the Engineer's Estimate, the State Contract Officer will publicly read the Price Proposals only. The Department will then determine whether to proceed to request a Best and Final Offer (BAFO) as outlined below.

In the event that the Department elects not to proceed with a Best and Final Offer (BAFO), then the State Contract Officer will schedule a date and time to publicly reiterate all Price Proposals, and read all Technical Scores and Adjusted Prices.

Provided the Department elects to proceed to request a Best and Final Offer (BAFO), at the date and time specified, the State Contract Officer will open the Best and Final Offer Price Proposals and proceed to publicly read all Price Proposals, Technical Scores and Adjusted Prices.

### **Best and Final Offer**

In the event initial Price Proposals exceed an acceptable range of the Engineer's Estimate or if the Department feels it is necessary, for any reason, the Department may choose to make amendments to the details of the RFP and request a Best and Final Offer from all the previously short-listed teams. Alternately, the Department may choose to redistribute to the short-listed Design-Build Teams another RFP for the project with no amendments to the RFP scope.

After receipt of the redistributed RFP, the Design-Build Team has the option of changing the Technical Proposal details to adhere to the RFP modifications. If the Design-Build Team changes any component of the Technical Proposal, the TRC will review those amended components of the Technical Proposal and reevaluate the scores accordingly. The Design-Build Team shall highlight the changes to bring them to the Department's attention. A revised consensus Technical Score will be calculated, if appropriate, based on these amendments to the Technical Proposal.

Additional oral interviews will not be held. The Design-Build Teams shall submit both a revised Price Proposal and a revised Technical Proposal (if applicable) at the time, place and date specified in the redistributed RFP. A revised Quality Credit Percentage (if required) and Adjusted Price will be determined. This will constitute the Design-Build Team's Best and Final Offer. Award of the project may be made to the Design-Build Team with the lowest Adjusted Price on this Best and Final Offer.

### **Stipend**

A stipulated fee of **\$285,000.00** will be awarded to each short-listed Design-Build Team that provides a responsive, but unsuccessful, Design-Build Proposal. If a contract award is not made, all short-listed Design-Build Teams that provide a responsive Design-Build Proposal shall receive the stipulated fee. Once award is made, or a decision is made not to award, unsuccessful Design-Build Teams can apply for the stipulated fee by notifying the State Contract Officer in writing and providing an original invoice within 60 days of Award. If the Design-Build Team accepts the stipulated fee, the Department reserves the right to use any ideas or information contained in the Design-Build Proposal and / or Alternative Technical Concepts, whether incorporated into the Design-Build Proposal or not, in connection with any contract awarded for the project, or in connection with any subsequent procurement, with no obligation to pay additional compensation to the unsuccessful Design-Build Team. The stipulated fee shall be paid to eligible Design-Build Teams within ninety days after the contract award or the decision not to award. Unsuccessful Design-Build Teams may elect to refuse payment of the stipulated fee and retain any rights to its Design-Build Proposal and the ideas and information contained therein.

In the event that the Department suspends or discontinues the procurement process prior to the Technical Proposal or Price Proposal submittal date current at the time of the suspension, no stipulated fee will be paid.

**ROADWAY SCOPE OF WORK** (6-23-22)

**Throughout this RFP, references to the Preliminary Roadway Plans shall denote the R-5777C Public Meeting Preferred Alternative Maps dated August 2020 (Revised October 26, 2020).**

**Throughout this RFP, references to the mainline and -L- Line shall denote US 70.**

**Project Details**

- The Design-Build Team shall design and construct a four-lane divided freeway from the northern limits of the proposed US 70 median barrier on the R-1015 Project (+/- Station 578+90 -L-, based on the R-1015 Project) to Station 250+00.00 -L-, based on the U-5713 / R-5777A & B Project. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct the mainline, including all ramps and loops, providing the same or better access, widening, improvements and traffic measures of effectiveness, in the Department's sole discretion, included in the Preliminary Roadway Plans provided by the Department. The mainline, including all ramps and loops, construction limits shall be of sufficient length to tie to existing based upon the current NCDOT guidelines and standards. The mainline shall be designed and constructed to meet a 75 mph design speed for a level rural freeway designed to interstate standards. The mainline shall be designed and constructed in accordance with the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 3-10 ( $e_{\max} = 8\%$ ). The Design-Build Team shall provide all other design criteria in the Technical Proposal.
- The Design-Build Team shall design and construct the mainline shoulders as follows:
  - Design and construct minimum 12-foot outside shoulders (ten-foot useable shoulder width plus two feet), ten-foot of which shall be full depth paved shoulders, including all acceleration, deceleration and auxiliary lanes, and ramps / loops to the back of the gore (12-foot width).
  - Unless noted otherwise elsewhere in this RFP, design and construct minimum six-foot median shoulders, four-foot of which shall be full depth paved shoulders.
- At the southern project limits, the Design-Build Team shall transition the R-1015 proposed US 70 median width to 46 feet. Within this transition, the Design-Build Team shall design and construct a full depth paved median and Type "T" double-faced concrete median barrier where the median width and / or ditch slope will not allow cable guiderail installation. Excluding the transition required to tie to the R-1015 proposed median width, the mainline median width shall be 46 feet.
- The Design-Build Team shall coordinate with Projects R-1015 and U-5713 / R-5777A & B design and construction to ensure accurate hydrology, capacity, and horizontal and vertical ties that adhere to the design criteria. The Design-Build Team shall not make any design or construction revisions that impact the design or construction of Projects R-1015 and U-5713 /

R-5777A & B without prior written approval from the Design-Build Unit. The aforementioned prior written approval shall occur 1) through the ATC Process prior to Award or 2) through coordination and / or submittals to the Design-Build Unit after Award. (Reference the *Alternative Technical Concepts and Confidential Questions and Cooperation Between Contractors* Project Special Provisions found elsewhere in this RFP)

- The Design-Build Team shall not modify the US 70 / SR 1106 (Stately Pines Road) interchange configuration (ramps in quadrants A, B, and D, a loop in quadrant D, and roundabouts at the ramp / loop terminals) or reduce the ramp terminal and service road separations along SR 1106 (Stately Pines Road). Alternative Technical Concepts (ATCs) that modify the US 70 / SR 1106 (Stately Pines Road) interchange configuration or reduce the ramp terminal and service road separations along SR 1106 (Stately Pines Road) provided by the Department are not permitted and will not be evaluated or considered.
- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct roundabouts at all ramp / loop terminals.
- In lieu of the roundabout shown on the Department's Preliminary Roadway Plans, the Design-Build Team shall design and construct the SR 1104 (Fisher Avenue) / Ramp A / Ramp B intersection as a standard intersection with stop control at the Ramp A terminal.
- The Design-Build Team will not be required to design or construct ramps or bridges to accommodate future loops or future auxiliary lanes.
- To the maximum extent practicable, the Design-Build Team shall avoid or minimize impacts to the North Carolina Railroad (NCR) right of way. The Design-Build Team shall describe how the Design-Build Team's design and construction methods avoid or minimize impacts to the NCR right of way in the Technical Proposal.
- The Design-Build Team shall design and construct one-lane ramps that provide a minimum 16-foot lane width. The Design-Build Team shall design and construct two-lane ramps that provide minimum 12-foot lanes. All ramps shall have 14-foot outside shoulders, four-foot of which shall be full depth paved shoulders and 12-foot inside shoulders, four-foot of which shall be full depth paved shoulders.
- The Design-Build Team shall design and construct loops that adhere to Table 3-27, *Design Widths of the Traveled Way for Turning Roadways* and Table 3-28, *Design Width Modifications for Edge Conditions of the Traveled Way for Turning Roadways*, shown in the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* - Case II / Condition C for one-lane loops; Case III / Condition C for two-lane loops. All loops shall have 12-foot outside shoulders, four-foot of which shall be full depth paved shoulders. All loops shall have 2'-6" curb and gutter along the inside edge of pavement, with a 14-foot berm. The minimum loop design shall be 30 mph with a minimum 230-foot radius.
- The DGT Ventures, LLC parcel - Parcel ID No. 7-048-015 (located adjacent to the US 70 / SR 1112 (Camp Kiro Road) interchange - Ramp C) is slated for redevelopment. Unless



approved by the Department, in writing, the Design-Build Team shall not further impact the DGT Ventures, LLC parcel beyond that shown on the Preliminary Roadway Plans provided by the Department. Unless approved otherwise by the Department, in writing, the Design-Build Team shall not acquire right of way, easements and / or control of access from the aforementioned parcel beyond the limits shown on the Preliminary Roadway Plans provided by the Department.

- Unless noted otherwise elsewhere in this RFP, the maximum allowable cut and fill slopes shall be 3:1. (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP) The slopes in the interchange area shall follow the requirements set forth in the *Roadway Design Guidelines for Design-Build Projects* located on the Design-Build website.
- Unless noted otherwise elsewhere in is RFP, the Design-Build Team shall design and construct -Y- Lines, service roads and cul-de-sacs providing the same or better access, widening, improvements and traffic measures of effectiveness, in the Department's sole discretion, -Y- Line and service road construction shall be of sufficient length to tie to existing based upon the current NCDOT guidelines and standards.
- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct at-grade intersections with the lane configurations noted in the December 18, 2019 R-5777C *Traffic Analysis Technical Memorandum* provided by the Department. At all intersections impacted by the Design-Build Team's design and / or construction, excluding resurfacing, the Design-Build Team shall design and construct turn lanes that adhere to the greater of the following:
  - All turn lane lengths shall adhere to the NCDOT Recommended Treatment for Turn Lanes. These lengths shall be determined by adding 1) the storage length defined in the aforementioned Memorandum or Section 8.7.2.2 of the NCDOT *Roadway Design Manual*, if not provided in the aforementioned Memorandum, and 2) the desirable deceleration length, as defined in the NCDOT *Roadway Design Manual* Figure 8-10.
  - Right turn lanes / tapers shall be provided in accordance with the NCDOT Right Turn Lane Warrants, as defined in the NCDOT *Roadway Design Manual* (Reference Section 8.7, Figure 8-8).
  - Taper only right turn lanes shall be a minimum of 230-foot, 265-foot, and 300-foot for design speeds of 40 mph, 50 mph, and 60 mph respectively.
- For all interchange / intersection design modifications, the Design-Build Team shall provide a traffic analysis that adheres to the July 1, 2015 NCDOT *Congestion Management Capacity Analysis Guidelines* for the Department's review and acceptance.
- The Design-Build Team shall design and construct all -Y- Lines such that the through movement is not required to change lanes throughout the project limits.

- Unless noted otherwise elsewhere in this RFP, all roundabouts shall adhere to the design and operation parameters as detailed in NCHRP Report 672: *Roundabouts: An Informational Guide* - Second Edition. Prior to incorporating any roundabout not shown on the Preliminary Roadway Plans provided by the Department or any roundabout not required herein, the Design-Build Team shall provide a traffic analysis of the proposed roundabout(s), utilizing the R-5777C *Traffic Forecast Report - 2045 Future Year - Build* traffic volumes and SIDRA Intersection 8.1 or higher analysis software, for NCDOT review and acceptance. In addition to the requirements noted above all roundabouts shall adhere to the following:
  - The Design-Build Team shall design and construct all roundabouts to accommodate a WB-62FL design vehicle without the cab of the truck traversing over the center truck apron or the trailer traversing over the exterior 2'-6" curb and gutter.
  - The Department prefers a maximum 25 mph roundabout entry speed. Thus, justification, in the Department's sole discretion, shall be provided for all entry speeds that exceed 25 mph. The Design-Build Team shall perform a fastest path performance check and provide the results to the Department for review and acceptance.
  - The Department prefers that all roadway grades approaching a roundabout are 4.0% or less. Thus, justification, in the Department's sole discretion, shall be provided for all roadway approach grades that are steeper than 4.0%.
  - The Design-Build Team shall design and construct all single-lane circular roundabouts with a minimum Inscribed Circle Diameter (ICD) of 130 feet.
  - The Design-Build Team shall design all roundabouts with an angle of intersection not less than 75 degrees for each leg.
  - The Design-Build Team shall design and construct chicanes along the approach roadway when the approach roadway design speed is greater than 50 mph. The Design-Build Team will not be required to provide chicanes between roundabouts located at adjacent ramp terminals.
  - The Design-Build Team shall design and construct splitter islands along the approach roadway when the approach roadway design speed is 50 mph or less. At a minimum, the splitter islands shall be 100 feet in length and extend beyond the end of the exit curve.
  - The Design-Build Team shall design and construct all chicanes and splitters islands with a minimum six-foot width.
  - The Design-Build Team shall design and construct five-inch keyed-in monolithic concrete islands for all roundabout approach / departure channelization islands, including the chicane and splitter islands.
  - The roundabout center island shall be capped with four inches of concrete. All roundabout approach / departure channelization islands shall be designed and constructed with

concrete. The Design-Build Team shall incorporate a red dye into the aforementioned center island and channelization island concrete prior to finishing, and stamp the concrete with a brick pattern. The Design-Build Team shall submit the red dye and brick pattern to the Engineer for review and approval prior to constructing the islands. If the circulating roadway is constructed with concrete, then the center island truck apron shall also be constructed with red dye concrete and stamped with a brick pattern.

- When roundabouts are constructed at adjacent ramp terminals, the Design-Build Team shall design and construct a continuous minimum 16-foot wide concrete median island, with nine-inch offsets to each adjacent travel lane, between the roundabouts. The aforementioned median island shall be a five-inch keyed-in monolithic concrete island.
- Along the outside edge of the roundabout pavement, the Design-Build Team shall design and construct 2'-6" curb and gutter, with a minimum ten-foot berm. At a minimum, the 2'-6" curb and gutter shall extend along all approach / departing roadways to the approach / departing curve radius point.
- The Design-Build Team shall design and construct minimum 16-foot travel lanes inside the roundabout.
- The Design-Build Team shall design and construct 1'-6" mountable curb and gutter between the roundabout lane and the concrete truck apron. The slope of the 1'-6" curb and gutter shall match the travel lane pavement slope. The Design-Build Team shall design and construct 9" x 18" concrete curb between the truck apron and the center island.
- At all intersections with restricted movements impacted by the Design-Build Team's design and / or construction methods, excluding resurfacing, the Design-Build Team shall provide five-inch keyed-in concrete monolithic channelization islands, regardless of the island dimensions. (Reference Roadway Standard Drawing No. 852.01)
- The Design-Build Team shall design and construct minimum four-foot wide five-inch keyed-in concrete monolithic channelization islands, with nine-inch offsets to the adjacent lanes, that delineate and separate all dual left turn lanes from the opposing through lanes.
- In accordance with the NCDOT Right of Way Manual, the Design-Build Team shall develop Service Road Studies for all land-locked parcels and / or as required by variations to the Department's design. If the aforementioned Service Road Studies indicate that service roads are required that are not shown on the Preliminary Roadway Plans provided by the Department, the design and construction costs of the additional service roads shall be as follows:
  - If the Design-Build Team demonstrates, to the Department's sole satisfaction, that the additional service road(s) are required for the Department's preliminary design, the service road(s) design and construction, including all associated NEPA requirements, will be paid for as extra work in accordance with Subarticle 104-8-(A) of the NCDOT *Standard Specifications for Roads and Structures*.

- If variations to the Department's proposed design and / or construction methods require additional service road(s), the service road(s) design and construction, as well as all associated NEPA requirements, shall be included in the Design-Build Team's lump sum bid for the entire project.
- The Design-Build Team shall not eliminate any service roads shown on the Preliminary Roadway Plans provided by the Department without the Department's written approval. The aforementioned written approval shall occur 1) through the ATC Process prior to Award or 2) through coordination and / or submittals to the Design-Build Unit after Award. (Reference the *Alternative Technical Concepts and Confidential Questions* Project Special Provision found elsewhere in this RFP).
- The Design-Build Team shall design and construct all service roads in accordance with the following requirements:
  - Adhere to a minimum 50 mph design speed and the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 3-8 ( $e_{\max} = 4\%$ ).
  - Travel lane widths shall be the greater of 1) 11 feet, 2) the width required for the functional classification and design year traffic, 3) the width shown in the MicroStation .dsn file provided by the Department, or 4) the existing width.
  - Paved shoulder widths shall be the greater of 1) five feet, 2) the width required for the functional classification and design year traffic, 3) the width shown in the MicroStation .dsn file provided by the Department, or 4) the existing width.
  - Total shoulder widths (turf and paved) shall be the greater of 1) the width required for the functional classification and design year traffic, 2) the paved shoulder width plus two feet, or 3) the existing width.
  - At a minimum, the limits of constructions shall encompass the "Proposed Roadway" limits shown on the Preliminary Roadway Plans provided by the Department, and all gaps between the Department's Preliminary Roadway Plans and the U-5713 / R 5777A & B Project construction limits.
- The Design-Build Team shall provide cul-de-sacs on all roads that are dead-ended. All cul-de-sacs shall be designed and constructed with a minimum 30-foot radius
- The mainline grade point shall be located on the inside edge of the median lane. In a normal crown section, the mainline lanes shall slope in the same direction from the pavement edge adjacent to the median shoulder to the outside edge of pavement at a 0.025 cross slope.
- The project will convert US 70 to a full control of access facility. The Design-Build Team shall bring to the Design-Build Unit's attention any deviations from the proposed control of access and / or right of way shown on the Preliminary Roadway Plans provided by the Department. The proposed control of access and / or right of way limits may deviate in proximity to

cemeteries, cultural, historic, or otherwise protected landmarks, to eliminate / minimize impacts. Prior to negotiating right of way, easements and / or control of access with property owners, the Department shall accept the Right of Way Plans developed by the Design-Build Team.

- Prior to installation, the Design-Build Team shall coordinate with, and obtain approval from, the NCDOT for the control of access fence placement. The Design-Build Team shall be responsible for installation of the control of access fence as noted below:
  - Except as required otherwise below, the Design-Build Team shall install woven wire fence.
  - The Design-Build Team shall install chain link control of access fence with half-inch mesh glare screen where service roads are adjacent to the mainline.
  - The Design-Build Team shall replace, in kind, all control of access fence damaged during construction.
  - The Design-Build Team shall install all missing control of access fence, matching the adjacent fence type.
- In accordance with the *US Department of Agriculture Forest Service Region 8 Gate Typical* provided by the Department, the Design-Build Team shall replace all USFS gates impacted by the project. The Design-Build Team shall design and construct all USFS gates to be locked and unlocked with a Forest Service padlock and a cooperators padlock. Both of the aforementioned padlocks shall be housed to prevent the use of bolt cutters. In accordance with the bollard detail provided by the Department, the Design-Build Team shall install bollards on both sides of the gate, between the gate post and the tree line. The Design-Build Team shall design and construct all USFS gates to allow a WB-50 design vehicle to traverse through the gate opening with a minimum two-foot clearance to each gate post. Prior to installation, the location of all USFS gates shall be reviewed and approved by the Engineer and USFS.
- Except as required elsewhere in this RFP and / or to eliminate a design exception, the Design-Build Team shall not further impact any cultural, historical or otherwise protected landmark or topographic feature beyond that shown on the Preliminary Roadway Plans provided by the Department. Unless approved otherwise by the Department, in writing, the Design-Build Team shall not acquire right of way, easements and / or control of access from a parcel with the aforementioned features unless shown on the Preliminary Roadway Plans provided by the Department.
- The Design-Build Team shall design and construct all retaining walls a minimum of ten feet inside the right of way.
- In accordance with the NCDOT Roadway Standard Drawings, the Design-Build Team shall provide milled rumble strips along the mainline outside and median paved shoulders, including ramp and loop terminals, and acceleration, deceleration and auxiliary lanes.

- For all bridges over roadways, the Design-Build Team shall submit vertical and horizontal clearance design calculations at all critical points. The Design-Build Team shall submit post construction survey points for the aforementioned critical points that verify construction adhered to the vertical and horizontal clearances accepted by the Department. The Design-Build Team shall be responsible for all costs associated with correcting vertical and horizontal clearances resulting from any construction variation from the design accepted by the Department.
- Throughout construction areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall provide a uniform overlay or design and construct a resurfacing grade. Excluding construction areas that consist solely of pavement marking obliterations / revisions that are uniformly overlaid, the Design-Build Team shall design and construct resurfacing grades for all roadways impacted by construction. All uniform overlays and resurfacing grades shall 1) completely cover the entire pavement surface (travel lanes and paved shoulders) and 2) be extended on a one-way roadway of a divided facility, as required, to provide the same limits for both directions of travel.

All resurfacing grades shall adhere to the design criteria and standards, provide all required pavement wedging and adhere to the minimum requirements noted below. For purposes of determining the required resurfacing limits only, the term “construction” below will not apply to construction areas that consist solely of pavement marking obliterations / revisions. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

- The Design-Build Team shall resurface all lanes and shoulders of an undivided facility throughout the limits of proposed widening and construction.
- Unless noted otherwise elsewhere in this RFP, for both divided and undivided facilities, the Design-Build Team shall resurface all lanes and shoulders within the outermost construction limits of all proposed widening and construction, including **all** gaps along the facility where construction activities are not required (e.g. Green Avenue between the proposed cul-de-sac and SR 1108 (Riverdale Road)).
- Excluding the modifications required herein, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed design revisions, including but not limited to the following:
  - The Design-Build Team shall note in the Technical Proposal any proposed deviations to the preliminary design shown on the Preliminary Roadway Plans provided by the Department. The Design-Build Team shall be responsible for all activities, as deemed necessary by the Department, USFS or the FHWA, resulting from changes to the NCDOT preliminary design, including but not limited to, public involvement, NEPA re-evaluation and / or coordination with other stakeholders. The Department will not honor any requests for additional contract time or compensation for completion of the required activities resulting from changes to the NCDOT preliminary design.

- After the contract has been Awarded, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed changes to the design shown in the Technical Proposal.
- After the Department has reviewed and accepted the Design-Build Team's design submittals, the Design-Build Team shall inform the Design-Build Unit, in writing, of any changes to previously reviewed submittals, including but not limited to changes to RFC Plans.

The proposed design revisions noted above shall be subject to the Department's review and acceptance.

- Design exceptions will not be allowed for 1) the mainline, including all ramps and loops, or 2) service road vertical alignments over drainage pipes. The Department prefers not to have design exceptions for the -Y- Lines and other service road design parameters. If the Design-Build Team anticipates any allowable design exceptions, the Design-Build Team shall identify the design exception details, including but not limited to the associated justification, in the Technical Proposal. Prior to requesting / incorporating a design exception into the Preliminary Plans developed by the Design-Build Team, the Design-Build Team shall inform the Design-Build Unit, in writing, and obtain prior conceptual approval from the Design-Build Unit. If conceptual approval is obtained, the Design-Build Team shall be responsible for the development and approval of all design exceptions. A design exception will only be approved if the design exception request demonstrates, in the Department's sole discretion, that a design exception is warranted and that it cannot be reasonably and / or feasibly eliminated.
- Prior to recording the Right of Way Plans, the Design-Build Team shall locate and install right of way markers that delineate the proposed right of way for all parcels within the project limits. The Design-Build Team will be allowed to temporarily delineate the aforementioned proposed right of way with temporary metal caps and fiberglass markers prior to recording the Right of Way Plans. However, prior to final project acceptance, the Design-Build Team shall locate and install permanent concrete right of way markers to delineate the aforementioned proposed right of way. The Design-Build Team shall remove and dispose of all metal caps and fiberglass markers used to temporarily delineate the proposed right of way.

For all parcels, the Design-Build Team shall locate and install metal caps with fiberglass markers that delineate all proposed permanent easements within the project limits.

The Design-Build Team shall replace all existing right of way and permanent easement markers / monuments damaged and / or relocated during construction.

In accordance with NCDOT Policy, the Department will furnish the metal caps with fiberglass markers.

- The Department will provide an accepted R-5777C Traffic Noise Report (TNR) that is based on the Department's preliminary design. The Design-Build Team shall evaluate the **entire** R-5777C project and develop a Design Noise Report (DNR) based on the plans developed by

the Design-Build Team, regardless of changes to the Department's preliminary design. The Design-Build Team shall complete TNM model validation, including but not limited to the collection of additional noise measurement data, regardless of what was included in the TNR. Unless noted otherwise in this RFP, the DNR shall be developed in accordance with the NCDOT 2016 Traffic Noise Policy and the NCDOT 2016 Traffic Noise Manual; and be reviewed and accepted by NCDOT. The DNR developed by the Design-Build Team must achieve a noise reduction design goal of at least 7dB(A) for as many impacted receptors as possible, while meeting all other feasibility and reasonableness criteria. If a 7 dB(A) noise reduction cannot be achieved for at least one impacted receptor, the sound barrier wall will not be considered reasonable. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall include all design and construction costs for all sound barrier walls required by the accepted DNR, including but not limited to all costs associated with performing any additional geotechnical investigations necessary to design the foundations, any additional utility coordination / construction, and any supplemental surveys, in the lump sum price bid for the entire project. However, the Design-Build Team will not be required to include any designs associated with the proposed sound barrier walls in the Technical Proposal. Prequalification under Discipline Code 441 shall be required for the firm developing the DNR.

The Design-Build Team is cautioned that the TNR is provided to show the general location of potential walls. Thus, as with all information provided by the Department, the TNR is provided for informational purposes only; and the Department will not honor any requests for additional contract time or compensation for any variations between the accepted TNR and the accepted DNR.

The Department will ballot all benefited receptors to determine which sound barrier walls recommended in the accepted DNR will be constructed. The Design-Build Team shall (1) develop and provide the information required by the Department to complete the balloting process, and (2) attend and / or speak at all balloting meetings and workshops. The Department will require four months to complete the balloting process. The Department will not honor any requests for additional contract time or compensation for the sound barrier wall construction unless the aforementioned four-month timeframe is exceeded. If time were granted, it would only be for that time exceeding the four-month period, which shall begin on the date the Department accepts the DNR developed by the Design-Build Team. The Design-Build Team shall not construct any sound barrier walls until the balloting process has been completed by the Department.

In accordance with Subarticle 104-8(A) of the 2018 *Standard Specifications for Roads and Structures*, if the accepted DNR and balloting process require more than 104,000 square feet of sound barrier wall on the shoulder and / or more than 0.0 square feet of sound barrier wall off the shoulder, the amount over 104,000 square feet and / or over 0.0 square feet will be paid for as extra work at the unit prices noted below:

- Sound barrier walls constructed on the shoulder - \$55.00 per square foot
- Sound barrier walls constructed off the shoulder - \$50.00 per square foot
- All work tasks required to design and construct the additional sound barrier walls, including but not limited to traffic control, pavement, drainage, concrete barrier,



geotechnical investigation, utility coordination / construction, supplemental surveys, and earthwork shall be considered inclusive in the aforementioned unit prices.

The amount of square footage to be paid for as extra work shall be determined by deducting all additional sound barrier wall square footage required as a result of horizontal and / or vertical alignment changes to the Preliminary Roadway Plans provided by the Department from the accepted DNR and balloting process sound barrier wall total square footage.

The Design-Build Team shall only credit the Department the construction cost of all sound barrier walls eliminated by the balloting process. The construction costs of all sound barrier walls eliminated solely by the balloting process shall be deducted from the lump sum amount bid for the entire project at the aforementioned unit prices.

Excluding sound barrier walls constructed in roadway cut / fill transition sections, proposed sound barrier walls constructed 1) off the shoulder in fill sections or 2) on the shoulder in cut sections shall be reviewed and approved by the Department, in writing, prior to incorporation into the DNR and Preliminary Plans developed by the Design-Build Team.

The Design-Build Team shall provide absorptive-faced sound barrier walls at the following locations:

- Where a sound barrier wall is located on the opposite side of the highway from impacted noise sensitive receptors that are not receiving a sound barrier wall and the receptors are located within ten times the proposed sound barrier wall height.
- Where the parallel barrier analysis (PBA), including PBAs for a single wall configuration with a minimum six-foot high retaining wall on the opposite side of the highway, shows that the noise reduction degradation results in noise levels and / or insertion loss values cause the sound barrier wall to not be feasible and reasonable.
- Where the PBA, including PBAs for a single wall configuration with a minimum six-foot high retaining wall on the opposite side of the highway, results in impacted receptors no longer being benefited.

At all sound barrier walls, the Design-Build Team shall provide 1) a four-foot berm between the wall and fill / cut slopes steeper than 6:1 and 2) a parallel concrete ditch at locations where the final grade slopes toward the wall.

The Design-Build Team shall design and construct all sound barrier walls a minimum of ten feet inside the right of way.

For all sound barrier walls, the Design-Build Team shall design and construct maintenance access points, as necessary and / or as directed by the Engineer.

To satisfy the FHWA's Abatement Measure Reporting requirements, the Design-Build Team shall prepare and concurrently submit a summary of the sound barrier walls to be constructed

on the project with the final sound barrier wall working drawings submittal. The Design-Build Team shall submit the sound barrier wall summary directly to the NCDOT Traffic Noise and Air Quality Group and include the information noted in Title 23 Code of Federal Regulations Part 772 Section 772.13(f), including but not limited to overall cost and unit cost per square foot.

## General

- Unless noted otherwise elsewhere in this RFP, the design shall be in accordance with the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, and 2019 Errata, NCDOT *Roadway Design Manual*, including all revisions effective on the Technical Proposal submittal date, January 2018 NCDOT *Roadway Standard Drawings*, or as superseded by detail sheets located at <https://connect.ncdot.gov/resources/Specifications/Pages/2018-Roadway-Standard-Drawings.aspx>, *Roadway Design Policy and Procedure Manual*, *Roadway Design Guidelines for Design-Build Projects*, 2018 NCDOT *Standard Specifications for Roads and Structures*, the Highway Capacity Manual, 6<sup>th</sup> Edition, and the 2011 AASHTO *Roadside Design Guide*, 4<sup>th</sup> Edition and 2015 Errata.
- If the NCDOT *Roadway Design Manual*, including all revisions, the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* and 2019 Errata, the 2018 NCDOT *Roadway Standard Drawings* and / or any other guidelines, standards or policies have desirable and / or minimum values, the Design-Build Team shall use the desirable values unless noted otherwise elsewhere in this RFP. Similarly, in case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.
- The Design-Build Team shall provide a Drainage Summary Sheet, Earthwork Summary Sheet, Guardrail Summary Sheet, (permanent and temporary) and Pavement Removal Summary Sheet in the Final Roadway Plans and RFC Roadway Plans.
- At all intersections, the Design-Build Team shall not exceed a 0.05 roll-over between the outside edge of travel lane of the primary roadway and the beginning of the proposed grade for the secondary roadway. For signalized intersections, the aforementioned roll-over shall be minimized to the maximum extent practicable.
- Unless noted otherwise elsewhere in this RFP, all bridge rail offsets shall be the greater of 1) the bridge rail offset as indicated in the NCDOT *Roadway Design Manual*, 2) the approach roadway paved shoulder width, or 3) the offset required to achieve stopping sight distance (maximum 12-foot). Narrower bridge rail offsets based on bridge length will not be allowed. The Design-Build Team will not be required to widen existing bridges solely to provide the aforementioned minimum bridge rail offsets. Where retaining walls are located along the US 70 outside shoulder approaching a bridge, the minimum outside bridge rail offset for bridges on US 70 shall be 12 feet.

- Outside the project limits, the Design-Build Team will not be allowed to use the NCDOT right of way and / or property for borrow or waste sites. Within the project limits, the Design-Build Team shall adhere to the following:
  - Only clean waste material may be wasted within the NCDOT right of way or property.
  - Excluding crushed concrete, debris shall not be buried within the NCDOT right of way or property.
  - Normal grading operations shall occur, including but not limited to, grading to drain all existing embankments supporting removed roadway sections.
  - Debris / waste material shall not be wasted within the NCDOT's perpetual right of way easement, or any other easements, on National Forest Service Lands.
- Unless noted otherwise elsewhere in this RFP, all guardrail / guiderail placement shall be in accordance with the NCDOT *Roadway Standard Drawings* and / or approved details in lieu of standards. Along all 3:1 fill slopes, constructed at fill heights that are equal to or greater than 12 feet, the Design-Build Team shall install guardrail. Along all fill slopes steeper than 3:1, constructed at fill heights that are equal to or greater than six feet, the Design-Build Team shall install guardrail. Excluding construction areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall upgrade all existing guardrail in the construction limits in accordance with the aforementioned requirements and the requirements noted below, regardless if the Design-Build Team's design and / or construction impacts the guardrail.
  - For existing guardrail that extends 100 feet or less outside the construction limits, the Design-Build Team shall replace all the existing guardrail.
  - For existing guardrail that extends more than 100 feet outside the construction limits, the Design-Build Team shall tie the proposed guardrail to the existing guardrail outside the construction limits.
  - In areas that solely consist of resurfacing and guardrail replacement, the Design-Build Team will not be required to widen the existing shoulders. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

The guardrail / guiderail design shall be submitted for review with the Preliminary Roadway Plans submittal.

- The total outside shoulder width for all facilities with defined usable shoulders shall equal the usable shoulder plus two feet.
- The Design-Build Team shall provide continuous single face concrete barrier between two segments of single face concrete barrier when 1) the two segments are less than 300 feet apart, and 2) guardrail would be required between the two segments.

- At all locations where back-to-back single face concrete barrier is provided, including but not limited to bridge piers and sign supports, the Design-Build Team shall fill the area between the single face concrete barriers with gravel and cap with four inches of concrete when the area is ten feet wide or less.
- The Design-Build Team shall be responsible for the evaluation of the algebraic difference in rates of cross slope (roll-over) between existing shoulders and roadways and the associated suitability for carrying traffic during construction, if necessary. In the event that the roll-over is found to be unacceptable for the proposed temporary traffic patterns, the Design-Build Team shall be responsible for providing cross slopes that meet design standards and eliminate roll-over concerns.
- Unless noted otherwise elsewhere in this RFP, the design speed for all roadways shall be the greater of the minimum design speed for the facility type, as specified in the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, or the anticipated / actual posted speed plus five mph. If a speed limit is not physically posted on an existing facility, General Statutes mandate the speed limit as 55 mph, resulting in a 60-mph design speed.
- The NCDOT shall review and accept the Design-Build Team's Design Criteria prior to the Preliminary Roadway Plans submittal.
- The Design-Build Team will not be required to submit separate Structure Recommendations as required by the Design-Build Submittal Guidelines. Instead, in accordance with NCDOT *Roadway Design Manual* Sections 5.3.1.1, 5.3.1.2, and 5.3.1.3, the Design-Build Team shall submit the roadway design information required to develop the Structure General Drawings with the Preliminary Roadway Plans submittal.
- Within the vehicle recovery area, the Design-Build Team shall design and construct single face concrete barrier in front of the traffic face of all shoulder piers, sound barrier walls, retaining walls, and all elements acting as a retaining wall. The Design-Build Team shall design and construct a concrete barrier with moment slab along the top of retaining walls constructed on the shoulder of US 70, all ramps and all loops. The aforementioned concrete barrier shall be located 1) beyond the typical section shoulder point and / or 2) a minimum of 12-foot behind the face of curb and gutter, requiring the Design-Build Team to widen the outside shoulder / berm beyond the typical section width. Between the single face concrete barrier and all shoulder piers, sound barrier walls, retaining walls, and all elements acting as a retaining wall, the Design-Build Team shall install minimum one-inch thick joint material. (Reference Section 1028-1 of the 2018 *Standard Specifications for Roads and Structures*)
- The Design-Build Team shall design and construct all depressed grass medians and raised medians in accordance with the following:
  - The minimum width of all depressed grass medians shall be eight feet. At all locations where a depressed grass median becomes narrower than eight feet, the Design-Build Team

shall design and construct a five-inch keyed-in concrete monolithic island in lieu of the depressed grass median.

- The Design-Build Team shall install a four-inch concrete cap on all raised medians that are eight feet wide or narrower, measured face to face from the surrounding mountable concrete curb and gutter.
- All grass covered raised medians shall be designed and constructed with topsoil and appropriate cross slope and median drain with pipe to prevent groundwater and surface water infiltration into the subgrade and / or pavement structure. Prior to construction of the grass covered raised median and / or median drain with pipe, the Design-Build Team shall submit to the Design-Build Unit, for review and acceptance, the proposed number of drains, drain locations within the typical section, topsoil specifications and construction details. Within all proposed grass covered raised median limits, the Design-Build Team shall completely remove and dispose of the existing pavement structure.
- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct all lane drops from the outside travel way.
- A sag vertical curve low point will not be allowed on any proposed bridge or approach slab.
- At all -Y- Line / -Y- Line intersection radius points, including service roads, the minimum -Y- Line pavement width shall be 30 feet.
- Excluding grades required to tie to existing, the minimum longitudinal grade shall be 0.30%, unless noted otherwise elsewhere in this RFP. Along -Y- Lines with turf shoulders, a 0.00% grade will be allowed, provided all hydraulic requirements are met. (Reference the Hydraulics Scope of Work found elsewhere in this RFP).
- At all intersections impacted by the Design-Build Team's design and / or construction methods, excluding resurfacing, the following design vehicles shall be required for all turning movements:
  - WB-62FL at all ramp / loop intersections with -Y- Lines, and all intersections on US and NC routes (For side-by-side turning maneuvers, WB-62FL for the outside movement only and SU-30 for inside movement)
  - WB-62 at all other intersections (For side-by-side turning maneuvers, WB-62 for the outside movement only and SU-30 for inside movement)
  - At all intersections, with existing / proposed pedestrian facilities, impacted by the Design-Build Team's design and / or construction methods, the Design-Build Team shall retrofit / upgrade all existing substandard curb ramps to current standards.
- Any variations in the Department's proposed design and / or construction methods that nullify any decisions reached between the Department and the environmental agencies; and / or

require additional coordination with the environmental agencies shall be the sole responsibility of the Design-Build Team. The Department will not allow any contract time extensions or additional compensation associated with any coordination or approval process resulting from design and / or construction modifications. (Reference the Environmental Permits Scope of Work found elsewhere in this RFP)

- Excluding parcels restricted by Control of Access and all undeveloped parcels except National Forest (NFS) Lands, the Design-Build Team shall design and construct a minimum of one driveway per parcel. The Design-Build Team shall design and construct all driveways to adhere to the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* and the minimum requirements noted below. Excluding the maximum grade requirements and NFS Lands requirements, if the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* and the requirements noted below have conflicting design parameters, the proposed design shall adhere to the aforementioned Policy:
  - The Design-Build Team shall provide horizontal and vertical alignments for all driveways that tie to existing beyond the clear zone or the right of way limits of the connecting -Y- Line or service road.
  - Unless shown on the Preliminary Roadway Plans provided by the Department, driveways shall not be installed in roundabouts, right turn lanes, including their taper, or within the limits of splitter islands and chicanes.
  - Excluding grades required to tie to existing, the maximum driveway grade shall be 10.0%.
  - For commercial driveway entrances that generate more than 500 ADT, design and construct a paved driveway turnout in accordance with NCDOT Roadway Standard Drawing No. 848.04. Commercial driveway entrances shall be designed and constructed to accommodate the predominant design vehicle used at the commercial facility.
  - Unless noted otherwise elsewhere in this RPF, the minimum driveway turnout along shoulder facilities shall be 16'-0" and 24'-0" for residential and commercial properties, respectively, or the existing width, whichever is greater.
  - Unless noted otherwise elsewhere in this RPF, the minimum driveway turnout along curb and gutter facilities shall be 20'-0" and 28'-0" for residential and commercial properties, respectively, or the existing width, whichever is greater.
  - All temporary and permanent driveways for NFS Lands shall be designed and constructed to accommodate a WB-50 design vehicle with a lowboy trailer.
- The Design-Build Team shall contact Mr. Gary W. Thompson, North Carolina Geodetic Survey Director, prior to disturbing any geodetic monument.
- The Design-Build Team shall identify the need for any special roadway design details (i.e. any special drainage structures, rock embankment, rock plating, special guardrail,

retaining walls, concrete barrier designs, etc.) and shall provide special design drawings. The Contract Standards and Development Unit may have special details available that can be provided to the Design-Build Team upon request.

- A 4:1 back slope shall extend from the back of the expressway gutter to the clear zone limit. Beyond that, a maximum 3:1 cut slope will be acceptable. The expressway gutter centerline shall be located at the hinge / shoulder point. Expressway gutter shall not be installed in fill sections. Expressway gutter shall only be used to minimize impacts to 1) existing structures; 2) cemeteries; 3) Craven County potable water supply well sites; and / or 4) cultural, historical or otherwise protected landmarks.
- Excluding locations to minimize impacts to existing 1) natural gas regulator stations; 2) sanitary sewer lift / pump stations; 3) Craven County potable water supply well sites; 4) structures; 5) cemeteries; and / or 6) cultural, historical or otherwise protected landmarks, the front slope of all roadway ditches, including special drainage cut ditches, shall be in accordance with the front slopes for the facility classification shown in the NCDOT *Roadway Design Manual*, Section 4.4.6, Figure 4-4. Excluding the limits of the cemetery located at Station 20+00 -L-, Right, the Design-Build Team shall design and construct all ditches adjacent to US 70, including all ramps and loops, in accordance with the desirable Ditch Type “A” as shown in the NCDOT *Roadway Design Manual* Section 4.4.6, Figure 4-4. Within the limits of the cemetery located at Station 20+00 -L-, Right, the Design-Build Team will be allowed to use a maximum 4:1 front slope and / or the minimum ditch width for the facility classification along US 70. Excluding locations where the aforementioned desirable Ditch Type “A” shall be required, the Design-Build Team will be allowed to use the minimum ditch widths for the facility classification along service roads.
- The Design-Build Team shall not impact the cemetery located at Station 20+00 -L-, Right. Retaining walls shall not be used to eliminate impacts to the aforementioned cemetery.
- At all locations with paved shoulders that extend beyond the typical width (e.g. to the face of single face barrier, guardrail, edge of expressway / shoulder berm gutter, etc.), the Design-Build Team shall taper the wider paved shoulder width to the typical paved shoulder width using an 8:1 taper. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)
- The minimum berm width along 2’-6” curb and gutter sections shall be ten feet.
- Shoulder berm gutter shall be installed in fill sections with guardrail and fill slopes steeper than 4:1, including but not limited to areas of guardrail replacement. Shoulder berm gutter shall not be installed in cut sections.
- Cut and fill slope transitions shall not exceed one increment (e.g. 3:1 to 4:1) per 50 feet.
- The Design-Build Team shall design and construct horizontal and vertical curves at all Points of Intersections (PIs) on the horizontal and vertical alignments, respectively.

- All paved shoulders shall be tapered at 8:1 to the existing pavement at tie-in points.

### **NCDOT Information Supplied**

- The NCDOT will provide a copy of the R-5777C Categorical Exclusion, the latest list of environmental commitments, and all pertinent approvals and correspondence. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall adhere to all commitments stated in the environmental documents.
- The NCDOT will provide a copy of the R-5777C Federal Land Transfer Deed and all associated construction stipulations. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall adhere to all commitments stated in the Federal Land Transfer Deed and all associated construction stipulations. If the Design-Build Team demonstrates, to the Department's sole satisfaction, that any commitment contained within the Federal Land Transfer Deed or associated construction stipulations require work not required herein, the additional work, including all associated NEPA requirements, will be paid for as extra work in accordance with Subarticle 104-8-(A) of the NCDOT *Standard Specifications for Roads and Structures*.
- The NCDOT will provide electronic surveys to the Design-Build Team. Any supplemental surveys, including but not limited to additional topography, existing and proposed roadway, structure sites, underground and overhead utilities, existing and proposed drainage, wetland delineation, right of way, parcel names, and deed research and descriptions shall be the responsibility of the Design-Build Team to acquire and process. All supplemental surveys shall adhere to the Location and Survey Unit's September 28, 2018 *Proc 2018-4 - L&S Implementation of SharePoint Site Guidelines* and *Proc 2018-6 - L&S Required PEF Attestations for Individually Developed Survey Products* Memorandums. The Design-Build Team shall modify / incorporate boundary information used for the determination and valuation of property solely under the direct supervision of a Professional Land Surveyor registered in North Carolina. Known existing utilities have been located and will be included with the survey data. The Design-Build Team shall be responsible for confirming the location of the utilities and the type / size of facilities. All supplemental Subsurface Utility Engineering (SUE) work shall be the responsibility of the Design-Build Team.
- The NCDOT will provide the R-5777C Public Meeting Preferred Alternative Map and electronic design files. The Design-Build Team is cautioned that the preliminary designs shown on the aforementioned Map, electronic design files, and plans are provided solely to assist the Design-Build Team in the development of the project design. The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of the project design, including, but not limited to, the use of the NCDOT's design, the use of portions of the NCDOT's design or modifications to the NCDOT's design.
- The NCDOT will provide final pavement designs for R-5777C. The Design-Build Team shall be responsible for all temporary pavement designs. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)



- The NCDOT will provide a Geotechnical Subsurface Investigation for R-5777C. The Design-Build Team shall be responsible for any additional geotechnical information, all geotechnical recommendations, as well as supplemental structural and roadway investigations. (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP)

**ENVIRONMENTAL PERMITS SCOPE OF WORK** (6-23-22)**General**

The Design-Build Team shall prepare all designs and documents necessary for the Department to obtain the environmental permits for the project construction. Permit applications shall be required for the US Army Corps of Engineers (USACE) Section 404 Permit, the NC Department of Environmental Quality (DEQ) Division of Water Resources (NCDWR) Section 401 Water Quality Certification Neuse Riparian Buffer Authorization, and the Division of Coastal Management Consistency Determination.

Excluding investigative borings covered under a Nationwide Permit No. 6, the Design-Build Team shall not begin ground-disturbing activities, including utility relocations, in jurisdictional areas until the environmental permits have been issued.

In accordance with the following, the Design-Build Team may perform geotechnical investigative borings covered under a Nationwide Permit No. 6 outside the National Forest Service (NFS) Lands prior to obtaining the environmental permits:

- The Design-Build Team shall coordinate with the Design-Build Unit to determine if a Preconstruction Notification (PCN) is required for the Nationwide Permit No. 6.
- If a PCN is required, the Design-Build Team shall submit all necessary documents and forms to the Design-Build Unit for submittal to the appropriate agencies; and shall not perform any geotechnical investigative work within the jurisdictional resource(s) requiring a PCN prior to obtaining the required approval.
- If a PCN is not required, the Design-Build Team may proceed with geotechnical investigations inside and outside jurisdictional resources, provided all of the Nationwide Permit No. 6 General Conditions are followed.

Outside NFS Lands, the Design-Build Team may begin construction activities prior to obtaining the aforementioned environmental permits provided that (1) the Department has reviewed and accepted the appropriate design submittal(s); (2) the Department is notified in writing and provides written approval prior to beginning work; and (3) the Environmental Analysis Unit (EAU) and / or the Division's Environmental Officer (DEO) concur that such activities are outside jurisdictional resources. The Design-Build Team is encouraged to advance as many construction activities as possible outside jurisdictional resources prior to issuance of the environmental permits. The Design-Build Team shall indicate the specific construction activities that will occur outside jurisdictional resources prior to obtaining the environmental permits and their anticipated start date in the Technical Proposal.

The Department will not allow any direct contact between the Design-Build Team and representatives of the environmental agencies. No contact between the Design-Build Team and the environmental agencies shall be allowed either by phone, e-mail or in person, without representatives of the Department's Environmental Analysis Unit (EAU) - Environmental

Coordination and Permitting Group (ECAP) or the Division's Environmental Officer (DEO) present. A representative from the Design-Build Unit shall be included on all correspondence.

The R-5777C Project is not in the Merger Process used by the environmental agencies and the Department to obtain environmental permits. On Non-Merger Projects, the Department has committed to coordination efforts with the environmental agencies. Thus, the Design-Build Team shall participate and present information for an interagency hydraulic design review meeting and an interagency permit impacts meeting. These meetings shall adhere to the Concurrence Point 4B and Concurrence Point 4C requirements of the Merger Process used by the environmental agencies and the Department to obtain environmental permits. Specifically, the Design-Build Team shall follow the appropriate details in the *Section 404 / NEPA Merger Process Information* document on the website noted below:

**<https://connect.ncdot.gov/resources/Environmental/EPU/Merger/Pages/default.aspx>**

Unless stipulated otherwise in the Technical Proposal, the Department will schedule the interagency hydraulic design review meeting and the interagency permit impacts meeting for June 2024 and September 2024, respectively. The Design-Build Team shall clearly identify in the Technical Proposal what months they would like the Department to schedule these meetings. Failure on the part of the Design-Build Team to meet the dates shown in the Technical Proposal shall place all responsibility for delays resulting from missing these dates solely in the hands of the Design-Build Team.

Any variations in the Department's proposed design and / or construction methods that nullify any decisions reached between the Department and the environmental agencies; and / or require additional coordination with the environmental agencies shall be the sole responsibility of the Design-Build Team. The Department will not allow any contract time extensions or compensation associated with this additional coordination.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be bound by the terms of all signed planning documents, and approved minutes and commitments of all interagency meetings. The Design-Build Team shall be held accountable for meeting all permit conditions. The Design-Build Team shall be required to staff any personnel necessary to provide permit compliance.

Unless noted otherwise elsewhere in this RFP, the Department will not honor any requests for additional contract time or compensation for any efforts required in order to obtain any permit or permit modification, including but not limited to public involvement, additional design effort, additional construction effort, and / or additional environmental agency coordination and approvals.

**Permit Application Process and Timeframe for all Permits except the Nationwide Permit No. 6 for Geotechnical Investigations and the USFS Special Use Permit**

It shall be the Design-Build Team's responsibility to acquire information and prepare permit drawings that reflect the impacts and minimization efforts resulting from the aforementioned interagency hydraulic design review meeting and the interagency permit impacts meeting, and from the project as designed by the Design-Build Team. Further, it shall be the Design-Build Team's responsibility to provide permit impact sheets (drawings) depicting the design and construction details to the Department as part of the permit application. The aforementioned permit impact sheets shall be reviewed and accepted by the Department prior to the permit application submittal. The Design-Build Team shall be responsible for developing the permit application for all jurisdictional impacts. The permit application shall include all utility relocations required by the project.

At a minimum, the permit application shall consist of the following:

- Cover Letter
- Completed forms (PCN, Section 404 ENG 4345, etc.) appropriate for impacts
- NCDOT Mitigation Site debit ledger and / or Division of Mitigation Acceptance Letter
- Minutes from the interagency hydraulic design review meeting and the interagency permit impacts meeting
- Stormwater Management Plan
- Permit drawings with and without contours, buffer drawings without contours and, if necessary, utility drawings with and without contours.
- Wetland Permit Impact Summary Sheets and Buffer Impact Summary Sheets
- Half-size plans
- Mitigation Plan (if required by the Design-Build Team's design and / or construction methods)

The Department will re-verify and update, as needed, the required environmental data that expires prior to permit issuance. These include, but are not limited to, federally protected species, re-verification of wetland jurisdictional areas, historic and archaeological sites, and 303d (impaired) streams.

Excluding the Nationwide Permit No. 6 for geotechnical investigations and the USFS SUP, the Design-Build Team shall submit one permit application for the entire project. The Design-Build Team shall not submit multiple applications to develop a "staged permitting" process to expedite construction activities in a phased fashion.

Any temporary construction measures, including de-watering, construction access, etc. shall be addressed in the permit application. Impacts that result from so-called temporary measures may not be judged to be temporary impacts by the environmental agencies. These issues shall be addressed by the Design-Build Team and reviewed by EAU prior to the interagency hydraulic design review meeting and the interagency permit impacts meeting; and resolved with the environmental agencies during the aforementioned meetings.

The Design-Build Team shall clearly indicate the location and impacts of haul roads and utility relocations in jurisdictional areas. The Design-Build Team shall also identify all proposed borrow and waste sites. Further, the Design-Build Team shall describe the construction methods for all structures that impact jurisdictional resources. The temporary impact descriptions (haul roads, utility relocations, work bridges, etc.) shall include restoration plans, schedules and disposal plans. The aforementioned information, descriptions and details shall be presented during the interagency hydraulic design review meeting and the interagency permit impacts meeting and be included in the permit application.

The NCDOT hereby commits to ensuring, to the greatest extent practicable, that the footprint of the impacts in areas under the jurisdiction of the Federal Clean Water Act will not be increased during the Design-Build effort. In accordance with the Department of Water Resources' NCG 010000, all fill material shall be stabilized and maintained to prevent sediment from entering adjacent waters or wetlands. The Design-Build Team shall be responsible for ensuring that the design and construction of the project will not impair the movement of aquatic life.

Permit modification requests are strongly discouraged and shall only be allowed if the Engineer determines it to be in the best interest of the Department. The Design-Build Team shall not take an iterative approach to hydraulic design issues. Prior to submitting the permit application, the hydraulic design shall be complete and accepted by the Department.

Direct coordination between the Design-Build Team, the Design-Build Unit, Resident Engineer, DEO, Hydraulics Unit, and EAU shall be necessary to ensure proper permit application development. Upon completion of the draft permit application, the Design-Build Team shall concurrently forward the permit application to the Design-Build Unit, Resident Engineer, DEO, Hydraulics Unit and EAU for review and approval. After all revisions are complete, the Department will subsequently forward the "complete" permit application to the appropriate environmental agencies.

The Design-Build Team should expect it to take up to seven months to accurately and adequately complete all designs necessary for the permit application and develop the permit application. The Design-Build Team shall assume the environmental agencies will take up to 120 days to review the complete permit application and issue the permits and certifications. No requests for additional contract time or compensation will be allowed if the environmental agencies issue the permits and certifications within this 120-day period. The Department will only consider requests for contract time extensions for the environmental agencies' review if the 120-day period has been exceeded. If time were granted, it would be only for that time exceeding the 120-day period. The 120-day period is considered to begin on the date the Department submits a fully complete and 100% accurate permit application to the environmental agencies; and does not include the time required for commitment reconciliation or obtaining signatures after the permits and certifications are received from the environmental agencies.

## National Forest Service Lands

Prior to accessing or impacting NFS Lands, the following requirements shall be adhered to:

- A minimum of one week prior to performing any non-invasive visual inspections, including but not limited to a visual inspection of wetlands and drainage areas, the Design-Build Team shall notify the USFS and obtain their permission. (Contact Ron Hudson, Croatan District Ranger, at (252) 638-5628 or [rondall.hudson@usda.gov](mailto:rondall.hudson@usda.gov))
- During the Design-Build procurement process, the Design-Build Team shall not perform any ground disturbing activities, including but not limited to geotechnical investigative borings.
- Post award, the Design-Build Team shall not perform any ground disturbing activities, including but not limited to geotechnical investigative borings until 1) either a Nationwide Permit No. 6, if required, has been issued or the environmental permits have been issued, **and** 2) either the Design-Build Team has obtained a USFS Special Use Permit (SUP) or the USFS has issued the Letter of Consent for the Federal Land Transfer.

The Design-Build Team shall prepare all documents and forms necessary to obtain the USFS SUP. The Design-Build Team shall coordinate with the USFS and obtain approval of the SUP. (Contact Allyson Conner, Land Management Planner, at (828) 545-5941 or [Allyson.conner@usda.gov](mailto:Allyson.conner@usda.gov))

The Design-Build Team shall coordinate with the Design-Build Unit to determine if a Preconstruction Notification is required for the Nationwide Permit No. 6. If a PCN is required, the Design-Build Team shall submit all necessary documents and forms to the Design-Build Unit for submittal to the appropriate agencies and shall not perform any geotechnical investigative work within the jurisdictional resource(s) requiring a PCN prior to obtaining the required approval. If a PCN is not required, the Design-Build Team may proceed with geotechnical investigations inside and outside jurisdictional resources, provided all of the Nationwide Permit No. 6 General Conditions are adhered to, and either the required SUPs have been issued or the Letter of Consent for the Federal Land Transfer has been issued.

- The Design-Build Team shall not perform any construction activities, including but not limited to utility relocations, until the USFS issues the Letter of Consent for the Federal Land Transfer. (Reference the Right of Way Scope of Work found elsewhere in this RFP)

## Mitigation Responsibilities of the Design-Build Team

As required by the NEPA Process and the USACE / EPA Section 404(b)(1) Guidelines, to offset potential wetland and stream impacts, the Department has reviewed the roadway project corridor for potential on-site mitigation opportunities. Since no on-site mitigation opportunities were identified, the Department will acquire compensatory mitigation for unavoidable impacts to

wetlands, streams and riparian buffers due to the R-5777C project construction from the NC Division of Mitigation Services. The amount of mitigation acquired will be based on impacts, as identified in the R-5777C Categorical Exclusion.

Any changes proposed by the Design-Build Team to any design or construction details provided by the Department shall be approved by the Department prior to being submitted to the environmental agencies for their approval.

Should additional jurisdictional impacts result from design revisions that are not required elsewhere in this RFP and / or construction methods, suitable compensatory mitigation for wetlands, streams and / or riparian buffers shall be the sole responsibility of the Design-Build Team. Therefore, it is important to note that additional mitigation will have to be approved by the environmental agencies and such approval shall require, at a minimum, the preparation and approval of a Mitigation Plan before permits are approved. To mitigate for these additional jurisdictional impacts, the Design-Build Team shall be responsible for all costs associated with acquiring suitable mitigation. Construction of any on-site mitigation shall be performed by a contractor that has successfully constructed similar on-site mitigation. In the absence of suitable on-site mitigation, the Design-Build Team shall be responsible for acquiring all additional mitigation from the NC Division of Mitigation Services or an approved compensatory mitigation banking source.

The Design-Build Team shall analyze all new areas to be impacted that have not been analyzed during the NEPA Process, including but not limited to borrow sites, waste sites, haul roads and staging areas that are located outside the project right of way. This analysis shall include performing all environmental assessments. These assessments shall require the Design-Build Team to engage the services of a NCDOT prequalified environmental consultant to conduct a full environmental investigation to include, but not be limited to, Federally Listed Threatened and Endangered Species, wetlands, streams, riparian buffers, avoidance and minimization in jurisdictional areas, compensatory mitigation, FEMA compliance, CAMA consideration, and historical, archaeological, and cultural resource surveys in these areas. The environmental consultant shall obtain concurrence, through EAU, from the U. S. Fish and Wildlife Service, to document compliance with Section 7 of the *Endangered Species Act* for those species requiring such concurrence. In addition, the Design-Build Team shall identify additional mitigation required and fulfill all other requirements that the environmental agencies impose to obtain the permit. Any contract time extensions resulting from additional environmental assessments required by the Design-Build Team's design and / or construction methods impacting areas outside those previously analyzed through the NEPA Process shall be solely at the Department's discretion.

### **Commitments**

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize wetland, stream and riparian buffer impacts; and to provide full compensatory mitigation of all remaining wetland, stream and riparian buffer impacts. Avoidance measures were taken during the planning and NEPA processes; and minimization measures were incorporated as part of the preliminary design provided by the Department. The Design-Build Team shall

incorporate these avoidance and minimization features, plus any minimization identified during the interagency hydraulic design review meeting and the interagency permit impacts meeting, into the design and / or construction methods at no additional cost or contract time extension.

All work by the Design-Build Team must be accomplished in strict compliance with the plans submitted with the permit application and in compliance with all conditions of the permits and certifications issued by the environmental agencies. The Design-Build Team shall provide each of its contractors and / or agents associated with the construction or maintenance of this project with a copy of the permits and certifications.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall strictly adhere to these commitments, as well as others, including but not limited to, those included in the R-5777C Categorical Exclusion, all permits, all interagency meetings, and all site visits.

### **Cultural Resources**

Based on the Department's preliminary design, NCDOT has reached a no adverse effect determination under Section 106 of the National Historic Preservation Act for this Undertaking. (Reference the February 22, 2021 Effects Determination, as well as the archaeological survey and historic architecture survey of the respective Areas of Potential Effects (APE) provided by the Department.) If the Design-Build Team's design or construction activities 1) impact any property that has been determined eligible for the National Register of Historic Places (NRHP) beyond the impacts shown in the Department's Preliminary Roadway Plans, or 2) go outside the limits of the APEs, consultation with NCDOT, North Carolina State Historic Preservation Office (NC-HPO), FHWA and USFS, as appropriate, must occur prior to any construction activities occurring in that area. If the consultation requires additional NRHP evaluation / surveys and / or Section 106 mitigation, the Design-Build Team shall engage the services of a NCDOT prequalified historic architecture and / or archaeology consultant to conduct further historic architecture and / or archaeology evaluation / surveys and / or determine potential mitigation. The Design-Build Team shall be responsible for all costs associated with the additional impacts, including but not limited to any additional design effort, additional construction, historic architecture and / or archaeology evaluations / surveys, coordination with NCDOT, NC-HPO and FHWA, and any required commitments and / or mitigation. The Design-Build Team is cautioned that any impacts to Archaeological Site 31CV241 will likely result in an adverse effect to the site and require a reevaluation. The Department will not honor any requests for additional contract time or compensation for any efforts required for the aforementioned activities, including but not limited to public involvement, additional design effort, required evaluations / surveys, required commitments / mitigation, additional construction effort, and / or additional environmental agency coordination and approvals.

Prior to performing any clearing and grubbing operation, the Design-Build Team shall install High-Visibility Fencing along the proposed right of way / control of access and / or easements at Archaeological Site 31CV241, as shown on the plans developed by the Design-Build Team. The High-Visibility Fencing shall be maintained and remain in place throughout the entire construction



duration. No construction equipment or personnel shall enter the area protected by the High-Visibility Fencing.

If the Design-Build Team discovers any undocumented historic or archaeological resources while conducting the authorized work, they shall immediately suspend activities in that area and notify, in writing, the Design-Build Unit, NCDOT Historic Architecture Team Leader, the NCDOT Archaeology Team Leader and the NCDOT Division Project Development Engineer, listed below. Upon receipt of notification, the Department will perform an initial assessment and initiate any required State / Federal coordination. Should the initial resource assessment and agency coordination completed by NCDOT determine that additional NRHP evaluation and / or Section 106 mitigation is necessary, the Design-Build Team shall engage the services of a NCDOT prequalified historic architecture and / or archaeology consultant to conduct further historic architecture and / or archaeology evaluation and / or mitigation.

The inadvertent or accidental discovery of human remains shall be handled in accordance with North Carolina General Statutes 65 and 70. All questions regarding these discoveries shall be addressed to Mary Pope Furr, NCDOT Historic Architecture Team Leader at (919) 707-6068, Matthew Wilkerson, NCDOT Archaeology Team Leader at (919) 707-6089, or Hon Yeung, PE, NCDOT Division 2 Project Development Engineer at (252) 439-2827.

**EROSION AND SEDIMENTATION CONTROL SCOPE OF WORK** (6-23-22)

The NCDOT Roadside Environmental Unit will review and accept all Erosion and Sedimentation Control Plans. Clearing & Grubbing and Final Grade Release for Construction (RFC) Erosion Control Plans shall be submitted, accepted and distributed to all NCDOT personnel listed in the Design-Build Submittal Guidelines before **any** land disturbing activities, including clearing and grubbing, can commence. If the Design-Build Team chooses to perform the work in discrete sections, then a complete set of Clearing & Grubbing and Final Grade RFC Erosion Control Plans shall be submitted, accepted, and distributed, as noted above, prior to land disturbing activities, including clearing and grubbing, commencing in that section. No land disturbing activities, including clearing and grubbing, shall occur in any location that does not have accepted Clearing & Grubbing and Final Grade RFC Erosion Control Plans. Refer to the most recent version of the NCDOT *Erosion and Sediment Control Design and Construction Manual* and the NCDEQ - *Erosion and Sediment Control Planning and Design Manual* for erosion control design guidelines not addressed in this Scope of Work.

In addition to the NCDOT reviews required in this Scope of Work, the USFS will review all Erosion and Sedimentation Control Plans located on NFS Lands, including but not limited to all plan revisions. With each NCDOT Erosion and Sedimentation Control Plan submittal, the Design-Build Team shall concurrently provide a separate plan submittal to the Design-Build Unit for USFS review that only includes the Erosion and Sedimentation Control Plans on NFS Lands. The Design-Build Team shall allow 15 working days for the USFS to review the Erosion and Sedimentation Control Plans.

To ensure adherence with the April 1, 2019 NCG-010000 General Construction Permit, issued by the North Carolina Department of Environmental Quality, Division of Water Resources, the Design-Build Team shall formally submit a project-wide Vegetation Management Procedure for the Department's review and acceptance prior to any land disturbing activities. After this initial review, the Design-Build Team shall concurrently provide the Resident Engineer and Roadside Environmental Field Operations Engineer updated versions of the Vegetation Management Procedure on a monthly basis. These updated versions will not require formal submittal to the Design-Build Unit, but will be subject to review comments by the aforementioned field personnel. All versions of the Vegetation Management Procedure shall include, but not be limited to, 1) provisions for the early establishment of grasses / vegetation, 2) provisions for obtaining the required 80% permanent vegetation stand, as defined in the April 1, 2019 NCG-010000 General Construction Permit and in accordance with the *Permanent Vegetation Establishment* Project Special Provision found elsewhere in this RFP, by the project final completion date, and 3) procedure and schedule details for fertilizer topdressing, supplemental seeding, mowing and repair seeding. The Vegetation Management Procedure shall be closely coordinated with the grading and hauling operations.

From the beginning through the end of construction, the Design-Build Team shall maintain comprehensive "red-line" As-Constructed Drawings that detail when and where permanent / temporary / repair seeding and fertilizer topdressing have been performed.

Erosion and Sedimentation Control Plans shall at a minimum address the following:

## I. Complete Set of Plans

### A. Clearing and Grubbing Phase

1. Use correct NCDOT symbology.
2. Protect existing drainage structure inlets with Rock Inlet Sediment Trap Type 'A' (RIST-A), Rock Inlet Sediment Trap Type 'C' (RIST-C), Rock Pipe Inlet Sediment Trap Type 'A' (PIST-A), etc.
3. Utilize adequate perimeter controls (temporary silt ditches (TSD)), temporary silt fence (TSF), etc.).
4. Clean Water Diversions (CWD) shall not be used to divert offsite runoff through the project construction limits.
5. All jurisdictional streams within the project limits shall be identified as 'Environmentally Sensitive Areas' on the Clearing and Grubbing Plans.
6. Utilize skimmer basins and rock measures with sediment control stone (Temporary Rock Sediment Dam Type 'B' (TRSD-B), Temporary Rock Silt Check Type 'A' (TRSC-A), etc.) at drainage outlets.
7. Take into account topography and show existing contour lines on Clearing & Grubbing Plans only.
8. Utilize Temporary Rock Silt Checks Type 'B' (TRSC-B) or wattles to reduce velocity in existing ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-Bs in proposed TSDs and temporary diversions (TD).
9. Protect existing streams; do not place erosion control devices in live streams unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
10. Sediment basins shall be sized to provide adequate silt storage for 3,600 cubic feet per disturbed acre with surface area equal to 435 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website <https://hdsc.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). A Sediment Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
11. Skimmer Basins shall be sized to provide adequate silt storage for 1,800 cubic feet per disturbed acre with surface area equal to 325 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using the 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website <https://hdsc.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). Skimmer Basins shall be designed to dewater in two to three days. A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.

12. Design Riser Basins to the following standards:
  - Surface Area shall be determined by Equation A (sq. feet) =  $Q25 \text{ (cfs)} * 435$ .
  - Volume requirement shall be 1,800 cubic feet per disturbed acre draining to the riser basin.
  - Riser Pipe shall have a cross-sectional area 1.5 times that of the barrel pipe.
  - The riser pipe shall be non-perforated with a skimmer attached to the bottom of the pipe, one foot from the bottom of the basin.
  - See NCDEQ - *Erosion and Sediment Control Planning and Design Manual* for additional design criteria.
13. The minimum and maximum length to width ratio of all Sediment Basins shall be 2:1 and 6:1, respectively.
14. Coir Fiber Baffles shall be installed in all silt basins and sediment dams at drainage outlets. For silt basins with a 20-foot or longer length, three Coir Fiber Baffles shall be installed with a spacing of 1/4 the basin length. For silt basins with a length less than 20 feet, a minimum of two Coir Fiber Baffles shall be installed, with a spacing of 1/3 the basin length. The Design-Build Team will not be required to show the individual baffles on the Erosion Control Plans, but shall be required to incorporate the Coir Fiber Baffle Detail on the Erosion Control Plans.
15. Include any culvert and / or pipe construction sequence plan sheets in the Clearing & Grubbing Plans; all pipes 48 inches or larger, or any combination of pipes that total 48 inches or more, in jurisdictional streams shall require a construction sequence. Prior to installation of pipes smaller than 48 inches in jurisdictional streams, the Design-Build Team shall submit a phasing plan for managing the watercourse to the Resident Engineer for review and acceptance. The phasing plan shall be in accordance with the *Best Management Practices for Construction and Maintenance Activities*.
16. During construction, provide temporary sediment basins that dewater from the surface at all permanent stormwater devices.
17. In accordance with the NCDOT *Erosion and Sediment Control Design and Construction Manual*, utilize Excelsior / Coir Fiber Wattles with Polyacrylamide (PAM) and / or TRSC-As with Matting and PAM in temporary and permanent, existing and proposed ditches in areas where sediment basins are not feasible at drainage outlets, and in areas where sediment basins at drainage outlets with sediment traps (i.e. PIST-A, RIST-A, etc.) cannot be properly sized to surface area and / or sediment storage requirements due to safety concerns, right of way restrictions, utility conflicts, or other construction limitations approved by the NCDOT Roadside Environmental Unit.
18. Place devices utilizing PAM at all sediment basin inlets.
19. At a maximum spacing of 200 feet, at all sag points and as directed, utilize Special Sediment Control Fence or Coir Fiber Wattles as drainage breaks in silt fence.
20. Do not place erosion control devices that require excavation (e.g. sediment basins, silt ditches, etc.) in wetlands unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
21. Within the entire project limits, provide disturbed and undisturbed drainage area delineations in MicroStation Format.

22. For all drainage outlets where the runoff cannot be treated with a sediment basin and / or the sediment basin cannot be constructed to the required sediment storage or surface area requirements, provide a written explanation.
23. Excluding Sediment Basins that will function only during Clearing and Grubbing operations, all perimeter Sediment Basins shall be placed outside of fill slopes.

#### B. Final Grade Phase

1. Use correct NCDOT symbology.
2. Protect existing and proposed drainage structure inlets with RIST-A, RIST-C, PIST-A, etc.
3. Utilize adequate perimeter controls (TSD, TSF, etc.).
4. Clean Water Diversions (CWD) shall not be used to divert offsite runoff through the project construction limits.
5. Utilize TRSC-Bs or wattles to reduce velocity in existing and proposed ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-Bs in proposed TSDs and TDs.
6. Utilize temporary slope drains and earth berms at top of fill slopes five feet or higher and a fill slope steeper than 4:1, or where there are superelevations above 0.04 and fills are greater than three feet. Maximum slope drain spacing shall be 200 feet.
7. Utilize a rock energy dissipater at the outlet of all slope drains.
8. Devices at all drainage turnouts shall utilize skimmer or sediment control stone (TRSD-B, TRSC-A, etc.) and a spillway with an adequately designed base length to distribute outflow.
9. Sediment basins shall be sized to provide adequate silt storage for 3,600 cubic feet per disturbed acre with surface area equal to 435 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website <https://hdsc.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). A Sediment Basin Designer Spreadsheet will be provided by NCDOT Roadside Environmental Unit upon request.
10. Skimmer Basins shall be sized to provide adequate silt storage for 1,800 cubic feet per disturbed acre with surface area equal to 325 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using the 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website <https://hdsc.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). Skimmer Basins shall be designed to dewater in two to three days. A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
11. Design Riser Basins to the following standards:
  - Surface Area shall be determined by Equation A (sq. feet) = Q25 (cfs) \* 435.
  - Volume requirement shall be 1,800 cubic feet per disturbed acre draining to the riser basin.
  - Riser Pipe shall have a cross-sectional area 1.5 times that of the barrel pipe.

- The riser pipe shall be non-perforated with a skimmer attached to the bottom of the pipe, one foot from the bottom of the basin.
  - See NCDEQ - *Erosion and Sediment Control Planning and Design Manual* for additional design criteria.
12. In accordance with the requirements below, install erosion control in all ditch lines, including but not limited to temporary ditch lines (TDs) utilized to divert offsite runoff around construction areas:
    - Install straw matting in all ditch lines where the velocity is greater than 2.0 feet / sec, and the shear stress is 1.25 psf or less.
    - Install excelsior matting in all ditch lines with a shear stress above 1.25 psf, but not greater than 2.55 psf.
    - Excluding locations where rip rap is not allowed (e.g. clear recovery zone, etc.), install Permanent Soil Reinforcement Mat or rip rap in all ditch lines with a sheer stress greater than 2.55 psf.
    - At locations where rip rap is not allowed, install Permanent Soil Reinforcement Mat in all ditch lines with a sheer stress greater than 2.55 psf.
  13. Unless otherwise approved by the Roadside Environmental Field Operations Engineer, provide matting for erosion control on all slopes (cut and fill) that are steeper than 4:1 and a height of five feet or greater.
  14. Install matting for erosion control on all disturbed slopes adjacent to jurisdictional areas regardless of height and slope. Rolled erosion control products used within wetlands or riparian areas shall be non-poly mesh nettings.
  15. Along all slopes (cut and fill) that are 30 feet or higher, place parallel rows of minimum nine-inch Excelsior Wattles at a spacing height of 20 feet.
  16. The minimum and maximum length to width ratio of all Sediment Basins shall be 2:1 and 6:1, respectively.
  17. Coir Fiber Baffles shall be installed in all silt basins and sediment dams at drainage outlets. For silt basins with a 20-foot or longer length, three Coir Fiber Baffles shall be installed with a spacing of 1/4 the basin length. For silt basins with a length less than 20 feet, a minimum of two Coir Fiber Baffles shall be installed, with a spacing of 1/3 the basin length. The Design-Build Team will not be required to show the individual baffles on the Erosion Control Plans, but shall be required to incorporate the Coir Fiber Baffle Detail on the Erosion Control Plans.
  18. During construction, provide temporary sediment basins that dewater from the surface at all permanent stormwater devices.
  19. In accordance with the NCDOT *Erosion and Sediment Control Design and Construction Manual* Utilize Excelsior / Coir Fiber Wattles with Polyacrylamide (PAM) and / or TRSC-As with matting and PAM in temporary and permanent, existing and proposed ditches in areas where sediment basins are not feasible at drainage outlets, and in areas where sediment basins at drainage outlets with sediment traps (i.e. PIST-A, RIST-A, etc.) cannot be properly sized to surface area and / or sediment storage requirements due to safety concerns, right of way restrictions, utility

- conflicts, or other construction limitations approved by the NCDOT Roadside Environmental Unit.
20. Place devices utilizing PAM at all sediment basin inlets.
  21. At a maximum spacing of 200 feet, at all sag points, and as directed, Utilize Special Sediment Control Fence or Coir Fiber Wattles as drainage breaks in silt fence.
  22. Do not place erosion control devices that require excavation (i.e. sediment basins, silt ditches, etc.) in wetlands unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
  23. Within the entire project limits, provide disturbed and undisturbed drainage area delineations in MicroStation Format.
  24. For all drainage outlets where the runoff cannot be treated with a sediment basin and / or the sediment basin cannot be constructed to the required sediment storage or surface area requirements, provide a written explanation.
  25. All perimeter Sediment Basins shall be placed outside of fill slopes.

### C. Intermediate Phase

Intermediate Erosion Control Plans shall be required if design modifications and / or site conditions require additional erosion control design or design revisions to the RFC Clearing and Grubbing and / or RFC Final Grade Erosion Control Plans, including but not limited to all detours where construction stormwater is not captured in the Erosion Control Plans. Intermediate Erosion Control Plans shall be submitted for review and shall be accepted prior to construction of any aspect impacted by the revised erosion control design. For any intermediate phase, comply with Section B, "Final Grade Phase" above.

## II. Detail Sheets and Notes

- A. Provide project specific special notes and details, including but not limited to, skimmer basin, coir fiber wattle with Polyacrylamide (PAM), etc.
- B. Provide matting summary sheet(s): matting for erosion control (straw and excelsior), permanent soil reinforcement mat, and coir fiber mat.
- C. Provide reforestation sheet(s): regular, wetland, streambank and / or buffer showing appropriate species.

## III. Title Sheet

- A. Show correct notes: NCG-01, HQW, ESA, clearing and grubbing, etc.
- B. Show correct standards for project
- C. List of standard NCDOT symbology
- D. Show name and certification number of Level III certified individual responsible for designing and / or reviewing Erosion and Sedimentation Control Plans

## IV. Special Provisions

- A. Erosion Control Special Provisions are available at the following website:

<https://connect.ncdot.gov/resources/roadside/Pages/Soil-Water.aspx>

- B. References in Erosion Control Special Provisions from the aforementioned website to Method of Measurement, Basis of Payment, or any other statement regarding direct payment for Erosion & Sediment Control measures shall be disregarded.
- C. *Erosion & Sediment Control / Stormwater Certification* Project Special Provision found elsewhere in this RFP.

## V. Miscellaneous

- A. Plan submittals shall include all pertinent design information required for review, such as design calculations, drainage areas, etc.
- B. The NCDOT Roadside Environmental Unit will provide a sample set of Erosion and Sedimentation Control Plans (including any special details or special provisions used by the NCDOT Roadside Environmental Unit) and MicroStation Erosion Control Workspace to the Design-Build Team for reference upon request.
- C. The Erosion and Sedimentation Control Plans shall address any environmental issues raised during the permitting process.
- D. The Design-Build Team shall allow sufficient time in the proposed schedule to address any comments to the Erosion and Sedimentation Control Plans, as deemed necessary by the NCDOT Roadside Environmental Unit and USFS.
- E. Temporary access and haul roads, other than public roads, constructed or used in connection with the project shall be considered a part of the project and addressed in the Erosion and Sedimentation Control Plans. Temporary access and haul roads located within the footprint and / or the right of way / easement corridor of the project shall be part of the highway Erosion and Sedimentation Control Plans. Temporary access and haul roads associated with borrow pits and staging areas shall be included in the Reclamation Plan.
- F. At a minimum, the Design-Build Team shall install Floating Turbidity Curtains at ponds, lakes, and other standing water bodies, both jurisdictional and non-jurisdictional, where 1) construction activities create surface fill impacts or 2) sufficient erosion and sediment control devices cannot be installed to contain sediment and / or turbidity impacts.
- G. To contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment, provide Concrete Washout Structures at egress points. Concrete Washout Structures must collect and retain all concrete waste water and solids so that this material does not migrate to surface waters or into the ground water. The Concrete Washout Structures are not intended for concrete waste not associated with washout operations. The Concrete Washout Structures may include devices above or below ground and / or commercially available devices designed specifically to capture concrete waste water. Concrete Washout Structure options may be found in the special provision, available at the website noted in Section IV above. For construction details of an above grade and below grade Concrete Washout Structure, reference the website noted below:

**[https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/  
ConcreteWashoutStructuredetail.pdf](https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf)**

- H. Borrow or waste areas that are part of the project shall require a separate Reclamation Plan, unless the borrow or waste activity is regulated under the *Mining Act of 1971*, or is a landfill regulated by the NCDEQ - Division of Waste Management (DWM). For newly created borrow pit(s) that require dewatering, Borrow Pit(s) Dewatering Basins shall be required



and shall be in accordance with the applicable special provisions available at the website noted in Section IV above. The Design-Build Team shall submit the location and permit number for waste / borrow sites covered by the aforementioned Mining Act or regulated by the NCDEQ - DWM concurrently to the Design-Build Unit and the Resident Engineer. For Reclamation Procedures, see:

**[https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/  
ContractedReclamationProcedures.pdf](https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/ContractedReclamationProcedures.pdf)**

- I. Whenever the Engineer determines that significant erosion and sedimentation continues despite the installation of approved protective practices, the Design-Build Team shall be required to, and shall, take additional protective action to maintain environmental compliance.
- J. An accepted Erosion and Sedimentation Control Plan shall not exempt the Design-Build Team from making every effort to contain sediment onsite. As directed by the Engineer, sediment losses shall be recovered and associated damages repaired.
- K. Any Erosion Control Design revisions made during construction of the project shall be submitted to the NCDOT Roadside Environmental Unit, via the Design Build Unit, for review and acceptance. At anytime requested by the Engineer or the NCDOT Roadside Environmental Unit, the Design-Build Team shall provide an updated version of the Erosion and Sedimentation Control Plans for distribution to all parties involved in the construction process.
- L. The Design-Build Team shall comply with the North Carolina Administrative Code *Title 15A Environmental Quality* Chapter 4, Sedimentation Control.
- M. A pre-submittal meeting shall take place between the NCDOT Roadside Environmental Unit Soil & Water Engineering Section, the USFS, the Design-Build Team, and any other pertinent NCDOT personnel before any Erosion and Sedimentation Control Designs are submitted to the NCDOT Roadside Environmental Unit or USFS. Erosion and Sedimentation Control Plan submittals shall only be reviewed and accepted by the NCDOT Roadside Environmental Unit and USFS after the Erosion and Sedimentation Control Pre-Submittal Meeting. The Design-Build Team shall be required to submit a tentative Erosion and Sedimentation Control Plan submittal schedule at the pre-submittal meeting.
- N. At a minimum, the Design-Build Team shall bring one erosion control plan sheet with a clearing and grubbing erosion control design to the Erosion and Sedimentation Control Pre-Submittal Meeting.
- O. All RFC Erosion and Sedimentation Control Plans, including any red line revisions, shall be kept on site at all times throughout the duration of the project.
- P. Immediately after the clearing and grubbing erosion control measures have been installed for the entire project, or for individual sections if the Design-Build Team has divided the project into construction segments, the Design-Build Team's erosion and sedimentation control designer shall field verify constructed dimensions and installation of all erosion control devices. After this initial inspection(s), the aforementioned designer shall review the project conditions a minimum of every 30 days during the heavy grading operations, and as directed by the Engineer, to verify the field conditions of disturbed areas draining to erosion control devices and to ensure that the erosion control devices provide the current field condition requirements for sediment storage and surface area. During construction, 1) the NCDOT may conduct separate field inspections of the project conditions and the

erosion control devices throughout the entire project limits, and 2) the USFS may conduct separate field inspections of the project conditions and erosion control devices within the NFS Lands. The erosion and sedimentation control designer shall make appropriate design revisions to the Clearing and Grubbing, Intermediate Erosion Control Plans and / or Final Grade Erosion Control Plans resulting from / required by the Design-Build Team, the Departmental and / or USFS field inspections for the Department's and / or USFS's review and acceptance, in accordance with the Design-Build Submittal Guidelines. The Design-Build Team shall concurrently provide written documentation of all field verifications / inspections performed by the Design-Build Team to the NCDOT Roadside Environmental Unit, Soil and Water Engineering and Field Operations Section, the Resident Engineer, and USFS, as appropriate. At a minimum, this documentation shall detail what was observed during the field verification / inspection and all resulting required actions with a timeframe for implementation. The Department will determine when the project conditions no longer warrant inspections by the erosion and sedimentation control designer.

Q. The Design-Build Team's erosion and sedimentation control designer shall submit design calculations, for the Department's review and acceptance, for all modifications to the Erosion and Sedimentation Control Plans that result in dimension modifications and / or relocations, other than minor shifts to accurately place, to the devices noted below:

- Riser Basin
- Skimmer Basin and all devices with Skimmers
- Temporary Rock Sediment Dam Type A
- Temporary Rock Sediment Dam Type B
- Temporary Rock Silt Check Type A
- Culvert Construction Sequences
- Temporary and Permanent Stream Channel Relocations

R. Erosion & Sediment Control / Stormwater Certification shall be required according to the Project Special Provision found elsewhere in this RFP.

S. Prior to installation of any erosion control devices, the Design-Build Team shall verify boundaries of jurisdictional areas and ESA areas in the field, and delineate with Safety Fence or flagging. For guidance on Safety Fence and flagging in jurisdictional areas, see:

**<https://connect.ncdot.gov/resources/roadside/Pages/Field-Operations-Documents.aspx>**

T. Once RFC Erosion and Sedimentation Control Plans are issued, any major design change or addition, any change that involves calculations, and any addition, deletion, or relocation of a sediment basin shall be submitted to the NCDOT Roadside Environmental Unit, via the Design-Build Unit, for review and acceptance. Minor changes such as moving silt fence, adding or moving temporary ditches (unless adding new runoff flow to a sediment basin), and adding or moving slope drains shall be reviewed in the field by the Engineer for the entire project and by USFS for NFS Lands.

U. All erosion control measures with stone extending beyond the construction limits shall be considered temporary fill. If impacted wetland areas are permitted as Hand Clearing, then the aforementioned temporary fill shall be permitted as Temporary Fill in Hand Cleared

Areas for Erosion Control. (Reference the Environmental Permits Scope of Work found elsewhere in this RFP)

- V. Sediment basins that drain directly into jurisdictional water or have a total drainage area of one acre or more shall be designed and constructed with outlet structures that only withdraw water from the surface. For sediment basins that do not drain directly into jurisdictional water and have less than one acre of total drainage area, surface dewatering outlets or stone outlets may be provided.
- W. In accordance with the requirements noted herein, the Design-Build Team shall be responsible for erosion control design, erosion control plans, erosion control plan implementation and maintenance of erosion control measures for all utility installation and relocation work performed by the Design-Build Team. To ensure that the Design-Build Team's erosion control designs, erosion control plan implementation and / or maintenance of erosion control measures do not conflict with the erosion control design, erosion control plan implementation and / or maintenance of erosion control measures for utility installation and / or relocation work performed by others, the Design-Build Team shall coordinate with the utility companies performing Utilities by Others (UBO) work.
- X. Structural controls installed to manage construction materials stored or used on site shall be shown on the Erosion and Sedimentation Control Plans in compliance with Section F, Materials Management of the NCG-010000 General Construction Permit.
- Y. The Design-Build Team shall conduct monthly litter pick-up and disposal of construction and non-construction waste within the project limits and as directed by the Engineer. Disposal of these waste materials shall be in accordance with local and state regulations.

On the pickup date, the Design-Build Team shall report the number of bags of litter and all recycling collected on the following NCDOT Litter Management website:

**<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](mailto:ncdot.clr@ncdot.gov). Prior to starting initial litter collection operations, the Design-Build Team shall request access to the litter removal reporting website and obtain an access code.

- Z. In accordance with the *Natural Fiber Matting* Project Special Provision found elsewhere in this RFP, furnish, install and maintain natural fiber matting on NFS Lands.
- AA. High-visibility fencing shall be installed along the limits of the construction footprint on NFS Lands.
- BB. In accordance with the *Equipment Cleaning for National Forest Service Lands* Project Special Provision found elsewhere in this RFP, all construction equipment shall be cleaned prior to being 1) brought into NFS Lands, and 2) moved from delineated non-native invasive species sites. The Design-Build Team shall submit a cleaning plan to the Department for review and approval. This plan shall detail cleaning methods including the materials and equipment utilized for this process. The plan shall also detail the frequency and the location of the equipment cleaning. The Design-Build Team shall be responsible for coordinating and communicating any changes to the plan to the Department. (Reference

the *Equipment Cleaning for National Forest Service Lands* Project Special Provision found elsewhere in this RFP)

- CC. To the maximum extent practicable, erosion control devices shall be designed and installed to capture and/ or divert surface waters from draining directly to vernal pools in the vicinity of Mabee's Salamander and Southern Chorus Frog observations.
- DD. Prior to applying any herbicides within NFS Lands, the Design-Build Team shall develop a herbicide treatment plan and obtain written approval from the USFS via the Design-Build Unit. The Design-Build Team shall submit the herbicide treatment plan to the Design-Build Unit for USFS review and approval. At a minimum, the herbicide treatment plan shall address the time, methods, chemicals, and exact portion of the NFS Lands to be chemically treated. (Reference the *Herbicide Application on National Forest Lands* Project Special Provision found elsewhere in this RFP)
- EE. Ground Cover Stabilization Requirements - NCG010000 (7 - 14 Days)

Ground cover stabilization shall comply with the timeframe guidelines specified by the North Carolina Department of Environmental Quality, Division of Water Resources NCG-010000 General Construction Permit that became effective on April 1, 2019. Excluding the slopes noted below, temporary and permanent ground cover stabilization shall be provided within seven calendar days from the last land-disturbing activity. The Design-Build Team shall label all slopes subject to the seven-day ground cover stabilization requirements on all Erosion and Sedimentation Control Plans submitted to the Department for review and acceptance.

For the slopes noted below, temporary and / or permanent ground cover stabilization shall be provided within 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of ten feet or less
- Slopes 3:1 or flatter, with a slope length of 50 feet or less
- Slopes 4:1 or flatter

Temporary and / or permanent ground cover stabilization shall be provided in accordance with the provisions in this RFP, the Vegetation Management Procedure developed by the Design-Build Team and the April 1, 2019 NCG-010000 General Construction Permit.

#### FF. Additional Ground Cover Stabilization Requirements

Once the Design-Build Team identifies the area for stabilization due to inactivity, the Design-Build Team shall obtain concurrence from the Engineer and adhere to the following options based on the estimated amount of time the area will remain inactive. If the area stabilized exceeds the estimated timeframe, the Design-Build Team shall implement the next level of stabilization as directed by the Engineer.

All application rates noted below are in pounds per acre.

**Short Term Stabilization - For areas that will remain inactive for up to 21 days**

Erodible areas shall be stabilized utilizing non-vegetative cover. Non-vegetative cover options include straw mulch, hydraulic applied erosion control products or rolled erosion control products. If straw mulch is used, it shall provide 100% groundcover and be tacked sufficiently to hold the mulch in place for the duration of the inactive period. All other methods shall be installed according to the manufacturer's directions.

**Mid-Term Stabilization -For areas that will remain inactive for up to 90 days**

Erodible areas shall be stabilized utilizing the following stabilization protocol:

**March 1<sup>st</sup> - August 31<sup>st</sup>**

50# German or Browntop Millet  
500# Fertilizer  
4000# Limestone

**September 1<sup>st</sup> - February 28<sup>th</sup>**

50# Rye Grain or Wheat  
500# Fertilizer  
4000# Limestone

At the Engineer's sole discretion, the use of limestone may be eliminated for Mid-Term (temporary) seeding. The Design-Build Team shall consult with, and obtain written approval from, the NCDOT Roadside Environmental Unit prior to eliminating limestone.

Excluding areas within NFS Lands, the Design-Build Team may use wood mulch and / or ground clearing and grubbing debris as an option for Mid-Term Stabilization, if approved by the Engineer, in writing. If approved, the aforementioned mulch and / or debris shall be installed at a thickness that prevents erosion.

**Long Term Stabilization - For areas that will remain inactive for more than 91 days**

Erodible areas outside the mowing area located within NFS Lands defined below, including riparian and wetland locations, shall be stabilized utilizing the following stabilization protocol:

Seeding shall be performed in accordance with section 1660 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. The kinds of seed, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates (May 1<sup>st</sup> to June 1<sup>st</sup> and August 1<sup>st</sup> to September 1<sup>st</sup>), the kind of seed to be used shall be determined by the Engineer.

**August 1<sup>st</sup> - June 1<sup>st</sup>**

8# Little Bluestem<sup>1</sup>  
 3# Slender Woodoats<sup>1</sup>  
 30# Oats  
 500# Fertilizer  
 4000# Limestone

**May 1<sup>st</sup> - September 1<sup>st</sup>**

8# Little Bluestem<sup>1</sup>  
 3# Slender Woodoats<sup>1</sup>  
 10# Browntop Millet  
 500# Fertilizer  
 4000# Limestone

<sup>1</sup>North Carolina ecotype

All other erodible areas shall be stabilized utilizing the following stabilization protocol:

**Roadway Areas****March 1<sup>st</sup> - August 31<sup>st</sup>**

10# Centipede \*  
 50# Tall Fescue Cultivars \*\*  
 25# Bermudagrass (hulled)  
 500# Fertilizer  
 4000# Limestone

**September 1<sup>st</sup> - February 28<sup>th</sup>**

10# Centipede \*  
 50# Tall Fescue Cultivars \*\*  
 35# Bermudagrass (unhulled)  
 500# Fertilizer  
 4000# Limestone

\* On cut and fill slopes 2:1 or steeper, the Design-Build Team shall apply centipede at a rate of five pounds per acre.

**Riparian and Wetland Locations****March 1<sup>st</sup> - August 31<sup>st</sup>**

18# Creeping Red Fescue Cultivars \*\*\*  
 6# Indiangrass  
 8# Little Bluestem  
 4# Switchgrass  
 25# Browntop Millet  
 500# Fertilizer  
 4000# Limestone

**September 1<sup>st</sup> - February 28<sup>th</sup>**

18# Creeping Red Fescue Cultivars \*\*\*  
 6# Indiangrass  
 8# Little Bluestem  
 4# Switchgrass  
 35# Rye Grain  
 500# Fertilizer  
 4000# Limestone

**Waste and Borrow Areas****March 1<sup>st</sup> - August 31<sup>st</sup>**

75# Tall Fescue Cultivars \*\*  
 25# Bermudagrass (hulled)  
 500# Fertilizer  
 4000# Limestone

**September 1<sup>st</sup> - February 28<sup>th</sup>**

75# Tall Fescue Cultivars \*\*  
 35# Bermudagrass (unhulled)  
 500# Fertilizer  
 4000# Limestone

**\*\* Approved Tall Fescue Cultivars**

|                            |                 |                 |                    |
|----------------------------|-----------------|-----------------|--------------------|
| 06 Dust                    | Escalade        | Justice         | Serengeti          |
| 2 <sup>nd</sup> Millennium | Essential       | Kalahari        | Shelby             |
| 3 <sup>rd</sup> Millennium | Evergreen 2     | Kitty Hawk 2000 | Sheridan           |
| Apache III                 | Falcon IV       | Legitimate      | Signia             |
| Avenger                    | Falcon NG       | Lexington       | Silver Hawk        |
| Barlexas                   | Falcon V        | LSD             | Sliverstar         |
| Barlexas II                | Faith           | Magellan        | Shenandoah Elite   |
| Bar Fa                     | Fat Cat         | Matador         | Sidewinder         |
| Barrera                    | Festnova        | Millennium SRP  | Skyline            |
| Barrington                 | Fidelity        | Monet           | Solara             |
| Barrobusto                 | Finelawn Elite  | Mustang 4       | Southern Choice II |
| Barvado                    | Finelawn Xpress | Ninja 2         | Speedway           |
| Biltmore                   | Finesse II      | Ol' Glory       | Spyder LS          |
| Bingo                      | Firebird        | Olympic Gold    | Sunset Gold        |
| Bizem                      | Firecracker LS  | Padre           | Taccoa             |
| Blackwatch                 | Firenza         | Patagonia       | Tanzania           |
| Blade Runner II            | Five Point      | Pedigree        | Trio               |
| Bonsai                     | Focus           | Picasso         | Tahoe II           |
| Braveheart                 | Forte           | Piedmont        | Talladega          |
| Bravo                      | Garrison        | Plantation      | Tarheel            |
| Bullseye                   | Gazelle II      | Proseeds 5301   | Terrano            |
| Cannavaro                  | Gold Medallion  | Prospect        | Titan ltd          |
| Catalyst                   | Grande 3        | Pure Gold       | Titanium LS        |
| Cayenne                    | Greenbrooks     | Quest           | Tracer             |
| Cessane Rz                 | Greenkeeper     | Raptor II       | Traverse SRP       |
| Chipper                    | Gremlin         | Rebel Exeda     | Tulsa Time         |
| Cochise IV                 | Greystone       | Rebel Sentry    | Turbo              |
| Constitution               | Guardian 21     | Rebel IV        | Turbo RZ           |
| Corgi                      | Guardian 41     | Regiment II     | Tuxedo RZ          |
| Corona                     | Hemi            | Regenerate      | Ultimate           |
| Coyote                     | Honky Tonk      | Rendition       | Venture            |
| Darlington                 | Hot Rod         | Rhambler 2 SRP  | Umbrella           |
| Davinci                    | Hunter          | Rembrandt       | Van Gogh           |
| Desire                     | Inferno         | Reunion         | Watchdog           |
| Dominion                   | Innovator       | Riverside       | Wolfpack II        |
| Dynamic                    | Integrity       | RNP             | Xtremegreen        |
| Dynasty                    | Jaguar 3        | Rocket          |                    |
| Endeavor                   | Jamboree        | Scorpion        |                    |

**\*\*\* Approved Creeping Red Fescue Cultivars**

|          |        |      |           |
|----------|--------|------|-----------|
| Aberdeen | Boreal | Epic | Cindy Lou |
|----------|--------|------|-----------|

Outside NFS Lands, the Design-Build Team shall apply an additional 20# of Sericea Lespedeza on cut and fill slopes 2:1 or steeper from January 1<sup>st</sup> - December 31<sup>st</sup>. Sericea Lespedeza shall not be applied on NFS Lands.

Fertilizer shall be 10-20-20 analysis or a different analysis that provides a 1-2-2 ratio applied at a rate that provides the same amount of plant food as a 10-20-20 analysis and as directed by the Engineer.

### **Soil Analysis**

If vegetation establishment indicates a deficiency in soil nutrients or an incurred pH level is present, the Design-Build Team shall take soil samples and apply additional soil amendments to the affected area and as directed by the Engineer.

### **Fertilizer Topdressing**

In accordance with the requirements noted below, the Design-Build Team shall apply a minimum of one Fertilizer Topdressing application to all permanently seeded areas immediately prior to completion of the project, twice during every growing season from April 1<sup>st</sup> through September 30<sup>th</sup>, and at other times as directed by the Engineer.

Fertilizer used for topdressing shall be 10-20-20 analysis applied at a rate of 500 pounds per acre; or a different analysis that provides a 1-2-2 ratio applied at a rate that provides the same amount of plant food as a 10-20-20 analysis and as directed by the Engineer.

Fertilizer used for waste and borrow areas shall be 16-8-8 grade applied at a rate of 500 pounds per acre; or a different analysis that provides a 2-1-1 ratio applied at a rate that provides the same amount of plant food as a 16-8-8 analysis and as directed by the Engineer.

### **Supplemental Seeding**

For all supplemental seeding, the kinds of seed and proportions shall be the same as specified above for *Long Term Stabilization*, with the exception that centipede seed shall not be allowed in the seed mix. The rate of application for supplemental seeding shall be between 25# to 75# per acre. Prior to topdressing, the Design-Build Team shall determine the actual rate per acre for supplemental seeding and submit the supplemental seeding rate and areas to the Department for review and acceptance.

To prevent disturbance of existing vegetation, minimum tillage equipment, consisting of a sod seeder, shall be used to incorporate seed into the soil where degree of slope allows. Where degree of slope prevents the use of a sod seeder, a clodbuster (ball and chain) may be used.



**Mowing**

Outside NFS Lands, the Design-Build Team shall, at a minimum, mow areas not under active construction within the project limits within 14 calendar days prior to the Memorial Day, Independence Day, Labor Day, and Veterans Day holidays, and as directed by the Engineer.

Within NFS Lands, the Design-Build Team shall only mow roadway shoulders not under active construction within 14 calendar days prior to the Memorial Day, Independence Day, Labor Day, and Veterans Day holidays, and as directed by the Engineer.

Monthly litter management cleanups shall be timed to occur just prior to planned mowing activities. With prior written approval, mowing dates may be modified to occur with Division mowing cycles. The Design-Build Team shall conduct an additional project mowing prior to final acceptance, as directed by the Engineer.

The minimum mowing height shall be four inches.

**EROSION CONTROL COORDINATION MEETINGS****Preliminary Construction Meeting**

Prior to any land disturbing activity, the Engineer will schedule a meeting with Division construction personnel, Design-Build Team senior management, Design-Build Team project staff, NCDOT project staff, consultant engineering / inspection staff, NCDOT Construction Unit, NCDOT Roadside Environmental Unit, Land Quality, Department of Water Resources, USFS and any other party associated with activities that impact the overall effectiveness of the project's erosion control.

During this meeting, the attendees shall review the Design-Build Team's Traffic Control Plans and identify potential erosion control issues. All attendees will provide comments, recommendations and supportive information to help facilitate resolution to the aforementioned potential erosion control issues.

**Construction Meetings**

Once construction begins, the Engineer will schedule monthly meetings to review the erosion control status. All parties listed above for the Preliminary Construction Meeting shall participate in these monthly construction meetings.

During the construction meetings, the erosion control efforts / issues to date will be reviewed and discussed. Additionally, the upcoming construction phases will be reviewed to identify potential erosion control issues. After the construction meeting, a project review may occur to identify site specific issues and identify solutions. The Design-Build Team shall be responsible for all actions, corrections and / or resolutions resulting from the construction meetings and / or subsequent site visits.

The NCDOT senior management will discuss issues that are repeatedly identified on inspection reports and / or discussed during the construction meetings with the Design-Build Team's senior management.

If project activities do not change the erosion control status / conditions, the Engineer may elect to change the construction meeting frequency or cancel a meeting.

### **EROSION CONTROL DAMAGES**

The Design-Build Team shall observe and comply with Federal and State Laws, Local Laws, Ordinances, and Regulations; as well as Orders and Decrees of Bodies having any jurisdiction or authority in accordance with Section 107 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall take all reasonable precautions to comply with all regulations of all authorities having jurisdiction over public and private land governing the protection of erosion and sedimentation. Any fines, remediation required or charges levied against the Department for failing to comply with all rules and regulations concerning erosion and sediment control, due to the Design-Build Team's negligence, carelessness, or failure to implement the Erosion and Sedimentation Control Plans and Specifications; or failure to maintain an approved Storm Water Pollution Prevention Plan (SWPPP), regardless of absence of neglect, shall be deducted from monies due the Design-Build Team. In addition to said fines, remediation required, or charges levied, any associated engineering costs or actions taken by the Department in order for the Department to comply with rules and regulations, as a result of the Design-Build Team's negligence, carelessness, or failure to implement the Erosion and Sedimentation Control Plans and Specifications; and / or the SWPPP, regardless of absence of neglect, shall be deducted from the monies due to the Design-Build Team.

**GEOENVIRONMENTAL SCOPE OF WORK** (6-23-22)**I. DEFINITION**

For the purpose of this Scope of Work, contamination / contaminants are defined as any substance that when discharged in any quantity may present an imminent and substantial danger to the public health or welfare. Petroleum is defined as any petroleum-derived product of any kind and in any form, including, but not limited to, crude oil, diesel fuel, fuel oil, gasoline, lubrication oil, oil refuse, oil mixed with other waste, oil sludge, petroleum related products or by-products, and all other liquid hydrocarbons, regardless of specific gravity, whether occurring singly or in combination with other substances.

**II. DESCRIPTION OF WORK**

Sites of concern were identified in the November 18, 2019 *GeoEnvironmental Phase I Report* for R-5777C. After submittal of the Right of Way / 60% Roadway Plans developed by the Design-Build Team, the Design-Build Team shall hold a right of way consultation with the Department's GeoEnvironmental staff, Design-Build Unit, and key Design-Build Team members.

Sites of concern within the proposed right of way that are noted in the November 18, 2019 *GeoEnvironmental Phase I Report*, and any other sites identified during the right of way consultation with the Design-Build Team, will be investigated by the Department. The Department will require 90 days from the date of the aforementioned consultation to investigate and provide Right of Way Recommendations. The Right of Way Recommendations shall be completed prior to the Design Build Team making offers to purchase the right of way on these sites of concern.

The Design-Build Team shall notify the Design-Build Unit, in writing, of any underground storage tanks (USTs) containing petroleum, chemicals, or heating oil tanks discovered during property appraisals. The Department will require 90 days from the date of written notification to investigate and provide Right of Way Recommendations. The Right of Way Recommendations shall be completed prior to the Design-Build Team making offers to purchase the right of way on sites containing USTs.

The Design-Build Team shall adhere to all Right of Way Unit procedures regarding the acquisition of contaminated property and all Right of Way Recommendations provided by the Department. (Reference the Right of Way Scope of Work found elsewhere in this RFP).

After the parcels with identified contamination and / or underground storage tanks (USTs) are acquired and cleared of all above ground structures, the Department will 1) remove from the right of way USTs identified in the R-5777C *Right of Way Recommendations* and discovered during the property appraisals, and 2) remove all associated contaminated soil anticipated to require excavation to complete the project. If any contaminated soil anticipated to require excavation to complete the project is located in an area only accessible after construction activities have occurred (e.g. beneath an existing operational interchange ramp to be relocated), the Department will remove the contaminated soil following completion of the necessary construction activities. The

Department will remove the aforementioned USTs and contaminated soil within 60 days of written notification that the Design-Build Team has 1) removed all the above-ground structures or 2) completed the necessary construction activities. All contaminated soil not required for removal to complete the project shall be left in place and undisturbed.

If contaminated groundwater is encountered and dewatering is required in areas of known contamination, the Design-Build Team shall containerize the groundwater in vessels provided by the Department. The Department will be responsible for the sampling and disposal of the water.

It is important to note that petroleum contaminated soil may be encountered during any earthwork activity on this project.

### **III. INFORMATION PROVIDED BY NCDOT:**

- November 18, 2019 *GeoEnvironmental Phase I Report* for R-5777C
- MicroStation file with the locations of the sites of concern identified in the November 18, 2019 *GeoEnvironmental Phase I Report* for R-5777C

### **IV. UNKNOWN CONTAMINATED SITES:**

The Design-Build Team shall immediately notify the Department if the Design-Build Team's operations encounter or expose any abnormal condition that may indicate the presence of a hazardous, contaminated, and / or toxic material not previously identified. If the Engineer elects to have the Design-Build Team remove and dispose of contaminated material, the removal and disposal of this material shall be performed as extra work in accordance with Article 107-25 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

**GEOTECHNICAL ENGINEERING SCOPE OF WORK** (6-23-22)**I. GENERAL**

All geotechnical data, tests, computations and supporting subsurface investigations and documentation submitted by the Design-Build Team shall be provided in English Units.

Obtain the services of a firm prequalified for geotechnical work by the NCDOT Geotechnical Engineering Unit. A list of prequalified firms and the Discipline Code requirements can be found at the websites noted below:

**<https://www.ebs.nc.gov/VendorDirectory/search.html?s=pc&a=new>**

**<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>**

The prequalified geotechnical firm shall use the personnel and office location(s) that were submitted to the Department for their latest prequalification approval.

The prequalified geotechnical firm shall prepare foundation design recommendation reports for use in designing structure foundations, roadway foundations, retaining walls, sound barrier foundations, overhead sign structure foundations, and temporary structures.

The Engineer of Record who prepares the foundation design recommendation reports shall be a Professional Engineer registered in the State of North Carolina who has completed a minimum of three geotechnical design projects of scope and complexity similar to that anticipated for this project using the load and resistance factor design (LRFD) method and in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specification*.

The prequalified geotechnical firm shall also determine if additional subsurface information, other than that required and noted elsewhere in this RFP, is required based upon the subsurface information provided by the NCDOT and the final roadway and structure designs. If a determination is made that additional subsurface information is required; the Design-Build Team shall use a prequalified geotechnical firm to perform all additional subsurface investigation and laboratory testing in accordance with the current NCDOT Geotechnical Engineering Unit *Guidelines and Procedures Manual for Subsurface Investigations*. Submit additional information collected by the Design-Build Team to the Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance. The Design-Build Team shall provide the final Subsurface Investigation report in electronic and hardcopy format to the NCDOT for its records.

Unless noted otherwise herein, the Design-Build Team shall design foundations (except for sign foundations), embankments, slopes, retaining walls, and sound barrier walls in accordance with the current edition of the AASHTO *LRFD Bridge Design Specifications*, NCDOT *LRFD Driven Pile Foundation Design Policy*, all applicable NCDOT Geotechnical Engineering Unit Standard Provisions, NCDOT *Structures Management Unit Manual*, and NCDOT *Roadway Design Manual*. The NCDOT *LRFD Driven Pile Foundation Design Policy* is located on the NCDOT Geotechnical Engineering Unit's website at:

**<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>**

For *Geotechnical Guidelines for Design-Build Projects*, the Design-Build Team shall adhere to the guidelines located at the following website:

**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**

A minimum of one standard penetration test (SPT) / rock core boring shall be required per bent for all bridges except dual bridges. A minimum of two SPT / rock core borings shall be required across the roadway typical section at each bent location for dual bridges. All driven piles shall be located within 75 feet of a SPT / rock core boring. All drilled piers and other types of bridge foundations shall be located within 25 feet of a SPT / rock core boring. The Design-Build Team shall extend all borings to a depth of 20 feet or four foundation element diameters, whichever is greater, below the foundation element to show a complete subsurface profile. The Design-Build Team shall be responsible for obtaining the borings noted above for all bents where subsurface information is not sufficient or is warranted by variability in the geology unless the prequalified geotechnical firm submits documented justification that the subsurface investigation provided by the NCDOT is adequate for design purposes and the justification is acceptable to the Department. Any deviations to the requirements noted above shall require acceptance from the NCDOT Geotechnical Engineering Unit prior to the foundation design submittal.

The maximum spacing between borings for retaining walls and sound barrier walls shall be 100 feet and 200 feet respectively, with a minimum of two borings; one at each end of the wall. Drill borings for retaining walls a minimum depth below the bottom of the wall equal to twice the maximum wall height. Boring depths for sound barrier walls shall be to a minimum depth below the bottom of the wall equal to the maximum wall height or to SPT refusal.

## **II. ADDITIONAL DESIGN REQUIREMENTS**

### **A. Structure Foundations**

- Spread footings / shallow foundations will not be allowed for bridge foundations, sound barrier walls, dynamic message sign (DMS) foundations, cantilevered sign foundations, overhead sign foundations, high mast light foundations, or signal pole foundations.
- Permanent steel casings shall be required for drilled piers that are constructed in six inches or more of water.
- Analyze drilled pier and pile bent foundations using either LPile or FB-Pier. Design drilled piers and vertical piles in pile bents with a sufficient embedment in soil and / or rock to achieve “fixity”.

- For box culverts, the Design-Build Team shall provide the following to the Geotechnical Unit, via the Design-Build Unit, for review and acceptance:
  - Details for undercut of unsuitable material or recommendations for use of more than one foot of conditioning material.
  - Total and differential settlement along the culvert and perpendicular to the culvert.
- Retaining walls or taller headwalls / end walls shall not be used to reduce the length of proposed box culverts.

#### **B. Roadway Foundations**

- Mitigate all unsuitable soils to the extent required to improve the stability of the proposed embankment, walls, and subgrade. Unless noted otherwise elsewhere in this RFP, use any suitable material to backfill undercut areas. When employing shallow undercut, in accordance with Section 505 of the NCDOT 2018 *Standard Specifications for Roads and Structures* use Select Material, Class IV to backfill undercut areas. For undercut backfilling in water, use Select Material, Class III. All AASHTO classification A-6 and A-7-6 soils shall be deemed unsuitable and shall be undercut as needed. All A-6 and A-7-6 undercut material shall be wasted.
- Unless noted otherwise herein, all unreinforced proposed fill slopes and cut slopes shall be 3:1 (H:V) or flatter.
- Reinforced soil slopes shall only be used to minimize impacts to existing Craven County potable water supply well sites, structures, cemeteries, and / or cultural, historical or otherwise protected landmarks. All reinforced soil slopes shall meet the requirements of the NCDOT Geotechnical Standard Detail Nos. 1802.1 and / or 1802.2 unless detailed design calculations and a slope stability analysis are submitted for review and accepted by the Department prior to construction.
- In accordance with the project specifications, Roadway Standard Drawings, and the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP, provide a vertical roadway alignment and / or drainage recommendations, including but not limited to, lateral ditches and underdrains for US 70 and all -Y- Lines, ramps, loops, service roads, and roundabouts to meet the following requirements:
  - For all roadways constructed on new location, excluding transitional areas required to tie to existing, maintain a minimum three-foot vertical separation between the groundwater table and the bottom of the pavement structure (asphalt base course, ABC, or cement treated base course, as applicable for the pavement design). (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

- For 1) all roadways that are not constructed on new location and 2) transitional areas required to tie to existing, the Department desires to have a minimum three-foot vertical separation between the groundwater table and the bottom of the pavement structure (asphalt base course, ABC, or cement treated base course, as applicable for the pavement design). To the maximum extent practicable, maintain a minimum three-foot vertical separation between the groundwater table and the bottom of the pavement structure for the aforementioned roadways and transitional areas. Where it is not practicable to provide the minimum three-foot vertical separation along the aforementioned roadways and transitional areas, the Design-Build Team shall adhere to the high groundwater requirements noted in the Pavement Management Scope of Work found elsewhere in this RFP. The Design-Build Team shall identify in the Technical Proposal all locations where the three-foot minimum vertical separation between the groundwater table and the bottom of the pavement structure will not be provided and indicate why it is not practicable to provide the minimum separation.
- Subsurface / pipe underdrains and shoulder drains shall use coarse aggregate (No. 57 stone).
- Where the organic content exceeds 5% by weight, within the construction limits of new embankments and existing embankments to be raised, undercut all organic soils to at least the slope stake line(s).
- All subsurface and / or slope drainage designed for either subgrade or slope stability shall be installed regardless of site conditions at the time of construction.
- Calculate and report estimated settlement and rate of settlement at bridge approach embankments within 250 feet of end bents. Add wait periods, settlement monitoring, and soil improvement techniques that keep long term settlements (15 years after substantial completion) equal to or less than one inch prior to performing fine grading of the subgrade.
- Calculate and report estimated settlement and rate of settlement for roadway embankments. Add wait periods, settlement monitoring, and soil improvement techniques that keep long term settlements (15 years after substantial completion) equal to or less than 1) four inches prior to performing fine grading of the subgrade and 2) two inches after substantial completion.
- Document and provide spring boxes or other subsurface drainage features for all springs located under proposed fill sections.
- Conduct proofrolling in accordance with Section 260 of the 2018 *Standard Specifications for Roads and Structures*. A minimum load capacity of 35 tons shall be required.



### C. Soil Improvement Methods

- Soil improvement techniques to mitigate long term settlement problems or to transfer the embankment load to a deeper bearing stratum are acceptable means to accelerate construction. All soil improvement techniques shall follow the current industry standard practices and the guidelines of *Geotechnical Engineering Circular No. 13 Ground Modification Methods Reference Manual FHWA publication FHWA-NHI-16-027 and FHWA-NHI-16-028* or *Geosynthetic Design and Construction Guidelines FHWA-HI-95-038*.
- Geofam design and construction shall be in accordance with the *Geofam Applications in the Design and Construction of Highway Embankments, Prepared for National Cooperative Highway Research Program (NCHRP) Project 24-11, Transportation Research Board of the National Academies, July 2004* and *Guidelines and Recommended Standard for Geofam Applications in Highway Embankments, NCHRP Report 529, Transportation Research Board of the National Academies, 2004*.
- Submit soil improvement design recommendations and calculations, including the Geotechnical Instrumentation and Monitoring Plan (GIMP) defined below, to the NCDOT Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance a minimum of 30 days prior to beginning embankment construction. The Design-Build Team shall not begin any embankment construction activities until the Department has accepted the aforementioned recommendations, calculations and GIMP. Only the following soil improvement methods or combination of methods will be allowed to improve the foundation soil conditions:
  - Excavation and replace with granular soils
  - Wick drains and / or surcharge and / or waiting periods
  - Lightweight fill - Lightweight aggregate
  - Lightweight fill - foamed (cellular) lightweight concrete
  - Lightweight fill - expanded polystyrene (EPS Geofam Blocks)
  - Column Supported Embankments (CSE) with a Load Transfer Platform (LTP) - Columns shall consist of aggregate columns as defined in Chapter 5 of FHWA GEC 013, vibro concrete columns (VCC), controlled modulus columns (CMC), or stiff piles as defined in 3.1.1 (first three paragraphs) of Chapter 6 of FHWA GEC 013. Helical Screw Piles will not be allowed for columns. Aggregate columns shall consist of coarse aggregate. Refer to FHWA GEC 013 Chapter 6 for design of the LTP.

**D. Geotechnical Instrumentation and Monitoring Plan (GIMP)**

- The Geotechnical Instrumentation and Monitoring Plan (GIMP) provided by the Design-Build Team, shall include a detailed program for monitoring settlement where soil improvement methods are used. Install and begin monitoring instrumentation prior to placing the first lift of the embankment to capture results and to compare with the predictions of the geotechnical design. Continue monitoring embankments and abutment walls until the project is substantially complete. Inclined meters and piezometers shall be installed by a geotechnical firm experienced in installing this type of geotechnical instrumentation on similar projects. Prior to installation, a meeting shall take place between the NCDOT and the program implementation staff to coordinate details of the monitoring program.
- The Design-Build Team shall develop, implement, and maintain a GIMP that includes the following information:
  - Instrument types to be used
  - Locations of each instrument
  - Installation procedures
  - Zone of influence for each instrument
  - Critical readings and frequency of readings
- Provide plan, profile, and cross section sheets showing the program instrumentation, including horizontal and vertical locations (X, Y, Z) of sensors, cables, and associated cabinets. Show sensor types, measurement ranges, and related data on the plans.
- Collect data at least once a week and record data on a website accessible by the Engineer.
- At a minimum, monitor the following parameters:
  - Settlement profile under or near the bottom of each bridge abutment wall at the end of the approach slab. Use a horizontal inclinometer to collect settlement profile data.
  - Pore water pressures except for embankments supported by stiff columns.
  - Measured vertical and horizontal movement and tilt of bridge abutment walls at five locations (end of both sides of the approach slab, both corners of the abutment wall, and centerline of each abutment wall).

**E. Permanent Retaining Wall Structures**

- For design and construction of mechanically stabilized earth (MSE) retaining walls, refer to the NCDOT *Policy for Mechanically Stabilized Earth Retaining Walls* which can be found at the NCDOT Geotechnical Engineering Unit's website at:

**<https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx>**

Transverse differential settlement for MSE walls shall be limited to 50:1 (H:V) from face of wall to back of straps. Where abrupt changes in settlement are anticipated, provide vertical slip joints.

- Retaining walls with moment slab barriers shall be designed and constructed for differential settlement between the moment slab and the wall facing. (Reference the Roadway Design Scope of Work found elsewhere in this RFP)
- Walls shall include drainage methods / mediums to drain water behind the wall.
- With the exception of walls covered by a Geotechnical Engineering Unit Standard Detail, design and construct permanent retaining walls in accordance with the applicable NCDOT Geotechnical Engineering Unit Project Special Provisions, which can be provided upon request by the Design Build Team. Geotechnical Provisions and Notes can be found at the NCDOT Geotechnical Engineering Unit's website at:

**[https://connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Provisions\\_Notes.aspx](https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Provisions_Notes.aspx)**

- Submit a wall layout and design for each retaining wall. At a minimum, the wall layout submittal shall include the following:
  - Wall envelope with top of wall, bottom of wall, existing ground, and finished grade elevations at incremental stations
  - Wall alignment with stations and offsets
  - Typical sections showing top and bottom of wall, drainage, embedment, slopes, barriers, fences, etc.
  - Roadway plan sheets showing the wall (half size)
  - Roadway cross sections sheets showing the wall (half size)
  - Traffic Control Plans showing the wall (half size)
- For project retaining walls requiring a design not covered by a Geotechnical Engineering Unit Standard Detail, the wall layout submittal shall also include the following:

- Calculations for sliding, settlement, overturning, bearing capacity, global stability, and settlement
- Details of conflicts with utilities and drainage structures
- The NCDOT Geotechnical Unit Standard Detail No. 453.01 (Standard Cast in Place (CIP) Gravity Retaining Wall) does not consider traffic impact loads applied to the top of the wall and shall not be used along roadways where moment slabs and crash barriers are required at the top of the wall.
- Locate retaining walls at toes of slopes unless restricted by right of way limits. The Design-Build Team shall submit global stability calculations for slopes at retaining walls and obtain acceptance from the NCDOT prior to construction. All slopes behind walls shall be 4:1 (H:V) or flatter.
- Cut wall (e.g., soil nail walls, soldier pile walls) anchors (where necessary) shall be located within the project right-of-way.
- Drainage over the top of retaining walls and sags in the top of walls shall not be allowed. Direct runoff above and below walls away from walls, if possible, or collect runoff at the walls and transmit it away. Curb and gutter or cast-in-place single faced barrier with paving up to the wall shall be required when runoff cannot be directed away from the back or front of the wall. In accordance with the NCDOT *Roadway Design Manual* - Section 5.5.1.2, Figure 5-25, the Design-Build Team shall design and construct a paved concrete ditch, with a minimum 12-inch depth, at the top of all retaining walls with slopes draining towards the wall, and a four-foot bench between the wall and fill / cut slopes steeper than 6:1 (H:V).
- Cast-in-place or precast coping shall be required for walls without a cast-in-place face with the exception of when a barrier is integrated into the top of the wall. Extend coping or cast-in-place face a minimum of 12 inches above where the finished or existing grade intersects the back of the wall.
- The Design-Build Team shall provide a fall protection chain-link fence immediately behind, or on top of the facing, coping or barrier of 1) all proposed and existing retaining walls where the delta in elevation of the finished grade and top of wall is 30.0 inches or more. If installed on top of the facing, on top of the coping or behind the aforementioned walls, the fence shall be six feet tall. If installed on top of the barrier, the fence shall extend six feet above the paved shoulder at the face of the barrier, measured from the highest finished grade. For all proposed abutment walls located at dual bridges, the Design-Build Team shall provide a four-foot chain-link fence or handrail, as directed by the Engineer, on top of the facing, on top of the coping or immediately behind the abutment wall between the dual bridges.

- When using abutment retaining walls with deep foundations, the end bent deep foundation shall be designed and constructed with one of the following and include any lateral loading resulting from the pile deflection in the design of the MSE walls:
  - A single row of plumb piles with brace piles battered toward the wall
  - A single row of plumb piles with MSE reinforcement connected to the back of the cap
  - An integral abutment with a single row of plumb piles and no reinforcement connected to the back of the cap in accordance with FHWA GEC 11, pages 6-8 through 6-10
  - Drilled Piers
- The Design-Build Team shall not drive, re-drive, and / or re-strike piles at end bents with abutment walls after the abutment walls have been built to eliminate down drag (negative skin friction) loads.
- All deep foundations for end bents with abutment retaining walls shall extend a minimum of ten feet below the retaining wall foundation or leveling pad.
- A design friction angle greater than 40 degrees shall not be used for retaining walls, even if the measured friction angle of the material is greater than 40 degrees.

#### **F. Temporary Structures**

- Design temporary retaining structures, which include earth retaining structures and cofferdams, in accordance with current allowable stress design AASHTO *Guide Design Specifications for Bridge Temporary Works*, the *Temporary Shoring Standard Special Provision* found elsewhere in this RFP and the applicable NCDOT Project Special Provisions available upon request by the Design-Build Team. The only submittal required to use the standard sheeting design is the “Standard Shoring Selection Form”.
- Traffic control barrier on top of walls shall be in accordance with the NCDOT Work Zone Traffic Control Unit details available upon request by the Design-Build Team. If anchored barrier is required, then anchor the barrier in accordance with NCDOT 2018 Roadway Standard Drawing No. 1170.01.

### **III. ADDITIONAL CONSTRUCTION REQUIREMENTS**

- Prior to incorporating recommended remedial measures into the project, the Design-Build Team shall investigate, propose, and submit proposed remedial measures to the NCDOT Geotechnical Engineering Unit for review and acceptance for any construction problems related to the features below. The NCDOT

Geotechnical Engineering Unit shall accept the recommended remedial measures prior to construction.

- Foundations
  - Retaining walls
  - Sound barrier walls
  - Subgrades
  - Settlement
  - Slopes
  - Construction vibrations
- The prequalified geotechnical firm which prepares the foundation designs shall review and approve all pile driving hammers and drilled pier construction sequences. After the prequalified geotechnical firm has approved these submittals, the Design-Build Team shall submit them to the NCDOT for review and be accepted prior to beginning construction. Hammer approvals shall be submitted prior to performing any pile driving and shall be performed using GRLWEAP Version 2010 or later.
  - The prequalified geotechnical firm which prepares the original foundation designs shall be responsible for any necessary changes to the foundation designs revising analysis, recommendations, and reports as needed. All changes shall be based upon additional information, subsurface investigation and / or testing. Send copies of revised designs, including additional subsurface information, calculations, and any other supporting documentation to the NCDOT for review and acceptance.
  - Within 30 days of completing all foundations for the project, the prequalified geotechnical firm which prepared the original foundation designs shall provide a signed and sealed letter with installation records to the Design-Build Unit, certifying that all foundations were installed in compliance with their recommendations, and the plans developed by the Design-Build Team and accepted by the Department.
  - The prequalified geotechnical firm which prepares the embankment design for a bridge or roadway fill shall review any necessary settlement monitoring data (at least weekly during fill placement and a minimum of every two weeks once full height is achieved) and provide monthly updates to the NCDOT Geotechnical Engineering Unit, via the Design-Build Unit. This same firm shall issue a release letter ending the wait period for an embankment fill once the settlement criteria listed elsewhere in this RFP is met. Settlement monitoring data and

recommendations shall be submitted to the NCDOT Geotechnical Engineering Unit, via the Design-Build Unit, for review and be accepted prior to issuing a release letter.

- The Design-Build Team shall be responsible for any damage and / or claim caused by construction, including but not limited to damage caused by vibration (see Article 107-14 of the NCDOT 2018 *Standard Specifications for Roads and Structures*). The Design-Build Team shall be responsible for deciding if any pre- and post-construction monitoring and inventories need to be conducted. Any monitoring and inventory work shall be performed by a prequalified consulting firm.
- Prequalification of contractors is not required for pile excavation or drilled-in pile holes that are 30 inches in diameter or less. Class A concrete or grout shall be required to backfill holes for drilled-in piles.
- Continuous Flight Auger (CFA) piles will be allowed for sound barrier walls.
- Use Pile Driving Analyzer (PDA) testing on a minimum of two production piles for each pile size and type for each bridge with driven piles using the approved hammer driving system for the pile. The two test piles shall not be located at the same bent to meet this requirement. Each PDA tested pile shall be driven to the maximum RDR for the end bent / bent(s) the PDA tested pile covers. The spacing between PDA tested piles shall not exceed 200 feet and at least one PDA tested pile shall be located at an end bent. Additional PDA testing shall be performed at other end bent / interior bents as needed to stay within the maximum spacing requirement. Changes in hammer driving systems and / or additional similar hammer driving systems shall require additional PDA testing. Additional PDA testing may be warranted based on AASHTO LFRD Bridge Design Specifications and shall be recommended as needed by the geotechnical foundation design engineer and submitted to the NCDOT for review and acceptance. Dual bridges shall not be considered as a single bridge when determining the amount and location of required PDA testing.
- A prequalified PDA consultant shall perform the required PDA testing, provide PDA reports, and develop pile driving criteria. All PDA consultants shall be prequalified a minimum of 30 days prior to performing any pile driving on the project. Geotechnical Contractor Prequalification requirements can be found at the NCDOT Geotechnical Engineering Unit's website at:

**[https://connect.ncdot.gov/resources/Geological/Documents/19-05-01\\_Contractor%20Prequalification%20Requirements.pdf](https://connect.ncdot.gov/resources/Geological/Documents/19-05-01_Contractor%20Prequalification%20Requirements.pdf)**

- PDA reports shall conform to the current NCDOT requirements and format and be signed and sealed by a Professional Engineer registered in the State of North Carolina who meets the experience requirements for the PDA Engineer in

responsible charge of the PDA report. In addition, the recommendations within the PDA report shall address the cause of any Integrity Factor (BTA) values less than 100 and clarify the condition of the pile. PDA reports with driving criteria recommendations shall be reviewed and accepted by NCDOT prior to driving any production piles at the end bents / bents the PDA tested pile covers. PDA reports for miscellaneous piles tested to confirm ultimate resistance or acceptable pile integrity shall be reviewed and accepted by NCDOT prior to incorporating the pile into an end bent, bent or footing.

- For drilled piers the following shall apply.
  - Use current NCDOT inspection forms for drilled piers available on the NCDOT Geotechnical Engineering Unit's webpage. Construct and inspect drilled piers in accordance with Section 411 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and the *Drilled Piers Project Special Provision* located on the NCDOT Geotechnical Engineering Unit's website.
  - The Department will inspect drilled piers using the Shaft Inspection Device (SID) for any pours using the wet method of concrete placement and for any drilled pier excavations that cannot be visually inspected or have remained open longer than 24 hours and cannot be dewatered due to unstable soil or rock.
  - The Design-Build Team shall notify Matt Hilderbran, PE by e-mail (mrhilderbran@ncdot.gov) a minimum of five days prior to required SID testing, followed by a confirmation two days prior to required SID testing. The Design-Build Team shall notify Matt Hilderbran of all SID testing cancellations as soon as possible at the e-mail address noted above and at (919) 329-4015.
  - Install Crosshole Sonic Logging (CSL) tubes in all drilled piers. CSL test a minimum of 25% of drilled piers at each bridge or one per bent, whichever is greater. If a CSL test identifies any defect in the drilled pier, the Department has the right to request additional CSL testing and / or tomography as needed. The Department will determine which piers will be CSL tested. Submit CSL and tomography test information and results to the Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance.
  - Drilled pier tip elevations shall not be changed during construction unless the prequalified geotechnical firm which prepares the bridge foundation design redesigns the drilled pier from either an SPT / rock core boring, performed in accordance with ASTM standards at the subject pier location, or observations of the drilled pier excavation. If a drilled pier is designed based on a boring, do not drill a boring inside an open drilled pier excavation. Locate the boring within three pier diameters of the center of



the subject pier and drill to a depth of two pier diameters below the revised tip elevation. If a drilled pier is redesigned based upon observations of the drilled pier excavation, the geotechnical engineer of record shall be present during the excavation to determine the actual subsurface conditions.

- The geotechnical grade point shall be defined as the location where the proposed subgrade and natural ground intersect. At all geotechnical grade points, the Design-Build Team shall undercut the existing soils within two feet of the bottom of the proposed subgrade in accordance with the requirements below.
  - The undercut shall extend along the profile to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet, or to 25 feet on each side of the geotechnical grade point, whichever is less.
  - The lateral extent of the undercut shall extend to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet or to one foot outside of the paved shoulder / face of curb of the proposed roadway typical section, whichever is less.
  - The base of the undercut shall parallel the proposed subgrade.
- Send copies of any inspection forms related to foundations, settlement, sound barrier walls, or retaining wall to the NCDOT for review and acceptance.

**HYDRAULICS SCOPE OF WORK** (6-23-22)**Project Details**

- The Design-Build Team shall employ a private engineering firm(s) to perform hydraulic design for all work required under this contract. The private engineering firm must be prequalified for Tier II hydraulic design work under the Department's normal prequalification procedures prior to the Technical Proposal submittal date.
- The Design-Build Team shall hold a pre-design meeting with the Design-Build Unit, the NCDOT Hydraulics Review Engineer and USFS after acceptance of the Preliminary Roadway Plans developed by the Design-Build Team.

**Design Freeboard for Box Culverts and Pipes**

- For all proposed box culverts and pipes, a minimum 1.5-foot freeboard shall be required below the shoulder point during the design storm.
- The Design-Build Team shall not steepen slopes, reduce easements and / or reduce right of way solely to obtain the aforementioned freeboard requirement.

**Storm Drainage System Design**

- The Design-Build Team shall design all storm drainage systems using Geopak Drainage, including but not limited to incorporating discharges from allowable routing programs.
- Raised median island cuts will not be allowed.
- Slotted concrete median barrier will not be allowed for permanent installations.
- All drainage system improvements shall be contained within the right of way. When tying directly to existing downstream systems located outside the right of way that are hydraulically deficient during the design storm, the Design-Build Team shall provide an Open Throat Catch Basin (OTCB) or 2GI within the right of way limits.
- The Design-Build Team shall use a minimum ditch grade of 0.3% and avoid constructing ditches in wetlands. Ditch grades less than 0.3% may be allowed post award if the Design-Build Team can demonstrate, in the Department's sole discretion, that a 0.3% grade cannot practically be achieved.
- At a minimum, the Design-Build Team shall install traffic bearing grated drop inlets with steel frames and flat steel grates at the following locations:
  - Within a temporary travel lane
  - Within four feet of a temporary and / or permanent travel lane

- Existing and proposed longitudinal pipe (trunkline) shall not be located beneath the proposed roadway travel lanes or beneath proposed barrier rails.

### Hydraulic Spread

- The hydraulic spread shall not encroach into any operational lane beyond the limits noted below:
  - For roadways with shoulders, including those with expressway gutter and shoulder berm gutter, the hydraulic spread shall not encroach into a permanent travel lane and shall not encroach more than two feet into an operational temporary travel lane.
  - For all other roadways, the hydraulic spread shall not exceed the values specified in Table 1 in Chapter 10 of the NCDOT *Guidelines for Drainage Studies and Hydraulics Design*.
  - The hydraulic spread shall not encroach into **ANY** operational lane on a bridge, including but not limited to permanent through lanes, temporary through lanes and exclusive turn lanes.
- The Design-Build Team shall analyze spread for all bridges within the project limits and, as necessary, provide mitigation that adheres to the hydraulic spread requirement noted above. If required, the Design-Build Team shall adhere to the bridge drainage system requirements noted below:
  - The Design-Build Team shall design bridge drainage without the use of bridge scuppers (open grated inlets) or closed / suspended drainage systems. If deck drains are used on the bridge, they shall be vertical pipes at the flow line through the deck with no elbow and shall be consistent with that shown in the current NCDOT Stormwater Best Management Practices Toolbox.
  - The Design-Build Team shall use four-inch deck drains adjacent to pedestrian facilities.
  - The Design-Build Team shall provide bridge drainage features that prevent direct discharge onto any existing / future greenway, travel lane or paved shoulder.
  - The maximum allowable deck drain spacing shall be 12-foot on center.

### Hydroplaning Analysis

- Excluding areas that the Design-Build Team will be uniformly overlaying the existing pavement structure, the Design-Build Team shall perform a hydroplaning risk assessment in accordance with the NCDOT *Guidelines for Drainage Studies and Hydraulic Designs*, including all addenda, memos and revisions and the requirements herein.

- The Design-Build Team shall provide mitigation that minimizes hydroplaning risk for all new and existing roadways within the construction limits, as necessary. (Reference the Roadway and Pavement Management Scopes of Work found elsewhere in this RFP)

The Design-Build Team shall include a brief summary of the mainline hydroplaning risk assessment in the Technical Proposal.

- The Design-Build Team shall use a 70 mph speed for the mainline hydroplaning analysis.
- The Design-Build Team shall give particular attention to areas with zero superelevation in a crest and / or sag vertical curve, and superelevation reversal points.
- The Design-Build Team shall develop a Final Hydroplaning Assessment that shall be included with the Preliminary Roadway Plans submittal for the Department's review and acceptance.
- In addition to Final Hydroplaning Assessment, the Design-Build Team shall develop a Construction Hydroplaning Risk Assessment and Mitigation Plan Report that shall be included with the Traffic Control Plans submittal for the Department's review and acceptance. The aforementioned Report shall identify a process that evaluates and avoids concentrated flow across travel lanes where speeds are in excess of 45 mph during construction phasing. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

### **Stormwater Management**

- In accordance with the NCDOT Post-Construction Stormwater Program, NCDOT's Stormwater Best Management Practices Toolbox, and NCDOT's *Guidelines for Drainage Studies and Hydraulics Design*, the Design-Build Team shall develop a Stormwater Management Plan that, at a minimum, demonstrates the following:
  - Compliance with the requirements described in the NCDOT Post-Construction Stormwater Program dated April 2014.
  - To the maximum extent practicable, stormwater runoff shall be diverted away from surface waters and existing vernal pools in proximity to Mabee's Salamander and Southern Chorus Frog observations.
  - To the maximum extent practicable, on-site stormwater control measures shall be employed to minimize water quality impacts.
  - Underground detention will not be allowed.
  - Unless noted otherwise elsewhere in this RFP, no additional right of way shall be acquired solely for stormwater management.
- In accordance with the NCDOT *Guidelines for Drainage Studies and Hydraulics Design*, including all addenda, memos and revisions, the Design-Build Team shall prepare Outlet

Analyses for the increases in discharge due to the proposed project and take appropriate action to ensure that any increases are appropriately mitigated. Velocity mitigation shall be implemented in compliance with NC Administrative Code 15A NCAC 04B .0109 and associated *NCDOT Compliance Documentation Workflow for Rule 15A NCAC 04B .0109*. Such mitigation measures shall first consider long-term maintenance of the proposed mitigation. Except as otherwise noted, improvements to receiving channels shall be implemented before implementing any detention basin structures.

The Design-Build Team shall not increase discharges (intensity or volume) to the railroad right of way. The Design-Build Team shall make every effort to mitigate for increases in discharge due to the proposed project within the existing / proposed right of way for the project. If, in the Department's sole discretion, mitigation measures cannot be contained within the existing / proposed right of way for the project, the Department will allow acquisition of additional right of way solely for stormwater management mitigation measures to avoid increased discharges to the railroad right of way.

- Direct connections from impervious surfaces to the receiving waters shall be minimized to the maximum extent practicable.

### **Drainage Structures**

**Throughout this RFP, the term *drainage structures* shall include box culverts, cross pipes, drainage boxes and storm drainage systems.**

- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall replace **all** existing pipes within the existing / proposed right of way of the mainline, and all -Y- Lines, service roads, ramps, loops, and interchange quadrants with the appropriate pipe type, in accordance with the *Drainage Pipe* Project Special Provision found elsewhere in this RFP.
- The Design-Build Team shall remove or fill with flowable fill all existing pipes not retained for drainage.
- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall remove and replace **all** existing drainage boxes with the appropriately sized drainage box.
- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall remove and replace all existing box culverts with the appropriately sized reinforced concrete box culvert.
- A maximum HW/D = 1.2 shall not be exceeded for all proposed box culverts and pipes during the design storm.
- The Design-Build Team will not be required to analyze or replace drainage structures within construction limits that consist solely of pavement marking obliterations and / or revisions.

- The Design-Build Team shall not install permanent elliptical pipe. Elliptical pipe will only be allowed in temporary conditions and all elliptical pipes shall be removed prior to final project acceptance.
- The Design-Build Team shall develop discharges for all drainage structures based upon the future build-out land use projections. At a minimum, the Design-Build Team shall use a level of future urbanization with a percent impervious area of no less than 20% throughout the project. The Design-Build Team shall not include the effects of storage when computing discharges for hydraulic design and analysis for areas less than 50% impervious. For drainage areas where impervious surfaces are greater than 50%, routing will be allowed. EPA SWMM, USACE HMS, Win TR-20, HydroCAD or equivalent are acceptable programs for routing. A storm drainage duration of 24 hours shall be used in developing the hydrograph.
- Revise the NCDOT *Pipe Material Selection Guide* as follows:
  - Delete Note No. 5 and replace with the following:
    - All cross-pipes on the mainline, including all ramps, loops and interchange quadrants, shall be upsized by a minimum of six inches in diameter above that which would be hydraulically and / or jurisdictionally required. Upsizing shall be in addition to any upsizing required due to burial below the streambed.
    - All cross-pipes on -Y- Lines and service roads that are beneath a fill height that is equal to or greater than fifteen (15) feet, as measured from the top of the pipe to the corresponding road surface above the pipe, shall be upsized by a minimum of six inches in diameter above that which would be hydraulically and / or jurisdictionally required. Upsizing shall be in addition to any upsizing required due to burial below the streambed.
- All storm drainage systems shall maintain a hydraulic grade line that is a minimum of 0.5 feet below the inlet rim elevation or top of junction box; and shall adhere to all other requirements as identified in Chapter 10 of the NCDOT *Guidelines for Drainage Studies and Hydraulic Design*.
- In the Technical Proposal, Volume II, the Design-Build Team shall provide a *Box Culverts and Cross Pipes Hydraulic Assessment Table* that contains the attributes noted below for all new box culverts and cross pipes 18 inches in diameter or greater:
  - Station
  - Proposed drainage structure details
  - Drainage Area
  - Percent Impervious or “C” value used
  - Discharge method used
  - Built-Out Discharges (Design Year and 100 Year)
  - Water Surface Elevation Natural Condition
  - Water Surface Elevation with Drainage Structure

- HW/D for Build-out Discharges
  - Hydraulic Freeboard for Build-out Discharges
  - Comments
- All cross structures requiring a hydraulically effective waterway opening of thirty square feet or more, excluding any area that is buried below the streambed, a reinforced concrete box culvert shall be required. The minimum reinforced concrete box culvert barrel height (inside dimension) shall be six feet, with a minimum six-foot clear opening height above the streambed. The minimum reinforced concrete box culvert barrel width (inside dimension) shall be six feet.
  - Cross drainage shall be conveyed with a single drainage structure (pipe or box culvert). More than one line of pipe and / or three (3) box culvert barrels serving the same watershed shall not be allowed.
  - All proposed drainage boxes, including but not limited to catch basins, drop inlets and junction boxes, shall have a grate or manhole access.
  - The “dry” (non-active flow) concrete pipe for passage of Mabee’s Salamander and Southern Chorus Frogs under US 70, including any ramps and loops, and -SRY3DY4C- shall be installed at +/- Station 202+50 -L-. The pipe diameter shall be a minimum of 48 inches or the maximum diameter allowed by the proposed roadway grade, whichever is greater. The pipe shall be buried one foot below the natural ground elevation and backfilled with one foot of native soil. An elevated “dry” drainage box with frame and grates shall be installed in the median of US 70 and the median between US 70 and -SRY3DY4C- to provide light within the pipe but, not allow water to enter the pipe.

### **Permit Coordination**

- The Design-Build Team shall conduct an interagency hydraulic design review meeting and an interagency permit impacts meeting prior to the final submittal of the environmental permit applications. (Reference the Environmental Permits Scope of Work found elsewhere in this RFP) All work resulting from the interagency hydraulic design review meeting and the interagency permit impacts meeting shall be the Design-Build Team’s responsibility. A minimum of five weeks prior to the appropriate interagency meeting, the Design-Build Team shall provide 1) hydraulic plans, 2) permit drawings, calculations, and impact sheets for the USACE 404 Permit and the NCDWR Section 401 Certification and 3) information required to obtain a Neuse Riparian Buffer Authorization to the Design-Build Unit. The Design-Build Team shall take minutes of the interagency hydraulic design review meeting and the interagency permit impacts meeting and provide them to the Department within three business days of the aforementioned meetings.

### **US Forest Service Plan Review**

- In addition to the required NCDOT hydraulic design reviews, the US Forest Service (USFS) will review all proposed drainage and drainage revisions located NFS Lands, including but not

limited to all plan revisions. With each plan submittal that requires NCDOT hydraulic design review on NFS Lands, the Design-Build Team shall concurrently provide a separate plan submittal to the Design-Build Unit for USFS review that only includes the Roadway Plans and proposed drainage on NFS Lands. The Design-Build Team shall allow 15 working days for the USFS to review the proposed hydraulic design.

## General

- The Design-Build Team's design shall be in accordance with the information on the following website, the version of the following references effective on the Technical Proposal submittal date, and the contract requirements contained herein:
  - The North Carolina Division of Highways Hydraulics Unit website:  

**<https://connect.ncdot.gov/resources/hydro/pages/default.aspx>**
  - The NCDOT *Guidelines for Drainage Studies and Hydraulics Design*, including all addenda, memos and revisions, excepted as may be amended herein
  - The NCDOT *Best Management Practices for Construction and Maintenance Activities*
  - The NCDOT *Stormwater Best Management Practices Toolbox*
  - The NCDOT *Post-Construction Stormwater Program*
  - The NCDOT *Design-Build Submittal Guidelines*
- In case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the NCDOT *Guidelines for Drainage Studies and Hydraulics Design*, including all addenda, memos and revisions, unless noted otherwise elsewhere in this RFP.



**ITS SCOPE OF WORK** (3-10-22)**GENERAL**

A pre-design meeting shall take place between the NCDOT Transportation Systems Management & Operations Unit (TSMOU), the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, the Statewide Operations Center (STOC) Engineer, Maintenance and Commercialization (OMC) Contractor, and any other pertinent NCDOT personnel. The Department will not review ITS Plan submittals prior to the pre-design meeting.

The Design-Build Team shall coordinate with the Division Traffic Engineer, the Regional Traffic Engineer, the TSMOU, the STOC, the R-5777D Design-Build Team and the R-5777D OMC Contractor throughout the project duration.

The Design-Build Team shall design, furnish, and install fiber-optic communications and new Closed-Circuit Television (CCTV) cameras within the project limits. The Design-Build Team shall integrate the new CCTV cameras into the “Statewide ITS Network”. Major items of work include, but are not limited to, the following:

- Install fiber-optic cables in new and existing conduit
- Relocate fiber optic communications infrastructure, as required to maintain connectivity
- Install two (2) new CCTV cameras
- Junction boxes (electrical and communications)
- Wood poles
- Electrical service equipment
- Portable CCTV camera assemblies, as identified herein

The Design- Build Team shall furnish and install guardrail and / or concrete barrier to protect temporary and permanent ITS devices and ITS Fiber Hub Cabinets, as required.

Determine the new location of each ITS device, obtain the Engineer’s approval of the location, install the devices and implement test procedures, then integrate the devices into the “Statewide ITS Network”.

Prior to any underground work, locate existing utilities, communications cable, power cable, and adjust work activities to protect these facilities. Immediately cease work and notify the Engineer and the affected owners if damage to existing utilities occurs. Repair damages to existing utilities, communications cable, and / or power cable at no cost to the Department.

Perform all work in accordance with the ITS Project Special Provisions found elsewhere in this RFP, the 2018 NCDOT *Standard Specifications for Roads and Structures*, the 2018 NCDOT *Roadway Standard Drawings*, and the ITS & Signals Project Special Provisions effective on the Technical Proposal submittal date, found on the NCDOT ITS and Signals Unit Design Resources website below:

<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

## **PROJECT OPERATION REQUIREMENTS**

It is the Department's desire to provide uninterrupted traffic incident management and traveler information operations throughout the life of the project. Thus, the Design-Build Team shall identify the approximate location of the new ITS devices and when they will be installed and operational in their permanent location in the Technical Proposal.

The Design-Build Team shall provide a portable CCTV camera that is integrated with the "Statewide ITS Network" at the permanent CCTV camera locations until a permanent CCTV camera is installed and integrated with the "Statewide ITS Network". The portable CCTV cameras shall be installed and integrated with the "Statewide ITS Network" prior to beginning any activity that will impede the traffic on US 70. All portable ITS devices shall communicate with the "Statewide ITS Network" by means of a Department supplied cell modem. Portable CCTV camera deployments shall comply with the requirements of the applicable project special provisions found elsewhere in this RFP.

For unplanned disconnections to permanent or temporary ITS devices, where communications cannot be restored within 24 hours, a replacement portable device capable of communicating with the "Statewide ITS Network" shall be provided at no additional cost to the Department. Portable CCTV cameras used at proposed locations shall be in addition to the portable CCTV cameras required for work zone traffic control and incident management during construction. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

The Design-Build Team shall remove and deliver all wireless radio equipment and cell modems used for portable ITS devices to the Division. Contact Steven Hamilton, Division Traffic Engineer, at (252) 439-2816 two weeks in advance to coordinate the delivery of the aforementioned equipment.

### **Intermediate Contract Time #1 for Failure to Repair a Damaged NCDOT Fiber Optic Communications Cable and Restore Communication**

The Design-Build Team shall repair all existing fiber optic communication cables damaged during construction. The Design-Build Team shall immediately report damages to the Engineer, NCDOT Division Traffic Engineer and the STOC. The Design-Build Team shall repair all damages within 24 hours at no cost to the Department. The Design-Build Team shall bring all affected NCDOT fiber optic communication cables back online within the same 24 hours. A "damaged" NCDOT fiber optic communications cable is any fiber optic communications cable that is determined damaged due to an accidental or unscheduled outage event.

**Liquidated Damages for Intermediate Contract Time #1 for failure to repair a damaged NCDOT fiber optic communications cable and restore communications within 24 hours are \$500.00 per hour or any portion thereof.**

**Intermediate Contract Times #2 and #3 for Failure to Reestablish NCDOT Fiber Optic Communications After a Disruption**

During construction, the Design-Build Team shall coordinate any disruption in NCDOT fiber optic communications with the Engineer, the NCDOT Division Traffic Engineer and STOC. The Design-Build Team shall notify the Engineer, the NCDOT Division Traffic Engineer and the STOC a minimum of seven days prior to all proposed disruptions in service. A minimum of 21 calendar days prior to any disruption in NCDOT fiber optic communications, the Design-Build Team shall develop and provide a plan for the Department's approval that defines 1) an anticipated disruption timeframe and 2) a plan of action for reestablishing NCDOT communications within 24 hours.

**Liquidated Damages for Intermediate Contract Time #2 for failure to reestablish NCDOT fiber optic communications within 24 hours after a disruption are \$2,500.00 per day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #3 for failure to provide a plan that defines 1) an anticipated NCDOT fiber optic communications disruption timeframe and 2) a plan of action for reestablishing NCDOT communications a minimum of 21 calendar days prior to a proposed disruption in service are \$10,000.00 per failure.**

**Intermediate Contract Time #4 for Failure to Restore Communication to ITS Devices**

The Design-Build Team shall maintain communications with all permanent and temporary ITS devices integrated with the "Statewide ITS Network". If communication is lost, the Design-Build Team 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 Intermediate Contract Time #4 for failure to restore communication to ITS devices or provide a replacement device within 24 hours are \$500.00 per hour or any portion thereof.**

**DESIGN REQUIREMENTS**

The Design-Build Team shall furnish and install all new ITS field equipment for this project.

**Communications****➤ NCDOT 96-Fiber ITS Trunk Line**

From the southern project limits to approximately Station 279+00 -L-, the R-5777D Design-Build Team will be installing the NCDOT 96-fiber ITS trunk line and three 1.25-inch conduits along US 70. North of Station 279+00 -L-, the R-5777D Design-Build Team will be installing the NCDOT 96-fiber ITS trunk line and three 1.25-inch conduits along SR 1113 (Old Cherry Point Road).

If any sections of the 96-fiber ITS trunk line and / or conduits are in conflict with the R-5777C Project and need to be relocated, the Design-Build Team shall relocate the 96-fiber ITS trunk line and conduits before installing the new 144-fiber ITS device line defined below. A maximum of two cuts / splices shall be allowed per section of fiber that needs to be relocated.

The 96-fiber ITS trunk line shall run expressed between hub cabinets and shall not be cut or spliced unless necessary for fiber relocation purposes. If the Design-Build Team relocates the 96-fiber ITS trunk line, the Design-Build Team shall label the 96-fiber ITS trunk line cable “NCDOT ITS TRUNK LINE” and store 50 feet of spare 96-fiber ITS trunk line cable in each impacted junction box.

ITS devices shall **NOT** be spliced into the 96-fiber ITS trunk line.

➤ **NCDOT 144-Fiber ITS Device Line**

From the southern project limits to SR 1116 (Thurman Road), the Design-Build Team shall furnish and install a new 144-fiber ITS device line, with 12-fiber drop cables for proposed ITS device drops, along US 70. From the southern project limits to where the aforementioned 96-fiber trunk line and conduit transitions to SR 1113 (Old Cherry Point Road), the Design-Build Team shall install the new 144-fiber ITS device line in the 1.25-inch blue conduit to be installed by the R-5777D Design-Build Team. The Design-Build Team shall terminate the 144-fiber ITS device line in the junction box at the base of the CCTV camera to be installed at US 70 / SR 1116 (Thurman Road) by the U-5713 / R-5777A & B Design-Build Team.

The 144-fiber ITS device line shall connect all ITS devices.

In all junction boxes, the Design-Build Team shall label the 144-fiber cable “NCDOT ITS DEVICE LINE” and store 50 feet of spare 144-fiber device line cable.

➤ **NCDOT 12-Fiber Drop Cable**

The Design-Build Team shall design, furnish and install 12-fiber drop cables from the 144-fiber ITS device line to each permanent ITS device. Drop cables shall be spliced into the 144-fiber ITS device line with a splice enclosure. The Design-Build Team shall terminate **ALL** fibers of each drop cable in an interconnect center in each ITS device cabinet.

In all junction boxes and device cabinets, the Design-Build Team shall label the 12-fiber drop cables and their interconnect centers “<DEVICE ID> DROP CABLE” and store 50 feet of spare drop cable.

➤ **OMC Fiber Optic Cable**

The OMC Contractor’s OMC Fiber Optic Cable runs through the commercialization conduit. Prior to performing any work on the OMC Fiber Optic Cable, the Design-Build Team shall obtain the OMC Contractor’s approval, in writing. If the Design-Build Team performs any

work on the OMC Fiber Optic Cable, the Design-Build Team shall store a minimum 50 feet of spare cable in each impacted junction box.

### **Ethernet Edge Switches**

The Design-Build Team shall furnish and install Ethernet edge switches in each ITS device cabinet in accordance with the *Ethernet Edge Switch* Project Special Provision found on the NCDOT ITS and Signals Unit Design Resources website.

### **Cellular Modems**

The Department will furnish all cellular modems to be used on the project. The Design-Build Team shall request the modems through the Engineer at least eight (8) weeks prior to scheduled installation.

### **CCTV Cameras**

The Design-Build Team shall strategically locate and install two (2) new CCTV cameras on new 60-foot wood poles at locations that provide optimum viewing. All CCTV camera installations, including equipment cabinets, shall comply with the requirements of the *CCTV Wood Pole* Project Special Provision found elsewhere in this RFP; and the *CCTV Field Equipment Cabinet* and *Digital CCTV Camera Assembly* Project Special Provisions found on the NCDOT ITS and Signals Unit Design Resources website. At locations where CCTV cameras are being installed, all CCTV camera equipment installed shall be new, including but not limited to cabinets, poles and pole grounding systems.

Install one CCTV camera on a new wood pole at each of the following locations:

- US 70 at SR 1112 (Camp Kiro Road) / Waterscape Way
- US 70 near Falcon Bridge Drive

Determine the exact location of each CCTV camera, obtain the Engineer's written approval of the locations, and install the cameras. Furnish site surveys, including but not limited to bucket truck or drone surveys, to ensure camera coverage areas are acceptable.

Install new electrical service equipment at all new CCTV camera locations unless power service is not available. Install solar power assembly equipment at any CCTV camera location where power service is not available. Obtain approval from the Engineer for any solar power location. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the 2018 NCDOT *Standard Specification for Roads and Structures*, the project special provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

## **MATERIALS & CONSTRUCTION**

Furnish and install new materials and hardware unless stated otherwise elsewhere in this RFP. Adhere to the requirements of the 2018 NCDOT *Standard Specifications for Roads and Structures* and the 2018 NCDOT *Roadway Standard Drawings* and the ITS & Signals Project Special Provisions effective on the Technical Proposal submittal date.

### **CCTV Cameras**

Install each stand-alone CCTV camera on a 60-foot Class 3 wood pole. Install CCTV equipment in a 336S equipment cabinet mounted on the pole.

Perform all work in accordance with the applicable ITS Project Special Provisions found elsewhere in this RFP and on the NCDOT ITS and Signals Unit Design Resources website, and other standards listed elsewhere in this RFP.

### **Conduit**

#### **➤ Power Conduit**

Furnish and install red conduit for power and all necessary hardware by trenching, plowing or directional drilling in accordance with Section 1715 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Conduit shall not be placed in the median or under the roadway, (travel lanes and shoulders), except for perpendicular crossings. (Reference the Electrical Service Section below)

#### **➤ Communications Conduit**

Furnish and install:

- Two (2) - 1.25-inch conduits for NCDOT communications lines
  - One blue conduit for the 144-fiber ITS Device Line
  - One orange conduit for the 96-fiber ITS Trunk Line
- One (1) - 1.25-inch conduit for possible future commercialization
  - One green conduit with pull tape
- Drop Cable Conduit - Furnish and Install
  - Two (2) 1.25-inch conduits for NCDOT drop cables passing under the roadway
  - One (1) 1.25-inch conduit for NCDOT drop cables not passing under the roadway
  - Drop cable conduits shall be white

Furnish and install conduit for fiber optic communication and all necessary hardware by trenching, plowing or directional drilling in accordance with the project special provisions found elsewhere in this RFP and on the ITS and Signals Unit Design Resources website. Conduit shall not be placed in the median or under the roadway (travel lanes and shoulders), except for perpendicular crossings. Seal all conduits with mechanical sealing devices as described in the project special provisions found elsewhere in this RFP and on the ITS and Signals Design Resources website.

Regardless of fiber cable installation, where new communication conduit is installed, the Design-Build Team shall furnish and install two NCDOT conduits and one commercialization conduit described above.

At interchanges where relocation of the conduit and fiber installed by the R-5777D Design-Build Team is necessary, the Design-Build Team shall split the NCDOT conduits and commercialization conduit and place the NCDOT conduits and commercialization conduit in separate junction boxes on one side of the -Y- Line at the interchange ramp terminal. All conduits may share junction boxes between interchanges.

The Design-Build Team shall provide 811 services for newly constructed segments of infrastructure until NCDOT has accepted the infrastructure.

## **Junction Boxes**

### ➤ **Electrical**

Furnish and install standard size junction boxes (pull boxes) for electrical services with all necessary hardware in accordance with the *Junction Boxes (Limited Access Facilities)* Project Special Provision found elsewhere in this RFP.

DO NOT bury junction boxes until all appropriate inspections have been conducted.

Provide junction box covers with standard “Electric” logo, pull slots and stainless-steel pins.

### ➤ **Communications**

Furnish and install junction boxes (pull boxes) for communications cable with all necessary hardware in accordance with the *Junction Boxes (Limited Access Facilities)* Project Special Provision found elsewhere in this RFP. Provide junction boxes with “mouse holes” to accommodate horizontal conduit entrances into the junction box for fiber installations.

For communications junction boxes installed between interchanges and further than six feet from an ITS device, bury the junction box six inches to eight inches below grade in accordance with the project special provisions found elsewhere in this RFP. Install locate balls and delineator markers at all communications junction boxes in accordance with the project special provisions found elsewhere in this RFP.

DO NOT bury junction boxes until all appropriate inspections have been conducted.

Install communications junction boxes within six feet of the base of each ITS device pole / cabinet and at each hub cabinet.

Every junction box shall house 50 feet of spare cable for each NCDOT cable entering the junction box.

Every junction box with a splice enclosure shall house 50 feet of spare cable for each direction of cables being spliced. (e.g. 50 feet of spare trunk line in each direction and 50 feet of spare drop cable for each drop)

Communications cables and power cables shall NOT share junction boxes.

### **Wood Poles**

In accordance with Section 1720 of the 2018 NCDOT *Standard Specifications for Roads and Structures*, furnish and install wood poles, with all necessary grounding systems and hardware necessary. Provide wood poles sized as necessary for the intended application.

- Use 60-foot CCTV Class 3 wood poles as defined in the *CCTV Wood Pole Project Special Provision* found elsewhere in this RFP.
- Use 40-foot Class 4 wood poles for approved applications.
- Use 6" x 6" x 8' treated wood posts for underground electrical service structures.

In accordance with Section 1720 of the 2018 NCDOT *Standard Specifications for Roads and Structures*, furnish and install related items of work, including but not limited to risers with weatherheads or heat shrink tubing and all necessary hardware.

### **Electrical Service**

Furnish and install new electrical services rated 100 Amps for overhead service or 200 Amps for underground service, 240/120 VAC service drops for the each new ITS device. In accordance with Section 1700 of the 2018 NCDOT *Standard Specifications for Roads and Structures*, furnish and install related items of work, including, but not limited to service entrance equipment, service conductors, feeder conductors, disconnects, junction boxes, risers, guy assemblies and wood poles with all necessary hardware. (Reference the Utilities Coordination Scope of Work found elsewhere in the RFP for additional coordination / approval requirements and payment responsibilities)



Electrical Services and Service Disconnects with regards to voltage drop calculations shall be rated to accommodate the following breaker sizes:

- CCTV = 15 AMPS

Calculations using actual equipment load amperage shall not be allowed.

## **OTHER CODES AND STANDARDS**

All ITS materials shall conform to the latest version of the applicable standards of the National Electrical Code (NEC), National Electric Manufacturer's Association (NEMA), the Underwriters' Laboratories, Inc. (UL), the Electronic Industries Association (EIA), the International Municipal Signal Association (IMSA), and the National Electrical Safety Code (NESC). All materials and workmanship must conform to the requirements of the NESC, standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI). Comply with all federal laws, state laws, and city codes in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*.

## **QUALIFIED PRODUCTS LIST**

Submit a listing of items on the NCDOT 2018 Qualified Products List (QPL) to receive approval for use on the project. Catalog cuts will not be required for items on the QPL. The QPL website is:

**<https://connect.ncdot.gov/resources/safety/Pages/default.aspx>**

For any equipment not on the QPL, the Design-Build Team shall provide product specifications and special provisions, as necessary, for the Department's review and acceptance prior to incorporation.

## **ADDITIONAL REQUIREMENTS**

For all ITS devices and components located in the project limits, the Design-Build Team shall comply with the following requirements:

### **Maintenance and Repair**

The Design-Build Team shall maintain and repair all ITS components within the project limits, including but not limited to, ITS devices, ITS conduit system, and all related ITS components, from the beginning of construction until the final acceptance of the project by the NCDOT. After acceptance of the project, the Design-Build Team shall be responsible for repairing the system due to faulty materials or workmanship in accordance with the *Twelve Month Guarantee* Project Special Provision found elsewhere in this RFP, or longer if the Design-Build Team extends the aforementioned warranty period.

## **Plan of Record Documentation**

Prepare and submit to the Department Plan of Record (POR) documentation that depicts the conduit and ITS device locations. Submit final POR documentation in electronic and hard copy format for Department approval. Provide electronic plans in MicroStation (latest release in use by the Department). Submit hard copy documentation on 22-inch x 34-inch plan sheets. POR documentation shall include the final location and depth of conduits, wiring external to the cabinets, locations of splice enclosures, junction box locations, and Single Mode Fiber Optics (SMFO) cable terminations. Include in the POR documentation real world coordinates for all ITS devices, splice enclosures, junction boxes, and equipment cabinets installed or utilized under this project. Provide the coordinates in feet units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83). Furnish coordinates that do not deviate more than 1.7 feet in the horizontal plane and 3.3 feet in the vertical plane. Global positioning system (GPS) equipment able to obtain the coordinate data within these tolerances may be used. All POR documentation described above shall be provided to the Engineer and the NCDOT ITS & Signals Management Section, via the Design-Build Unit.

## **Integration**

Upon completion of the ITS device installations, integrate the new devices with the “Statewide ITS Network” and verify command and control connectivity at the STOC. Ensure all existing and new ITS devices along the project corridor remain integrated with the “Statewide ITS Network”.

## **Testing**

Develop unit and system test plans and procedures for each ITS device and all associated components and submit to the Engineer for review and approval.

Upon completion of the ITS device installations, conduct unit and system tests according to the approved test plan and procedures. Provide all necessary test equipment.

In case of failures and substandard performance, the Design-Build Team shall identify the cause, repair or replace the faulty parts and components, and repeat the test. If the problem persists, the entire unit causing the problem shall be replaced prior to retest, at no additional cost.

After successful completion of all unit and system tests, submit the test reports along with the record of repairs and part replacements to the Engineer.

## **SUBMITTALS**

Submit a set of 60% preliminary plans, 90% unsealed set of project plans, including specifications for materials, catalog cuts, and installation and testing requirements for review. Upon acceptance by the Department, provide a 100% set of sealed plans and specifications to the Department. No construction of the ITS devices shall begin until the Department has accepted the 100% sealed plans and specifications.

**PAVEMENT MANAGEMENT SCOPE OF WORK** (6-23-22)**US 70 REQUIREMENTS**

Where the minimum vertical separation between the groundwater table and the bottom of the pavement structure, as defined in the Geotechnical Engineering Scope of Work found elsewhere in this RFP, is obtained, the pavement design for the US 70 travel lanes, the US 70 median paved shoulders and the US 70 outside paved shoulders shall consist of one of the following alternates throughout the project limits. The Design-Build Team shall specify the pavement alternate chosen in the Technical Proposal.

| <b>Alternate 1<br/>Full Depth Asphalt</b> | <b>Alternate 2<br/>Aggregate Base Course</b> | <b>Alternate 3<br/>Cement Treated Base Course</b> |
|---|--|---|
| 3.0" S9.5C                                | 3.0" S9.5C                                   | 3.0" S9.5C  |
| 4.0" I19.0C                               | 4.0" I19.0C                                  | 3.0" I19.0C                                       |
| 7.0" B25.0C                               | 3.5" B25.0C                                  | 3.0" B25.0C                                       |
|   | 8.0" ABC                                     | 8.0" CTBC   |

**US 70 High Groundwater Areas**

In areas 1) where it is not practicable to provide the minimum vertical separation between the groundwater table and the bottom of the pavement structure, as defined in the Geotechnical Engineering Scope of Work found elsewhere in this RFP and 2) transitional areas required to tie to existing, the pavement design for the US 70 travel lanes, the US 70 median paved shoulders and the US 70 outside paved shoulders shall consist of Alternate 4 if utilizing Alternate 1 or 2, as defined above, or Alternate 5 if utilizing Alternate 3, as defined above. The alternate selected shall be used throughout the project limits in areas where it is not practicable to provide the aforementioned minimum vertical separation. The alternate selected shall extend to the outermost limits of the high groundwater or 1000 feet, whichever is longer.

| <b>Alternate 4<br/>Full Depth Asphalt</b> | <b>Alternate 5<br/>Cement Treated Base Course</b> |
|---|---|
| 3.0" S9.5C                                | 3.0" S9.5C  |
| 4.0" I19.0C                               | 4.0" I19.0C                                       |
| 10.5" B25.0C                              | 4.0" B25.0C                                       |
|   | 8.0" CTBC   |

Excluding the high side of superelevated sections, the Design-Build Team shall design and construct new continuous median and outside shoulder drains and outlets for the US 70 pavement where it is not practicable to provide the aforementioned minimum vertical separation. Where installed on the outside shoulder, outlets shall be provided approximately every 300 feet. Where installed on the median shoulder, outlet locations shall not exceed 500 feet, and all outlets shall be located at drainage structures. Unless noted otherwise elsewhere in this RFP, shoulder drains shall be placed to drain the entire US 70 pavement structure. The

shoulder drain design and outlet locations shall be submitted to the Design-Build Unit for review and acceptance.

If only one direction of travel does not provide the minimum vertical separation between the groundwater table and the bottom of the pavement structure, as defined in the Geotechnical Scope of Work found elsewhere in this RRP, the Design-Build Team will only be required to provide the Alternate 4 or Alternate 5 pavement design, and median and outside shoulder drains along the direction of travel that does not provide the minimum vertical separation.

### **Required US 70 Travel Lane and Shoulder Reconstruction**

For areas where the existing US 70 travel lanes will remain in place and be resurfaced, excluding construction areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall remove and dispose of / recycle the existing US 70 median paved shoulder, outside paved shoulder, right turn lane, and left turn lane pavement structures, in their entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course. Within the aforementioned limits, the Design-Build Team shall design and construct new US 70 median and outside paved shoulders that consist of the alternate pavement design chosen, as defined above. (Reference the Roadway Scope of Work found elsewhere in this RFP)

For areas where existing service road pavement is located within the limits of the proposed US 70 travel lanes, US 70 median paved shoulder and / or US 70 outside paved shoulders, the Design-Build Team shall 1) remove and dispose of / recycle the existing service road pavement structure or 2) break up the existing service road pavement structure, in accordance with Section 250 of the 2018 *Standard Specifications for Roads and Structures*. In areas where the Design-Build Team removes and disposes of / recycles the existing service road pavement structure, the Design-Build Team shall remove the pavement structure, in its entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course. Within these reconstruction sections, the Design-Build Team shall design and construct new US 70 travel lanes, new US 70 median paved shoulders and / or new US 70 outside paved shoulders that consist of the alternate pavement design chosen, as defined above.

### **Potential US 70 Travel Lane Reconstruction**

In accordance with the requirements below, additional US 70 travel lane reconstruction may be allowed / required solely due to the Design-Build Team's proposed grade and / or pavement design chosen:

- In sections where the US 70 proposed crown point is raised less than the thickness of the mainline pavement design chosen above the existing crown point, the Design-Build Team may elect to reconstruct the US 70 travel lane pavement structures in lieu of resurfacing the existing travel lane pavement, as required elsewhere in this RFP. If the Design-Build Team elects to reconstruct these sections, the Design-Build Team shall remove and dispose of / recycle the existing travel lane pavement structures, in their entirety, to the top of the soil subgrade, including but not limited to the removal and

disposal of existing aggregate base course. Within these reconstruction sections, the Design-Build Team shall design and construct new US 70 travel lanes that consist of the alternate pavement design chosen, as defined above. If the Design-Build Team does not elect to reconstruct the US 70 travel lane pavement structures within these sections, the Design-Build Team shall mill and resurface the existing US 70 travel lane pavement structures as required elsewhere in this RFP, including but not limited to providing all required pavement wedging.

- In sections where the US 70 proposed crown point is raised the thickness of the mainline pavement design chosen, or more, above the existing crown point, the Design-Build Team shall 1) remove and dispose of / recycle the existing US 70 travel lane, US 70 median paved shoulder and US 70 outside paved shoulder pavement structures or 2) break up the existing US 70 travel lane, US 70 median paved shoulder and US 70 outside paved shoulder pavement structures, in accordance with Section 250 of the 2018 *Standard Specifications for Roads and Structures*. In areas where the Design-Build Team removes and disposes of / recycles the existing US 70 travel lane, US 70 median paved shoulder and US 70 outside paved shoulder pavement structures, the Design-Build Team shall remove the pavement structures, in their entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course. Within these reconstruction sections, the Design-Build Team shall design and construct new US 70 travel lanes that consist of the alternate pavement design chosen, as defined above.

### **US 70 Pavement Resurfacing / Uniform Overlay**

Excluding the US 70 sections below, the Design-Build Team shall uniformly mill the existing US 70 travel lane pavement to be retained to a depth of 2.5", and resurface with a minimum 2.5" I19.0C and 3.0" S9.5C. (Reference the Roadway Scope of Work found elsewhere in this RFP)

- Sections of US 70 where the existing pavement structure is removed or broken-up and reconstructed, as described in **Potential US 70 Travel Lane Reconstruction Section** above.
- Sections of US 70 where due to an increase in the crown point elevation, the entire existing US 70 travel lane pavement to remain in place will be resurfaced with at least 2.5" I19.0C and 3.0" S9.5C.
- US 70 construction limits that consist solely of pavement marking obliterations and / or revisions. In these areas the Design-Build Team shall uniformly overlay the existing pavement (travel lanes and shoulders) with a minimum pavement depth that equals half the full thickness of the surface course of the pavement design chosen, as defined above. At project completion, no pavement marking obliterations and / or revisions (grind marks, etc.) shall be visible, including but not limited to within construction limits that consist solely of pavement obliterations and / or revisions.

### **US 70 Full-Depth Pavement Repair**

In accordance with Section 654 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall repair (remove, dispose of / recycle and reconstruct) the US 70 pavement structure at locations identified by the Engineer that are outside the limits defined in the **Required US 70 Travel Lane and Shoulder Reconstruction** and **Potential US 70 Travel Lane Reconstruction Sections** above, and at locations required to remove and / or place pipe lines and reinforced concrete box culverts.

The Design-Build Team shall include in their lump sum price bid for the entire project, all costs associated with full-depth pavement repairs required solely to remove and / or to place pipe lines and reinforced concrete box culverts, including but not limited to pavement repairs that extend three feet from the outside diameter of the pipe / box culvert in each direction. The Design-Build Team shall be responsible for **all** US 70 pavement repair costs associated with open-cut installation of drainage pipes 48 inches in diameter or smaller, including but not limited to repairs required outside the three-foot dimensions noted above.

Within all sections of US 70 full-depth pavement repair, the Design-Build Team shall install the Alternate 1 or Alternate 4 pavement design, as defined above. The US 70 full-depth pavement repairs that are 1) outside the limits defined in the **Required US 70 Travel Lane and Shoulder Reconstruction** and **Potential US 70 Travel Lane Reconstruction Sections** above, 2) outside the limits required solely to remove and / or to place pipe lines greater than 48 inches in diameter, as defined above, and 3) outside the limits required solely to remove and / or to replace reinforced concrete box culverts, as defined above, will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2018 *Standard Specifications for Roads and Structures* at the unit price of \$200.00 per square yard. All work tasks required for the US 70 full-depth pavement repair, including but not limited to traffic control and portable lighting, shall be considered inclusive in the aforementioned unit price.

### OTHER REQUIREMENTS

Other pavement designs for this project are listed in **Table 1** below:

| Lines   | Surface    | Intermediate | Base        | ABC | Stab |
|---|------------|--------------|-------------|-----|------|
| -Y1RPA-, -Y1RPB-, -Y1RPD-,<br>-Y3RPA-, -Y3RPB-, -Y3RPC-,<br>-Y3RPD-, -Y4RPA-, -Y4RPB-,<br>-Y4RPC-, -Y4RPD-, -Y1LPD-, and<br>Roundabouts *   | 3.0" S9.5C | 4.0" I19.0C  | 4.0" B25.0C | -   | No   |
| -Y1- (SR 1106 - Stately Pine Road),<br>-SRY1B-, -SRY1A-, -SRY1C-,<br>-SRY1DY3C-, -SRY3DY4C-,<br>-SRY4B-, -SRY4A-, -SRY4D-,<br>-SRY4D2-, -Y3- (SR 1104 - Fisher<br>Avenue), -Y4- (SR 1112 - Camp<br>Kiro Road) | 3.0" S9.5B | -            | 5.5" B25.0C | -   | No   |
| -SRY1D2- (SR 1107 - Flanners<br>Beach Road),<br>-Y5- (Falcon Bridge Drive),<br>-Y6- (SR 2018 - Arabica Lane),<br>SR 1108 (Riverdale Road),<br>Green Avenue and<br>-Y8- (SR 1161 - River Bluffs Drive)         | 3.0" S9.5B | -            | 4.0" B25.0C | -   | No   |
| -Y7-, -WELLD1-, -WELLD2-  |            |              |             | 8"  |      |

\* Roundabouts shall include an 8.0" jointed concrete truck apron (with 4 x 4 W3.5 x W3.5 wire mesh reinforcement) on 4.0" B25.0C.

Along sections of -Y- Lines, ramps, loops, service roads and roundabouts where it is not practicable to provide the minimum vertical separation between the groundwater table and the bottom of the pavement structure, as defined in the Geotechnical Engineering Scope of Work found elsewhere in this RFP, the asphalt base course thickness noted in **Table 1** above for the specified roadway shall be increased by an additional 1.5 inches. The additional asphalt base course thickness shall extend to the outermost limits of the high groundwater or 1000 feet, whichever is longer.

For the -Y- Line, ramp, loop, service road and roundabout pavement designs noted in **Table 1** above, the Design-Build Team may substitute an ABC layer for an asphalt base course layer. If such an alternative is proposed, the thickness of the ABC layer, used as a substitute for the asphalt base course layer, shall be equal to twice the proposed asphalt base course layer thickness, including any required additional thickness in high groundwater areas, specified for the roadway. If an asphalt surface course is placed directly on the ABC layer, the Design-Build Team shall apply prime coat over the ABC layer.

The Design-Build Team shall maintain the same pavement design throughout the -Y- Line, ramp, loop, service road and roundabout construction limits. In the Technical Proposal, the

Design-Build Team shall specify the base option chosen (ABC or asphalt) for all -Y- Lines, ramps, loops, service roads and roundabouts. The Design-Build Team may substitute an asphalt base course layer for an ABC layer, as described above, for tie-ins and narrow widening.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall resurface the existing pavement (travel lanes and shoulders) of all -Y- Lines and service roads with a minimum depth that equals the full thickness of the surface course provided in **Table 1** above. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Excluding the existing US 70 travel lane pavement structures, the Design-Build Team shall 1) remove and dispose of / recycle or 2) break up all existing pavement structures located within the construction limits of a proposed ramp / loop in accordance with Section 250 of the 2018 *Standard Specifications for Roads and Structures*. In areas where the Design-Build Team removes and disposes of / recycles the existing pavement structures, the Design-Build Team shall remove the pavement structures, in their entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course. Within these reconstruction sections, the Design-Build Team shall install the ramp / loop pavement design provided in **Table 1** above.

Within the -SRY1DY3C- construction limits, the Design-Build Team shall remove and dispose of / recycle the existing SR 1106 (Stately Pine Road), SR 1107 (Flanners Beach Road), Falcon Bridge Drive, and SR 2018 (Arabica Lane) pavement structures in their entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course; and replace with the -SRY1DY3C- pavement design provided in **Table 1** above.

Within the -SRY3DY4C- construction limits, the Design-Build Team shall remove and dispose of / recycle the existing SR 1161 (River Bluffs Drive) pavement structures in its entirety, to the top of the soil subgrade, including but not limited to the removal and disposal of existing aggregate base course; and replace with the -SRY3DY4C- pavement design provided in **Table 1** above.

Throughout the -Y- Line, ramp, loop and service road construction limits that consist solely of pavement marking obliterations and / or revisions, the Design-Build Team shall uniformly overlay the existing pavement (travel lanes and shoulders) with a minimum pavement depth that equals half the full thickness of the surface course as provided in **Table 1** above. At project completion, no pavement marking obliterations and / or revisions (grind marks, etc.) shall be visible, including but not limited to within construction limits that consist solely of pavement obliterations and / or revisions.

On all interchange ramps and loops, the adjacent through lane pavement design shall extend to the back of the gore (12-foot width).

The Design-Build Team shall construct all pavement widening such that the longitudinal joints of adjacent pavement layers are offset a minimum of six inches. The Design-Build Team shall include bench milling and any other adjustments to the existing pavement that may be necessary to meet the required minimum six-inch longitudinal joint offset in the lump sum price bid for



the entire project. The Design-Build Team shall provide details in the plans developed by the Design-Build Team to illustrate all bench milling and pavement adjustments required to obtain the minimum six-inch longitudinal joint offset. Unless otherwise approved by the Engineer, in writing, longitudinal joints of all final surface course layers shall be located on the final traffic pattern lane line. If applicable, the Design-Build Team shall indicate in the Technical Proposal where all underlying longitudinal joints will be located and demonstrate how the underlying longitudinal joint location will minimize reflective cracking.

Unless noted otherwise elsewhere in this RFP, the minimum narrow widened width shall be eight feet. The minimum narrow widened width may be reduced to four feet only if the Design-Build Team demonstrates that their equipment properly compacts narrow widening and obtains prior Department written approval. Tapers that tie proposed pavement to existing pavement are excluded from the narrow widening requirements noted above.

In areas where the existing -Y- Line or service road paved shoulders are proposed to be incorporated into a permanent travel lane, the Design-Build Team shall be responsible for evaluating the existing paved shoulder regarding its suitability for carrying the projected traffic volumes. In the event that the existing paved shoulder is found to be inadequate, the Design-Build Team shall be responsible for upgrading the existing paved shoulder to an acceptable level or replacing the existing paved shoulder. The Design-Build Team shall submit their evaluation and proposed use of existing paved shoulders to the Design-Build Unit for review and acceptance or rejection.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall pave from 1) the edge of all paved shoulders to the face of all single face barrier / guardrail, including but not limited to areas that consist solely of guardrail replacement, 2) from the edge of all paved shoulders to the edge of all expressway / shoulder berm gutter, and 3) from the edge of all paved shoulders to the face of proposed retaining walls and sound barrier walls located on the outside shoulder with 6" ABC (or 4" B25.0C), a split seal and at least two lifts of surface course. If approved by the Engineer, in writing, the split seal may be omitted provided all paving (surface and base courses) will be completed between April 1<sup>st</sup> and November 15<sup>th</sup> of the same calendar year. If a split seal is not used, the ABC pavement design shall require prime coat at the normal application rate. In these areas, the Design-Build Team's installation of ABC or black base shall be consistent with the pavement type for the specific roadway. As an alternative to the above pavement design for paving the shoulders to the face of the aforementioned features, the Design-Build Team may use the adjacent travel lane pavement design. Where concrete barrier will be installed along the US 70 outside shoulder, the Design-Build Team shall pave to each face of the concrete barrier with the adjacent travel lane pavement designs. Along ramps, the Design-Build Team shall provide a continuous paved shoulder width between segments of single face concrete barrier and / or guardrail when the segments are less than 800 feet apart.

In accordance with the NCDOT Roadway Standard Drawing No. 862.01, Sheet 2 of 11, 1) the Design-Build Team will not be required to pave to the face of guardrail protecting median sign supports; and 2) the special layer of pavement shall consist of 1.5" S9.5C and 6" ABC - prime coat will not be required.

The Design-Build Team shall place a minimum 6" ABC or 4" B25.0C under all single face barrier, expressway / shoulder berm gutter, and curb and gutter.

All driveways, up to the radius point, shall be constructed with the full-depth pavement design of the intersecting roadway. The entire impacted length of all non-concrete driveways with a grade steeper than or equal to 7% shall be constructed with 1.5" S9.5B (or S9.5C) and 8" ABC with prime coat. Unless otherwise noted above, the Design-Build Team shall adhere to the following for all driveway construction:

- For existing gravel and soil driveways, use 8" ABC.
- For existing asphalt driveways, use 1.5" S9.5B (or S9.5C) and 8" ABC with prime coat, or 2.0" S9.5B (or S9.5C) and 6" ABC with prime coat.
- For existing concrete driveways, use 6" jointed concrete reinforced with woven wire mesh.

The Design-Build Team shall be responsible for the design of all temporary pavements and for the evaluation of existing shoulders and roadways regarding their suitability for carrying traffic during construction, if necessary. In the event that the existing shoulders and / or roadways are found to be inadequate for the proposed temporary traffic volumes and duration, the Design-Build Team shall be responsible for upgrading the pavement to an acceptable level in accordance with the NCDOT *Pavement Design Procedure - AASHTO 1993 Method* dated January 4, 2019, including all revisions. Temporary pavement designs and associated calculations shall be submitted for review and acceptance using the Design-Build submittal process prior to incorporation. The expected duration for traffic on temporary pavement must be included as part of the submittal.

The rate of application and the maximum and minimum thickness per application and layer shall be in accordance with the NCDOT Roadway Design Manual and 2020 Asphalt QMS manual.

When a uniform overlay or resurfacing grade ties to an existing curb, bridge and / or pavement, the Design-Build Team shall perform incidental milling, such that the new pavement ties flush with the existing feature(s). In superelevated sections of facilities with existing curb on both sides of the typical section, the Design-Build Team shall uniformly mill the entire pavement width to a depth that equals the required surface layer pavement thickness noted above. When tying to the aforementioned feature(s), the Design-Build Team shall not reduce the minimum required surface layer pavement thickness noted above. At existing pavement ties at bridges and the beginning / end of construction, the Design-Build Team shall perform incidental milling for 25 feet per surface course. To tie into existing curb and gutter, The Design-Build Team shall perform incidental milling for a minimum of six feet. The Design-Build Team shall not perform incidental milling more than 72 hours prior to placement of the asphalt surface layer.

**ALTERNATIVE TECHNICAL CONCEPTS**

Alternative Technical Concepts proposing alternate pavement designs are not permitted and will not be evaluated or considered; but may be allowed after the Department distributes the Second Industry Draft RFP.

**PAVEMENT MARKINGS SCOPE OF WORK** (6-23-22)**General**

The Design-Build Team shall prepare Pavement Marking Plans in accordance with the information on the following websites, the version of the following references effective on the Technical Proposal submittal date, and the contract requirements contained herein:

- The Signing and Delineation Unit website  
**<https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx>**
- Signing and Delineation Unit Procedures Manual  
**<https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx>**
- Traffic Engineering Practices, Policies, and Legal Authority (TEPPL)  
**<https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Select-Topics.aspx>**
- *Manual on Uniform Traffic Control Devices (MUTCD)*  
**[http://mutcd.fhwa.dot.gov/kno\\_2009r1r2.htm](http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm)**
- *Guidelines for Preparation of Signing and Final Pavement Marking Plans for Design-Build Projects*  
**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**
- *Design-Build Submittal Guidelines*  
**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**
- *NCDOT Standard Specifications for Roads and Structures*
- *NCDOT Roadway Standard Drawings*

In case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

**Final Pavement Marking Plan Requirements**

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing Pavement Marking Plans for NCDOT on comparable projects.

The Design-Build Team shall develop Pavement Marking Plans that maintain all types of traffic (motorists, bicyclists, and pedestrians within the highway, including persons with disabilities, in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130) as defined by the *Manual for Uniform Traffic Control Devices* (MUTCD).

If sidewalk is constructed, the Design-Build Team shall show and station all curb ramps in the Pavement Marking Plans for signalized intersections, non-signalized intersections and points of pedestrian crossings. Curb ramps shall be constructed per current ADA standards and with guidance from the 2018 NCDOT Roadway Standard Drawings. If the roadway geometry does not allow for the use of standard details, contact the Contract Standards and Development Unit for alternate approved curb ramp designs.

### **Final Pavement Marking Project Limits**

The Design-Build Team shall install all pavement markings and markers located within and outside the project limits, resulting from the project construction. The Final Pavement Marking Plans shall address all required modifications to existing pavement markings and markers located outside the project limits to ensure appropriate tie-ins. At a minimum, the Design-Build Team shall modify existing pavement markings and markers located outside the project limits to ensure that all lanes in each direction are open to traffic.

### **Pavement Markings, Markers and Delineation**

The Design-Build Team shall submit a complete set of Final Pavement Marking Plans that includes the -L- Line, and all -Y- Lines, ramps / loops, and service roads for review and acceptance. The Design-Build Team shall not place any final pavement markings or markers until the aforementioned Final Pavement Marking Plans are reviewed and accepted by the Department.

The Design-Build Team shall use pavement marking and marker products that conform to all NCDOT requirements and are listed on the NCDOT's Approved Products List. The use of any devices that are not shown on the Approved Products List shall require written approval from the NCDOT Signing and Delineation Unit prior to incorporation.

The Design-Build Team shall install pavement markings and markers in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

In accordance with the NCDOT Roadway Standard Drawing No. 1205.08, Sheet 1 of 8, and guidance found on the Signing and Delineation Unit's website, the Design-Build Team shall install wrong-way ramp arrow pavement markings and markers on all exit ramps / loops.

The Design-Build Team shall install longitudinal pavement markings and pavement markers on the final surface as follows:

| Road              | Marking   | Marker   |
|-------------------|---|--|
| Asphalt Surfaces  | Extruded Thermoplastic with AASHTO Type IV / NCDOT Standard Bead - Double Dropped Glass Beads | <b>Roadways</b> <ul style="list-style-type: none"> <li>• Non-cast iron snowplowable markers on mainline, ramps and loops</li> <li>• Match existing on all other roadways</li> </ul> <b>Bridge Decks</b> <ul style="list-style-type: none"> <li>• Raised markers on mainline bridge decks</li> <li>• Match existing on -Y- Line bridge decks</li> </ul> |
| Concrete Surfaces | Polyurea with AASHTO Type IV / NCDOT Standard Bead - Double Dropped Glass Beads               |  |

On concrete surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Cold Applied Plastic (Type 2 or 3) markings for stop bars, symbols, characters, crosswalks, and diagonals.

On asphalt surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Extruded Thermoplastic markings for stop bars, symbols, characters, crosswalks, and diagonals.

On all Full Control of Access interstate facilities and US Routes the Design-Build Team shall install six-inch wide pavement markings, (i.e., lane line, edge line and skips) for the final pavement marking. The Design-Build Team shall install gore lines that are twice the edge line width.

Using approved methods, the Design-Build Team shall remove residue and surface laitance on concrete bridge decks prior to placing final pavement marking materials. In accordance with approved methods and the 2018 NCDOT *Standard Specifications for Road and Structures*, the Design-Build Team shall remove curing compound from all other concrete surfaces prior to placing final pavement marking materials.

The Design-Build Team shall only remove pavement markings from asphalt surfaces by grinding.

The Design-Build Team shall only remove pavement markings from concrete surfaces by hydroblasting.

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

The Design-Build Team shall replace any pavement markings that have been damaged by the end of each day's operation.

**PUBLIC INVOLVEMENT AND INFORMATION SCOPE OF WORK** (12-13-21)**General**

NCDOT will take the lead role on this project and be responsible for a portion of the public involvement and information efforts, through the Department's Public Involvement Group and Communications Office, respectively. At a minimum, the Design-Build Team shall designate a contact for public involvement and information inquiries / coordination.

The Design-Build Team shall hold an initial project coordination meeting with NCDOT at least six weeks prior to the start of construction to discuss project impacts to the public. This information will be used by the Department to create a Public Involvement and Information Plan.

The Design-Build Team shall prepare all required corridor and design public hearing maps in accordance with the Public Involvement Map Information Guide and the Corridor Public Hearing Map Checklist and / or Design Public Hearing Map Checklist located at the following website:

**<https://connect.ncdot.gov/projects/Roadway/Pages/Guidelines--Standards.aspx>**

The Department will develop, with assistance from the Design-Build Team, the specific list of target audiences for this project. The following groups are identified as typical target audiences to receive informational materials:

- Governmental agencies
- Municipalities directly affected by construction
- Transportation services
- Emergency services
- Neighborhood groups and private homes
- Industry and businesses
- Chamber of Commerce
- Individual schools affected by the project
- County / City school systems
- Any other organization as deemed necessary by the Department.

The Department will be responsible for establishing, creating, maintaining and updating a project website. However, throughout the project duration, the Design-Build Team shall coordinate public involvement activities with the NCDOT Public Involvement Officer assigned to the project; and provide weekly updates, photos and other needed announcements to the Communications Office to ensure the accuracy of the aforementioned project website.

In the Technical Proposal, the Design-Build Team shall discuss their approach to providing the public access to project personnel for inquiries on vehicular and pedestrian traffic impacts.

The Design-Build Team shall include in their lump sum bid for the project, all costs associated with their involvement in the Public Involvement and Information Scope of Work.

## Public Involvement

Unless noted otherwise elsewhere in this RFP, the NCDOT Public Involvement Group will be responsible for the activities noted below:

- Organizing public meetings, including venue selection, reservation and fee
- Excluding corridor and design public hearing maps, developing and producing informational print materials for all meetings and workshops
- Soliciting and administering advertisements, as deemed necessary
- Mailings to the identified target audiences, including postage
- If necessary, developing and producing informational print materials for Limited English Proficiency (LEP) outreach
- Web page updates related to public involvement efforts

To ensure that project information can be distributed to the public using standard methods, including but not limited to newspaper notices, the Design-Build Team shall coordinate with the Public Involvement Officer assigned to the project.

The Design-Build Team shall also coordinate with the Public Involvement Officer to promote public awareness for this project. The amount of public involvement required for this project shall be directly based on the Design-Build Team's Transportation Management Plans and construction details. The Design-Build Team's responsibilities shall include, but are not limited to, the following:

- Providing information requested by the Department to develop and produce informational printed materials for all meetings and workshops
- Developing and providing corridor and design public hearing maps for presentation at all public meetings / workshops
- Providing details surrounding the impacts to the public
- At a minimum, the Design-Build Team shall attend and speak at monthly Facilitating Operations Meetings during construction to update stakeholders on the status of the project and upcoming construction activities. The Design-Build Team shall coordinate with the Engineer post Award to determine who needs to be invited to these meetings.
- Providing advance notice to the Department of upcoming project impacts
- Assisting the Department in the development of the target audience list
- Attending and / or speaking at public meetings
- Hand delivery of time sensitive informational materials

The minimum public involvement requirements solely associated with the Transportation Management Plans shall include, but are not limited to the following:

- Public Meetings - If Beginning of Construction meeting for area businesses and residents is held, attending and / or speaking at this event.
- Distribution of Informational Materials - For beginning of construction and for all road closures with detour routes, the Design-Build Team shall be responsible for providing time



sensitive informational material, provided by the Department, directly to the target audiences. If the Design-Build Team informs the Department of the aforementioned activities less than thirty (30) calendar days in advance, the Design-Build Team shall hand deliver the materials to the impacted target audiences.

### **Public Information**

Unless noted otherwise elsewhere in this RFP, the NCDOT Communications Office will be responsible for the activities noted below:

- Providing media announcements, including social media
- Scheduling interviews, as needed
- Website updates related to project progress

To ensure that project information can be distributed to the public using standard methods, including but not limited to notifying media outlets and updating the project website, the Design-Build Team shall inform the Department at least thirty (30) calendar days in advance of any construction activity that will significantly impact the public. These activities shall include, but are not limited to, the start of construction, major traffic shifts, road closures, ramp closures, detours, night work and project completion.

Throughout construction, the aforementioned Design-Build contact shall provide weekly updates to the NCDOT Communications Office, including, but not limited to, traffic control phasing, graphic illustrations, project pictures, etc.

**RAILROAD COODINATION SCOPE OF WORK** (6-23-22)

The Design-Build Team shall not enter into or onto the Norfolk Southern Railway and / or the North Carolina Railroad rail corridor until the appropriate Agreements are executed, insurance requirements are met, and all required written authorizations have been received from Norfolk Southern Railway and North Carolina Railroad.

**AGREEMENTS**

The Design-Build Team shall be responsible for coordinating with Norfolk Southern Railway (Lessee) and North Carolina Railroad (Owner), herein referred to jointly as the Railroads, to secure all railroad agreements necessary for the proposed highway work encroaching on the Railroads' right of way and work that will impact highway-rail grade crossings or trackage owned, operated, or maintained by the Railroads, including but not limited to the following agreements:

- A. **Crossing Signals:** As detailed herein, the Design-Build Team shall coordinate with the Norfolk Southern Railway to obtain partially executed authorizations for construction and authorizations for preliminary engineering for crossing signal work. All agreements, and any modifications thereto, shall include necessary Force Account items, including but not limited to preliminary engineering; construction engineering; crossing signals materials and construction including gates, bells, flashing lights, track approach circuitry and any required overhead cantilever structures.
- B. **Roadway Encroachment:** As detailed herein, the Department will provide the Design-Build Team with a draft Construction Agreement for submittal to the Railroads, as well as a Roadway Agreement for submittal to North Carolina Railroad. All agreements, and any modifications thereto, shall include necessary Force Account items, including but not limited to preliminary engineering, construction engineering, crossing surfaces, track materials and construction, and flagging.
- C. **Storm Water Pipelines:** As detailed herein, the Design-Build Team shall coordinate with North Carolina Railroad to obtain any Pipeline Occupancy Agreements for storm drainage pipes located within the North Carolina Railroad Corridor per Specifications for Pipeline Occupancy of North Carolina Railroad Company Property - Form NCR 102 and Pipeline Occupancy Application (NCRR Form 220).

**<https://www.ncrr.com/wp-content/uploads/2019/11/2019-07-30-Form-NCR-102-w-Plates.pdf>**

**<https://www.ncrr.com/wp-content/uploads/2019/11/2019-07-30-Form-NCRR-220-Application-for-Pipeline-Occupancy.pdf>**

The Design-Build Team shall be responsible for any modifications to these agreements that may be necessary based on their design and / or construction methods. The Design-Build Team shall be responsible for coordination of all design and construction details on the Railroads right of way and shall secure any necessary agreements required by the NCDOT and / or the Railroads. The

Department will review all agreement modifications prior to submittal to the Railroads within 14 calendar days of receipt.

The Design-Build Team shall be responsible for all coordination necessary with the Railroads and the Department to obtain partial execution of the agreements by the Railroads, including but not limited to all required modifications. Upon receipt of comments from the Railroads for each submittal, the Design-Build Team shall schedule a meeting with the NCDOT Rail Division, Design-Build Unit, Division construction staff, other NCDOT staff as appropriate, and Railroad representatives to discuss the Railroads' comments.

The Department will handle all negotiations with the Railroads.

After all negotiations between the Department and the Railroads have been finalized, and approval obtained by the Board of Transportation, the Design-Build Team shall submit partially executed agreements and plans to NCDOT's Rail Division, via the Design-Build Unit, for final agreement execution by the Department, prior to authorizing railroad work. After final execution of the agreements and railroad work is authorized by the Rail Division, the agreements will be distributed by the Rail Division to the Railroads with copies provided to the Design-Build Team and Department's Resident Engineer. The Department will execute and distribute the agreement modifications within 14 calendar days of Board of Transportation approval. The Design-Build Team or the Railroads shall not begin any construction work that impacts the Railroads prior to obtaining the final executed agreements. If a modification to an agreement is required, the approval process above shall be adhered to; and the Design-Build Team and the Railroad shall not begin any construction work that impacts the Railroads prior to obtaining the final executed modified agreement.

The railroad agreements state that the Department will be responsible for payment of Norfolk Southern Railway's Force Account work, the Railroads' expenses, and the Railroads' fees; however, the Design-Build Team shall reimburse the Department for these costs, including any overruns. This reimbursement shall be incidental to the lump sum price bid for the project. Upon request, the Department will provide copies of the Railroads' invoices to the Design-Build Team for review. The Design-Build Team shall have ten (10) days to provide written comments to the NCDOT Design-Build Unit, after which the Department will pay the invoice. The Design-Build Team shall be responsible for maintaining records to verify the invoice items.

### **TEMPORARY GRADE CROSSING SURFACES**

The Design-Build Team shall make the necessary arrangements with the Railroads for the installation of temporary grade crossing surfaces, including but not limited to, associated temporary drainage, removal of temporary construction crossings after completion of project, shoring plans, railroad force account estimates, and agreements. The temporary grade crossing surface shall conform to the Railroads' standards.

All crossing surfaces, including but not limited to, all grade crossing signals, gates, and any related train control signals / communications systems, shall be procured, installed and removed by the Railroads, or their representative, at the Design-Build Team's expense.

## **TRAIN DATA**

Railroad traffic shall be maintained at current levels at all times. The Design-Build Team shall verify the number and types of trains per day, and the maximum speed allowed with Norfolk Southern Railway. Railroad inspection and maintenance requirements, in addition to normal train operations, will occur that may impact construction activities. The Design-Build Team shall have no claims whatsoever against either Norfolk Southern Railway or NCDOT for any delays and / or additional costs incurred based on changes to the following information:

|                          |         |
|--------------------------|---------|
| Number of trains per day | 2 - 4   |
| Type of trains per day   | Freight |
| Maximum train speed      | 35 mph  |

## **RAILROAD RELATED COSTS**

The Design-Build Team shall be responsible for all Railroad Owners costs associated with this project, including but not be limited to, plan reviews, materials furnished by the Railroad Owners, signals and communications work, track and related construction by the Railroad Owners and / or their representative(s), any delays to train operations or maintenance crews, required insurances, railroad flagging, right of way acquisition, and construction engineering.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be responsible for all Railroad construction costs. Norfolk Southern Railway will be responsible for furnishing and installing any necessary improvements to the railway, including but not limited to rails and ties at at-grade crossings, at the Design-Build Team's expense. Norfolk Southern Railway will not incur any cost.

Norfolk Southern Railway has sole authority to determine the need for flagging required to protect its operations and property. The Design-Build Team will not be responsible for the cost of flagmen required for Norfolk Southern Railway to perform routine maintenance programs.

## **APPLICABLE STANDARDS AND SPECIFICATIONS**

The Design-Build Team shall comply with the following applicable documents unless a design exception is received from the railroads and NCDOT, via the NCDOT Design-Build Unit:

- *Manual on Uniform Traffic Control Devices*, latest edition
- *AREMA Manual for Railway Engineering*, latest edition
- *Norfolk Southern Railway - Standard Specifications for Materials and Construction*, latest edition
- *Norfolk Southern Railway - Public Projects Manual*, latest edition
- *Federal Aid Policy Guide 23 CFR 140I*
- *Federal Aid Policy Guide 23 CFR 646*
- *NCDOT Construction Manual Section 105-8*

- NCDOT *Standard Specifications for Roads and Structures*, Section 107-9 (Excluding Paragraph 2)
- *North Carolina Administrative Code* Section T19A: 02B, 0150 through 0158
- NCDOT *Roadway Design Manual*
- 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*
- *North Carolina Railroad / Norfolk Southern Railway Special Provisions for Railway Interests*
- North Carolina Railroad Company *Specifications for Wire, Conduit and Cable Occupations Of North Carolina Railroad Company - Form NCR 101*
- North Carolina Railroad Company *Specifications for Pipeline Occupancy of North Carolina Railroad Company Property - Form NCR 102*, latest edition

## **INSURANCE REQUIREMENTS**

The Design-Build Team shall not commence any work on the Railroads' right of way or easements until all agreements have been executed, insurance acquired and approved in accordance with the Railroads policies and procedures, and all construction plans have been approved by NCDOT, Norfolk Southern Railway, and the North Carolina Railroad Company. The Design-Build Team shall make the necessary arrangements with the Railroads that are required to protect against property damage that may result in loss of service, expense, property, or life. The Design-Build Team shall be responsible for all damage to the Railroads resulting from their operations and the Railroads may issue a stop order until all dangerous situations are remedied.

The Design-Build Team shall be responsible for providing Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability, and Physical Damage to Property to the Railroads, identifying each of the Railroads as the insured party, during the duration of the time work is being performed on or over the Railroads' right of way and / or easements. The Design-Build Team shall be responsible for verifying and obtaining the appropriate insurance and coverage with the Railroads. Other insurance requirements, including those for all subcontractors, are detailed in the documents referenced herein. The Design-Build Team shall be responsible for all required Roadway Worker Protection training and certifications.

## **UTILITIES**

Prior to any utility installation, removal, or relocation across the Railroads' right of way and / or easements, including but not limited to pipelines and / or electrical and communication cable routings over or under Railroad-owned facilities, the Design-Build Team shall coordinate with the Railroads and private utility owners to obtain the necessary permits and secure the appropriate Wireline / Pipeline Occupancy Agreements. At a minimum, the Design-Build Team shall assist the private utility owners in obtaining their respective Encroachment Agreements in the private utility owner's name. In accordance with the requirements noted herein and the Railroads specifications, the private utility owner(s) will be responsible for all associated fees and provide the necessary insurance coverage.

All work associated with any utility installation across the Railroads' right of way and / or easements shall adhere to the requirements noted herein and the Railroads' specifications.

## **CROSSING SIGNALS AND ROADWAY PLAN COORDINATION**

With the Preliminary Roadway Plan submittal, the Right of Way / 60% Plan submittal and the Final Roadway Plan submittal, the Design-Build Team shall prepare and submit completed roadway plans and rail grade crossing signalization planimetrics (if applicable) for the proposed roadway work to NCDOT's Rail Division, via the NCDOT Design-Build Unit, for review and approval. The Design-Build Team shall address all comments received, incorporate all plan modifications, and obtain approval from the NCDOT Rail Division prior to transmitting plans to the Railroads.

Within two weeks of receipt of the Preliminary Roadway Plans, the Department will provide a draft Construction Agreement and Roadway Agreement for the project. If the Design-Build Team's design or construction methods require modifications to the existing rail grade crossing signals, the Design-Build Team shall submit the rail grade crossing signalization planimetrics to Norfolk Southern Railway requesting railroad prepared design, engineering, materials list, and cost estimate of the rail grade crossing signalization, including required authorizations for construction and preliminary engineering.

## **COORDINATION WITH NORFOLK SOUTHERN RAILWAY**

The Design-Build Team shall coordinate with Norfolk Southern Railway, 650 West Peachtree Street, NW, Box 45, Atlanta, GA 30308 to obtain plan approvals, engineering and estimations, insurance requirements, and agreement coordination. Contact Brian Taylor with Norfolk Southern Railway at telephone number 678-333-4274. Plan approval shall be based on multiple submittals including but not limited to a preliminary plan submittal, a right of way / 60% plan submittal and a 90% plan submittal.

At a minimum, the preliminary plan submittal and right of way / 60% plan submittal to the Norfolk Southern Railway shall include appropriate roadway plan sheets showing impacts to the right of way / easement, erosion control plans, and drainage calculations for any drainage on or across the Railroads' right of way / easement. The 90% plan submittal shall include all necessary details, insets, and notes for construction with no substantial changes to the alignments or layout shown in the right of way / 60% plan submittal and all supporting design calculations.

All review plans and associated data shall be submitted to Norfolk Southern Railway electronically, in PDF format.

Roadway Final Construction Plans shall be submitted to, and approved by, Norfolk Southern Railway before construction that impacts the Railroads begins. The Roadway Final Construction Plans shall be submitted to Norfolk Southern Railway electronically, in PDF format.

Working Drawings affecting the Norfolk Southern Railway's operations or right of way and easements shall follow the submittal process as outlined in the 2018 NCDOT *Standard Specifications for Roads and Structures* or Special Provisions.

The Design-Build Team shall be responsible for coordinating all construction with Norfolk Southern Railway, including force account work to be performed by the Norfolk Southern Railway.

**COORDINATION WITH THE NORTH CAROLINA RAILROAD**

The Design-Build Team shall coordinate with the North Carolina Railroad Company, 2809 Highwoods Boulevard, Raleigh, NC 27604, telephone number 919-954-7601 to obtain plan approval and execution of the legal agreements by North Carolina Railroad Company for all work on the North Carolina Railroad Corridor. Contacts are Donald Arant, PE, Vice President - Engineering (For plan review and approval) and Robert Dobronski (agreements) and Amy Sandidge (property issues).

Plan approval shall be based on multiple submittals including but not limited to a preliminary plan submittal, a right of way / 60% plan submittal and 90% plan submittal. The plan submittals to the North Carolina Railroad shall include the same information provided in the submittals to Norfolk Southern Railway.

All review plans and associated data shall be submitted to the North Carolina Railroad Company electronically, in PDF format.

Roadway Final Construction Plans shall be submitted to, and approved by, the North Carolina Railroad Company before construction that impacts the Railroads begins. The Roadway Final Construction Plans shall be submitted to North Carolina Railroad Company electronically, in PDF format. All plans, specifications and contract documents shall be approved by the North Carolina Railroad Company, in writing, prior to the start of any work on the North Carolina Railroad Company corridor.

**COORDINATION WITH THE NCDOT RAIL DIVISION**

All plans submitted to Norfolk Southern Railway and / or the North Carolina Railroad Company, as required above, shall be submitted to the NCDOT Rail Division through the NCDOT Design-Build Unit, including but not limited to plan resubmittals and requests for information. The Design-Build Team shall copy the NCDOT Rail Division and Design-Build Unit on all correspondence with the Norfolk Southern Railway and / or the North Carolina Railroad Company.

**RIGHT OF WAY SCOPE OF WORK** (6-23-22)

**\*\* NOTE \*\* Prior to negotiating property acquisition with property owners, the Design-Build Team shall meet with the appropriate NCDOT Location and Surveys, Right of Way and Design-Build personnel.**

**State and Federally Owned Properties, Excluding National Forest Service Lands**

For all State and Federally owned properties, the Design-Build Team shall be responsible for all right of way acquisition services noted herein, excluding negotiations, coordination with the Council of State, settlement of claims, deed development, and recordation of deeds. The Department will require twelve months from the date of approving the appraisal to finalize the aforementioned right of way acquisition services for State and Federally owned properties, excluding the National Forest Service Lands. If the negotiations, coordination with the Council of State, settlement of claims, deed development, and recordation of deeds are completed within the aforementioned twelve-month timeframe, the Department will not honor any requests for additional contract time or compensation, including but not limited to idle equipment or mobilization / demobilization costs, for the Design-Build Team mobilizing men, materials (or ordering materials) or equipment. If time were granted, it would only be for that time exceeding the twelve-month period. The Design-Build Team shall provide the approximate easement and right of way acreage that will be needed from each State and Federally owned property in the Technical Proposal.

**National Forest Service Lands**

For all National Forest Service (NFS) Lands, the FHWA and US Forest Service (USFS) are required to complete a Federal Land Transfer so that FHWA can convey the property interest to the Department on behalf of USFS. The Design-Build Team shall assist the Department and FHWA obtain a Letter of Consent from USFS for the Federal Land Transfer. Activities could include, but are not limited to, providing right of way, control of access and easement descriptions in metes and bounds format (bearings and distances) for all NFS Lands impacted by the project; and any exhibits, diagrams and / or other information required to verify / delineate the aforementioned descriptions. The Design-Build Team shall assume it will take 1) 18 months from the date the Department accepts the Right of Way Plans developed by the Design-Build Team or 2) until January 1, 2025, whichever is later, to obtain a Letter of Consent from USFS for the Federal Land Transfer. If the Letter of Consent is obtained within the aforementioned 18-month timeframe or before January 1, 2025, whichever is later, the Department will not honor any requests for additional contract time or compensation, including but not limited to idle equipment or mobilization / demobilization costs, for the Design-Build Team mobilizing men, materials (or ordering materials) or equipment. If time were granted, it would only be for that time exceeding the 18-month period or January 1, 2025, whichever is greater. The Design-Build Team shall provide the approximate easement and right of way acreage that will be needed from NFS Lands in the Technical Proposal.

In accordance with Section 210 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall demolish, remove, and dispose of the existing USFS Ranger Station and amenities as noted in the Memorandum of Understanding (MOU) between the



NCDOT and USFS. If any USFS buildings or amenities noted in the MOU are located outside of NCDOT's perpetual right of way easement or other easements, the Design-Build Team shall coordinate with the Resident Engineer and USFS and obtain a USFS Special Use Permit prior to demolishing, removing or disposing the buildings or amenities. (Reference the Environmental Permits Scope of Work found elsewhere in this RFP)

### **Advanced Acquisition Parcels**

Through the Advance Acquisition Process, the Department is in the process of acquiring the parcels noted below as total takes; and anticipates completing the acquisition or having a right of entry to the parcels by June 1, 2023:

- Parcel No. 600 (formerly Parcel No. 39) - Angel Land, Et Vir (The Kickling Post, LLC) - Parcel ID No. 6-207-009
- Parcel No. 601 (formerly Parcel No. 41) - Mary A. Evans (Thomas H. Evans, Sr. Heirs) - Parcel ID No. 7-054-3-007
- Parcel No. 602 (formerly Parcel No. 42) - Mary A. Evans, Widow (Lee Grant Henderson, Heirs) - Parcel ID No. 7-054-3-002
- Parcel No. 603 (formerly Parcel No. 43) - Tammy Kaye Satchell, Et Vir - Parcel ID Nos. 7-054-3-001-A and 7-054-3-003
- Parcel No. 604 (formerly Parcel No. 57) - Latasha White & Kokica Roberson - Parcel ID No. 7-054-2-015
- Parcel No. 605 (formerly Parcel No. 63) - Linda Faye Pelham - Parcel ID No. 7-054-2-006
- Parcel No. 606 (formerly Parcel No. 64) - Willie Bennett (Katie Bennett) - Parcel ID No. 7-054-1-016
- Parcel No. 607 (formerly Parcel No. 65) - Floretha W. Bugg - Parcel ID No. 7-054-1-017
- Parcel No. 608 (formerly Parcel No. 67) - Patricia Whitehead Adamson - Parcel ID No. 7-054-1-019
- Parcel No. 608A (formerly Parcel No. 67) - Patricia Whitehead Adamson - Parcel ID No. 7-054-1-029
- Parcel No. 609 (formerly Parcel No. 68) - Jerry Wayne Ryan - Parcel ID No. 7-054-1-024
- Parcel No. 610 (formerly Parcel No. 69) - Floretha W. Bugg - Parcel ID No. 7-054-1-015
- Parcel No. 612 (formerly Parcel No. 71) - Patricia Whitehead Adamson - Parcel ID No. 7-054-1-013
- Parcel No. 613 (formerly Parcel No. 72) - Willie Howard Edwards & Yvonne Edwards - Parcel ID No. 7-054-1-006
- Parcel No. 614 (formerly Parcel No. 73) - Mary Humphrey Slade - Parcel ID No. 7-054-1-025
- Parcel No. 615 (formerly Parcel No. 74) - Casper Edward Carter (Marvin E. Carter, Son POA) - Parcel ID No. 7-054-1-023
- Parcel No. 616 (formerly Parcel No. 75) - Trina L. Tiggs - Parcel ID No. 7-054-1-7001
- Parcel No. 618 (formerly Parcel No. 78) - Hilda Harvey Petifer - Parcel ID No. 7-054-1-007-B
- Parcel No. 619 (formerly Parcel No. 79) - Tarlton Walker (Lillie B. Clark) - Parcel ID No. 7-054-1-007-A
- Parcel No. 620 (formerly Parcel No. 80) - Effie Julia Sharpe Fair - Parcel ID No. 7-054-1-010

- Parcel No. 621 (formerly Parcel No. 168) - Fred Scott Smith Heirs - Parcel ID No. 7-048-009
- Parcel No. 622 (formerly Parcel No. 169) - Amanda Simmons Williams (Marjorie Smith) - Parcel ID No. 7-048-016
- Parcel No. 623 (formerly Parcel No. 175) - Sarah B. Galbreath - Parcel ID No. 7-046-012
- Parcel No. 624 (formerly Parcel No. 190) - George Edward Brown & Mary Brown - Parcel ID No. 7-048-006
- Parcel No. 625 (formerly Parcel No. 191) - George E. Brown - Parcel ID No. 7-048-005
- Parcel No. 626 (formerly Parcel No. 199) - Marty Dean Roberts & Sueko Chinen Roberts - Parcel ID No. 7-048-014
- Parcel No. 627 (formerly Parcel No. 200) - Barbara Scott & Bryant Scott - Parcel ID No. 7-048-002
- Parcel No. 628 (formerly Parcel No. 201) - Geraldine C. White Heirs - Parcel ID No. 7-048-013
- Parcel No. 629 (formerly Parcel No. 203) - Matthew S. Peterik - Parcel ID No. 7-046-004

If the Department completes the acquisition process or obtains a right of entry by June 1, 2023 for the parcels above, the Department will not honor any requests for additional contact time or compensation, including but not limited to idle equipment or mobilization / demobilization costs, for the Design-Build Team mobilizing men, materials (or ordering materials) or equipment. If time were granted, it would only be for that time exceeding June 1, 2023.

### **All Other Properties**

Excluding the aforementioned advanced acquisition parcels, and the aforementioned activities the Department will perform for State and Federally owned properties, including NFS Lands, the Design-Build Team shall be responsible for all right of way, easement and / or control of access acquisition services required by the Design-Build Team's design and / or construction methods:

- The Design-Build Team shall employ qualified, competent personnel who are currently **approved by the NCDOT Right of Way Unit**, herein after referred to as the Department, to provide all services necessary to perform all appraisal (except appraisal reviews and updated appraisals required solely for condemned parcels), negotiation and relocation services required for all right of way, control of access and easements, including but not limited to utility easements, necessary for completion of the project in accordance with G.S. 136-28.1 of the General Statutes of North Carolina, as amended, and in accordance with the requirements set forth in the *Uniform Appraisal Standards and General Legal Principles for Highway Right of Way*, the *North Carolina Department of Transportation's Right of Way Manual*, the *North Carolina Department of Transportation's Rules and Regulations for the Use of Right of Way Consultants*, the *Code of Federal Regulations*, and Chapter 133 of the *General Statutes of North Carolina* from Section 133-5 through 133-18, hereby incorporated by reference, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The Design-Build Team shall field stake all right of way, control of access and easements, including but not limited to utility easements, in accordance with the requirements noted above. For a list of firms currently approved, the Design-Build Team should contact Ms. Lois Little, in the NCDOT Right of Way Unit, at 336-334-3515.

The Design-Build Team, acting as an agent on behalf of the State of North Carolina, shall provide right of way acquisition services in accordance with the requirements herein for TIP R-5777C in Craven County.

- With respect to the payments, costs and fees associated with the acquisition of right of way, easements and / or control of access, the Department will be responsible for only direct payments to property owners for negotiated settlements, recording fees, any relocation benefits, and deposits and fees involved in the filing of condemnation claims. The Department will assume responsibility for all costs associated with the litigation of condemned claims, including testimony by the appraiser(s). The Design-Build Team shall be responsible for all other acquisition services related to payments, costs and fees, including but not limited to attorney fees required for all non-condemnation acquisitions.
- A Department representative will be available to provide technical guidance on right of way acquisition procedures and to make timely decisions on approving relocation benefits and approving administrative adjustment settlements on behalf of the Department over and above the authority granted to the Department Right of Way Consultant Project Managers.
- The Design-Build Team shall verify / determine the prior rights and / or compensable interest for an existing utility prior to acquiring any corresponding utility easement. (Reference the Utilities Coordination Scope of Work found elsewhere in this RFP)
- If applicable, the Department will provide a list indicating if existing billboards located within or adjacent to the project limits are conforming or non-conforming to the NCDOT *Regulations for The Control of Outdoor Advertising in North Carolina*, dated 2000. Prior to contacting any property owner(s) or billboard owner(s), the Design-Build Team shall meet with the appropriate Regional Outdoor Advertising Technician and the Division Right of Way Agent to determine the relocation eligibility and relocation benefits, and possible leasehold interest if the billboard is on leased property.
- The Design-Build Team shall submit a right of way project tracking report and right of way quality control plan to the Department. The Department standard forms and documents shall be used to the extent possible.
- The Design-Build Team shall provide a current title certificate for each parcel as of the date of closing or the date of filing of condemnation, unless required otherwise in the NCDOT December 21, 2018 *Right of Way Manual*.
- The Department will prepare all Condemnation Maps. The Design-Build Team shall prepare all Final Condemnation Reports and provide updated MicroStation CADD files, upon request, to the Department for preparation of the Condemnation Maps. Upon approval of the Final Condemnation Report, the Department will require a minimum of eight weeks to file the condemnation claim. For all plan revisions on condemned parcels that modify the area acquired, modify the control of access and / or impact the appraised value, the Design-Build Team shall be responsible for the following:

- The Design-Build Team shall notify the Division Right of Way Agent, the Area Negotiator, Area Appraiser, Location and Surveys Unit, and the Attorney General, in writing, that revisions have been made that impact a condemned parcel, and provide updated plan sheets, revised MicroStation CADD files, and revised area takes.
- The Design-Build Team shall consult with the Attorney General and the Area Appraiser to determine the status of the negotiations and appraisal(s).
- If the Attorney General and / or Area Appraiser recommend an updated appraisal, the Design-Build Team shall provide an updated Summary Sheet to the Area Appraiser for the Department's use in obtaining an updated appraisal(s).
- Upon receipt of the approved updated appraisal(s), the Design-Build Team shall develop a revised written offer. If settlement is not reached, the Design-Build Team shall submit an updated Final Condemnation Report and revised MicroStation CADD files. If settlement is reached, the Design-Build Team shall notify the Attorney General and Area Appraiser, in writing, and submit an updated Final Condemnation Report with all necessary documentation, including but not limited to, revised MicroStation CADD files.
- The Department will be responsible for payment for the additional deposit to the Attorney General's Office and the Attorney General will prepare and file an Amendment to the Declaration of Taking.

If the preparation of a Condemnation Map results in modifications to property lines, the Design-Build Team shall be responsible for 1) incorporating the updated property lines provided by the Department into the Roadway Plans developed by the Design-Build Team and 2) all resulting right of way acquisition services required for adjacent parcels, including but not limited to additional property acquisitions for parcels that the Design-Build Team has reached a prior settlement.

- The following shall be required:
  - Unless otherwise approved by the NCDOT Assistant State Negotiator, in writing, the Design-Build Team shall provide right of way, control of access and easement descriptions in metes and bounds format (bearings and distances) for all acquisitions, including but not limited to right of way revisions and "Z" Claims. The Design-Build Team shall provide exhibits, diagrams and / or other information required to verify the aforementioned descriptions.
  - In accordance with the NCDOT December 21, 2018 *Right of Way Manual*, the Design-Build Team may prepare red-line adjustments for parcels that are not condemned. The Department must approve a red-line adjustment, in writing, prior to the Design-Build Team making an offer based on the red-line adjustment.
  - The Design-Build Team shall prepare, execute and record documents conveying title to acquired properties to the Department with the Register of Deeds.

- Prior to project acceptance, or as directed by the Engineer, the Design-Build Team shall record the Final RFC Plans, including all revisions, with the Register of Deeds.
  - The Design-Build Team shall furnish and deliver to the Department reports accompanied by all documents, including but not limited to all revisions and electronic design files, necessary for the settlement of claims and the recordation of deeds, or necessary for condemnation proceedings covering said properties in accordance with the NCDOT December 21, 2018 *Right of Way Manual*.
  - For all property purchased in conjunction with the project, title shall be acquired in fee simple or easement and shall be conveyed to “The North Carolina Department of Transportation”, free and clear of all liens and encumbrances except permitted encumbrances.
- In accordance with the Location and Survey Unit’s September 28, 2018 *Proc 2018-3 - Creating NCDOT Right of Way Plan Sheets for LET Projects* and *Proc 2018-5 - Elimination of Need to Request Control Sheets and Property Ties and RW Series Development Timeline Memorandums* (references to timelines in the aforementioned Memos shall be disregarded), the Design-Build Team shall develop the following right of way items:
    - Right of Way series of plan sheets (“R/W” series of plan sheets) that delineate the existing property information, property ties, proposed centerline data, existing and proposed right of way, existing and proposed easements, and existing and proposed control of access. The “R/W” series of plan sheets shall be signed and sealed by a Professional Land Surveyor registered in the State of North Carolina. The Professional Land Surveyor’s signature and seal shall attest that the right of way monuments were placed under their responsible charge.
    - A table of control points for the proposed centerline alignments (“D series of plan sheets).
    - A table of proposed right of way and permanent easement control points (“E” series of plan sheets) that shall be signed and sealed by a Professional Land Surveyor registered in the State of North Carolina.
- It is understood and agreed by and between the parties hereto that all reports, surveys, studies, specifications, memoranda, estimates, etc., secured by and for the Design-Build Team shall become and remain the sole property of the Department upon termination or completion of the work, and the Department shall have the right to use same for any public purpose without compensation to the Design-Build Team.
  - The Design-Build Team shall prepare appraisals in accordance with the Department’s *Uniform Appraisal Standards and General Legal Principles for Highway Right of Way Acquisitions*. The Design-Build Team’s appraiser shall be on the Department’s approved state certified appraiser list. The Design-Build Team may request its state certified

appraiser(s) be added to the approved state certified appraiser list, subject to approval by the Department's Area Appraiser and State Appraiser.

- The Department will develop or contract with a private firm to develop and provide a second appraisal for parcels as noted below:
  - All parcels with an initial appraisal, with just compensation, equal to or greater than one million dollars (\$1,000,000.00).
  - All parcels where the initial appraisal indicates damages to the remaining property equal to or greater than two hundred fifty thousand dollars (\$250,000.00), where damages to the remaining property are defined as a loss in value to the remaining land, and / or improvements and / or a cost to cure.
- The NCDOT, or its agent, will provide appraisal reviews complying with the Department's *Uniform Appraisal Standards and General Legal Principles for Highway Right of Way Acquisitions*. The reviewer will ensure that the appraisal meets the Department's guidelines and requirements, conforms to acceptable appraisal standards and techniques, does not include any non-compensable items or exclude any compensable items and that the value conclusions are reasonable and based on facts presented in the appraisal. The reviewer has the authority to approve, adjust, request additional data or corrections, or not to recommend and request another appraisal. Within ten business days from the date of receipt, all appraisals and / or appraisal corrections will be reviewed by NCDOT Review Appraisers or Review Appraisers under contract to the corresponding NCDOT Area Appraisal Office. The NCDOT will sign as approving any and all appraisals to be used in acquisitions.
- The NCDOT will provide relocation reviews and approvals for all Replacement Housing Payment calculations and all Rent Supplement Payment calculations prior to the Design-Build Team making any offers to the displacees. Within five business days of the receipt of the Replacement Housing Payment or Rent Supplement Payment calculation documentation, which shall include all documentation required for an Evaluation Package, the Department will approve the calculation, and the signed FRM15-D will be returned to the Design-Build Team, or a request for an updated calculation or documentation will be presented to the Design-Build Team for further handling. At this time, the Relocation Coordinator in the NCDOT Right of Way Unit is the approving authority for the aforementioned calculations.
- The Design-Build Team shall coordinate with the Health Department to determine if septic systems can be relocated / modified to remain operational. To assist with the aforementioned determinations, the Design-Build Team may utilize a third-party consultant to perform the septic system inspections only if the Health Department approves the third-party consultant, in writing, prior to the inspections beginning. The Department will only be responsible for the Health Department fees and / or third-party fees associated with these determinations. The Design-Build Team shall determine the relocation / modification design and construction costs required for the septic systems to remain operational and include these costs in the property right of way appraisals. (Reference the Utilities Coordination Scope of Work found elsewhere in this RFP)

- All Claims for Payment involving relocation benefits must be submitted to the NCDOT Relocation Coordinator in the Right of Way Unit for approval and processing.
- At the conclusion of the right of way acquisition process, the Design-Build Team shall provide a right of way certification to the Division Right of Way Agent.
- The Design-Build Team shall prepare Right of Way Transmittal Summaries and / or Narrative Appraisals for all right of way, control of access and easement acquisitions. Claim Reports will not be allowed for any acquisition.
- Prior to acquiring right of way, control of access and / or easement from any parcel with contaminated soil, the Design-Build Team shall provide a written priority list of all properties with contaminated soil that require right of way, control of access and / or easement acquisition to the Division Right of Way Agent, the Area Negotiator, the Area Appraiser, and the Eastern Assistant State Negotiator, Ms. Lois Little. At a minimum, the aforementioned priority list shall contain the following information:
  - Project TIP Number, description and county
  - Parcel number(s) requiring acquisition of contaminated soil
  - Acquisition Appraisal(s)
  - GeoEnvironmental Impact Evaluation and Hazardous Materials Report provided by the Department
  - Description, with metes and bounds, of the area(s) to be acquired

**SIGNING SCOPE OF WORK** (6-23-22)**Project Description**

The Design-Build Team shall prepare Signing Plans for the entire project limits, including but not limited to, advance and other necessary signing outside of the roadway construction limits.

**Websites and References**

The Design-Build Team shall prepare Signing Plans in accordance with the information on the following websites, the version of the following references effective on the Technical Proposal submittal date, and the contract requirements contained herein:

- The Signing and Delineation Unit website

**<https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx>**

- Signing and Delineation Unit Procedures Manual

**<https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx>**

- Traffic Engineering Practices, Policies, and Legal Authority (TEPPL)

**<https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Select-Topics.aspx>**

- *Manual on Uniform Traffic Control Devices* (MUTCD)

**[http://mutcd.fhwa.dot.gov/kno\\_2009r1r2.htm](http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm)**

- *NC Supplement to the Manual on Uniform Traffic Control Devices*

**<https://connect.ncdot.gov/resources/safety/TrafficSafetyResources/2009%20NC%20Supplement%20to%20MUTCD.pdf>**

- *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* (AASHTO)

**[https://bookstore.transportation.org/collection\\_detail.aspx?ID=126](https://bookstore.transportation.org/collection_detail.aspx?ID=126)**

- *Guidelines for Preparation of Signing and Final Pavement Marking Plans for Design-Build Projects*

**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**



- *Design-Build Submittal Guidelines*

**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**

- *NCDOT Standard Specifications for Roads and Structures*
- *NCDOT Roadway Standard Drawings*

In case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

### **Signing Requirements for Technical Proposal**

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience in the preparation, design, and sealing of Signing Plans for NCDOT on comparable projects.

The Design-Build Team shall include a Preliminary Signing Concept Map in the Technical Proposal. At a minimum, the aforementioned Concept Map shall include all ground mounted Type A and B guide signs.

### **Signing Plans Submittal Requirements**

Prior to submitting the 50% Preliminary Signing Plans, the Design-Build Team, the Division Traffic Engineer, the Regional Traffic Engineer, the Signing and Delineation Regional Engineer and the Design-Build Unit shall meet to discuss and review the Design-Build Team's 25% Preliminary Signing Plans.

The Design-Build Team shall provide 25% Pavement Markings Plans that have been reviewed and accepted by the Department and the latest Roadway Plans with the 50% Preliminary Signing Plans submittal.

### **Signs to be Furnished by Design-Build Team**

The Design-Build Team shall furnish signs in accordance with the specifications provided by the NCDOT.

### **Signing Project Limits**

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design, fabricate and install all Type A, B, D, E and F signs and supports required through the construction limits of the mainline, as well as all -Y- Lines, all service roads, all cul-de-sacs, all roundabouts, all ramps and all loops. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design, fabricate and install all signs required beyond the roadway construction limits of the mainline, all

-Y- Lines, all service roads, all cul-de-sacs, all roundabouts, all ramps and all loops to ensure adequate advance signage and spacing is provided.

### **Sign Designs**

The Design-Build Team shall include all sign designs in the Signing Plans. All sign designs shall be prepared using the latest version of GuideSign software.

The Design-Build Team shall design, fabricate and install all signs required for the mainline, all -Y- Lines, all ramps, all loops, all service roads, all roundabouts, and all cul-de-sacs, including Type A, B, and D ground mounted signs and exit gore signs. The Design-Build Team shall size and locate all Type E signs (warning and regulatory) and Type F signs (route marker assemblies).

The Design-Build Team shall design, fabricate and install mile markers for US 70 at **1-mile** intervals along both sides of the mainline. The Design-Build Team shall install each mile marker on one three-pound U-channel post. Mile markers shall be located at the outside shoulder point or a maximum of 15 feet from the edge of travel lane. The Design-Build Team shall install mile markers such that the bottom of the mile marker shall be four feet above the edge of travel lane (edgeline) elevation. Mile marker designs shall be in accordance with the Enhanced Reference Location Signs (D10-4) referenced in the Standard Highway Signs (2004 Edition and the 2012 Supplement to the 2004 Edition).

The Design-Build Team shall design, fabricate and install mile markers and exit numbers in accordance with the mile numbers provided by the Department.

At all interchange exit loops and / or as required by the MUTCD Table 2C-5, the Design-Build Team shall fabricate and install advisory speed signing as shown in Figure 2C-3 of the MUTCD. In addition to signing shown in Table 2C-5 of the MUTCD, the advisory speed signing shall include W1-8, W13-6, W13-7, W1-13R, and E13-1P signs.

Prior to submittal of RFC Signing Plans, the Design-Build Team shall coordinate with the Signing and Delineation Unit and the Design-Build Unit on destination cities and / or street names on guide signs.

### **Supplemental and General Service Signs for Neuse River (Flanners Beach) Recreation Area and Fishers Landing Recreation Area**

The Design-Build Team shall design, fabricate and install supplemental signs, trail blazer signs, and plaques in accordance with Chapter M of the MUTCD on US 70, -Y1RPA-, -Y1LPD-, -Y1-, -SRY1DY3C- and SR 1107 (Flanners Beach Road) to direct motorist to the Neuse River (Flanners Beach) Recreation Area.

The Design-Build Team shall design, fabricate and install supplemental signs, trail blazer signs, and plaques in accordance with Chapter M of the MUTCD on -Y3RPA-, -Y3RPC-, -Y3-, and -SRY3DY4C- to direct motorist to the Fishers Landing Recreational Area.

**US Forest Service (USFS) Signs**

The Design-Build Team will not be responsible for designing, locating or installing any US Forest (USFS) signs that are not required by the MUTCD.

Existing USFS signs that are not required by the MUTCD shall remain in place until they become in conflict with the R-5777C project construction. Once the aforementioned signs become in conflict with the R-5777C project construction, the Design-Build Team shall remove and deliver the USFS sign to the USFS District Office at 141 East Fisher Avenue New Bern, North Carolina 28560. Two weeks prior to delivering the aforementioned USFS signs, the Design-Build Team shall contact Ron Hudson, District Ranger, at (252) 638-5628 to coordinate their delivery.

If the existing USFS signs that are not required by the MUTCD are damaged during construction and / or transport, the Design-Build Team shall immediately notify Ron Hudson at the contact information above, and be responsible for their replacement costs.

**Speed Limit**

The posted speed limit for the mainline (US 70) shall be 70 mph. (Reference the Roadway Scope of Work found elsewhere in this RFP)

**Interstate, US and NC Route Designation**

The Design-Build Team shall coordinate all interstate, US and NC highway routing with the Transportation Mobility and Safety Division of NCDOT. Prior to designing any signs that display new or revised Interstate, US or NC routes, the Design-Build Team shall confirm all highway routes with the Department. Concurrent with the Release for Construction (RFC) Signing Plans submittal, the Design-Build Team shall notify the State Signing and Delineation Engineer, in writing, of all new or revised Interstate, US or NC routes.

**Sign Locations**

The Design-Build Team shall determine the station location of all signs.

The Design-Build Team shall provide a minimum of two advanced guide signs for all freeway / expressway interchange approaches.

To avoid placing a sign in a location that might be in conflict with future roadway projects and / or limit its usefulness / lifespan, the Design-Build Team shall coordinate all proposed sign designs and locations with the Department.

**Ground Mounted Sign Supports**

The Design-Build Team shall design, fabricate and install ground mounted signs supports in accordance with the NCDOT Roadway Standard Drawings. The associated software for the design of Type A and B ground mounted sign supports, may be referenced on the website noted below:

**<https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx>**

Prior to installation, the Design-Build Team shall 1) field verify all Type A and B ground mounted sign supports, 2) recalculate the field verified S-Dimensions, using the latest edition of the design software on the website noted above, and 3) revise the beam sections, where applicable. The Design-Build Team shall use the most recent version of the ground mounted sign support selection workbook tool, in accordance with the submittal schedule outlined in the “Instructions” tab of the tool.

Unless otherwise approved by the Department, the vertical mounting height for ground mounted Type D, E and F signs shall be a minimum of seven feet and maximum of eight feet from the edge of the travel lane to the bottom of the sign.

On freeways and expressways, the minimum lateral offset for Type A and B ground mounted signs on breakaway supports shall be 30 feet, unless approved otherwise by the Department. The lateral offset shall be measured from the edge of the travel lane closest to the shoulder to the closest sign edge.

On freeways and expressways, all Type A and B ground mounted signs on simple (non-breakaway) supports shall be protected by guardrail, barrier or another form of approved positive protection. The minimum lateral distance between the face of guardrail and the closest sign edge shall be six feet.

Unless noted otherwise elsewhere in this RFP, all Type D, E and F signs shall be installed on U-channel posts in accordance with the NCDOT Roadway Standard Drawings. Type D signs shall not exceed eight feet in width and / or 24 square feet. Unless positively protected, all Type D signs shall be installed on a maximum of two U-channel posts.

### **Removal and Disposal of Existing Signs**

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall determine which existing signs and sign supports will not be needed or relevant when the project is completed. The Design-Build Team shall remove and dispose of these signs and sign supports.

### **Temporary Sign and Support Design**

The Design-Build Team shall locate, design and install all temporary signs and sign supports. (Reference the Signing Requirements Section of the Transportation Management Scope of Work found elsewhere in this RFP for additional temporary signing requirements)

### **Sign Maintenance**

During project construction, the Design-Build Team shall maintain all existing signs within the project limits (including USFS Recreational Area signs and temporary sign installations that may be required by the Transportation Management Plans) to ensure the signs are in good condition,

perform as intended, and are visible to motorists. (Reference Articles 901-4 and 1092-2 of the NCDOT *Standard Specifications for Roads and Structures*) All signs and supports remaining / existing at the completion of this project shall be plumb, oriented correctly and adhere to AASHTO requirements.

### **CADD Files**

After acceptance of RFC Signing Plans, the Design-Build Team shall provide the final Signing Plans to the Department in .pdf and MicroStation format.

### **Construction Revisions**

After submittal of RFC Signing Plans, the Design-Build Team shall submit all construction revisions to the Department for review and acceptance prior to incorporation.

### **As-Built Plans**

After project completion, the Design-Build Team shall provide final electronic Signing Plans to the Department. At a minimum, these Signing Plans shall include all revisions that occurred during construction, as well as field verifications for ground mounted sign supports. These Signing Plans shall be provided in .pdf and MicroStation format.

**STRUCTURES SCOPE OF WORK** (6-23-22)**Project Details**

The Design-Build Team shall design and construct all structures necessary to complete the project, including but not limited to, the following:

- Bridge on SR 1106 (Stately Pines Road) over US 70
- Bridges on US 70 over SR 1104 (Fisher Avenue)
- Bridges on US 70 over SR 1112 (Camp Kiro Road)
- All retaining walls required by the Design-Build Team's design
- All sound barrier walls required by the Design-Build Team's design (Reference the Roadway Scope of Work found elsewhere in this RFP)
- All reinforced concrete box culverts, including but not limited to reinforced concrete box culvert replacements, required by the Design-Build Team's design

Alternative Technical Concepts that modify the bridge locations noted above (e.g. over or on US 70) are not permitted and will not be evaluated or considered.

All bridges shall meet the geometric criteria shown in the accepted Preliminary Roadway Plans developed by the Design-Build Team.

The minimum vertical clearance for bridges constructed over US 70 shall be 17'-0". The minimum vertical clearance for bridges constructed over all local roads and collector roads, shall be 15'-6".

The proposed bridges on US 70 over SR 1104 (Fisher Avenue) shall be single span bridges, without interior bents. The aforementioned bridges shall be long enough and high enough to accommodate the future symmetrical widening required for a 12-foot left turn lane and a four-foot concrete monolithic island, with nine-inch offsets to each adjacent lane, (additional 17.5 feet total width) between the ramp terminals on SR 1104 (Fisher Avenue), without the need to:

1. reconstruct any of the substructure elements, including but not limited to retaining walls located at the end bents or,
2. obtain a future design exception, including but not limited to all minimum vertical clearance requirements noted elsewhere in this RFP.

The Design-Build Team shall indicate in the Technical Proposal how the aforementioned future construction can be accomplished without the need to reconstruct any of the substructure elements or obtain a future design exception.

Bridge barrier rails shall be per Standard Drawing CBR1.

The minimum horizontal setbacks from the closest edge of travel lane to face of barrier in front of walls shall be 12'-0".

End bents shall be integral if the criteria listed in the NCDOT *Structures Management Unit Manual* is met. The criteria in Section 6.2.3.2 of the NCDOT *Structures Management Unit Manual* shall apply to all roadways, including Secondary Routes that meet the criteria for North Carolina Routes.

All bridges shall be designed and constructed with vertical abutments.

Link slabs may be used for bridges, provided the girders in adjacent spans are the same depth.

Unless noted otherwise elsewhere in this RFP, the following will not be allowed on the project:

- Cored slab, box beam, fracture critical, deck girder and cast-in-place deck slab bridges
- Precast bridge barrier rails
- Precast reinforced box culverts
- Metal plate arch culverts
- Interior pile bents at roadway grade separations
- Attachment of sign structures to bridges
- Bridge attachments (excluding ITS) in the overhang of roadway grade separation structures
- Casting of conduit in the bridge deck or barrier rail for roadway bridges
- Bridge piers adjacent to a roadway shoulder, excluding interior median piers
- Modular expansion joints
- Monotube or cantilever DMS (if required on project) support structures
- Shallow foundations behind MSE abutment walls
- Bridges with less than four girder lines
- Multiple girder depths on an individual bridge
- Sound barrier walls constructed on top of retaining walls

### **Box Culverts**

As required by the Design-Build Team's design, the Design-Build Team shall design and construct all proposed reinforced concrete box culverts and replace all existing reinforced concrete box culverts. Reinforced concrete box culvert designs shall be in accordance the Hydraulic Culvert Survey Reports prepared by the Design-Build Team and accepted by the Department. (Reference the Hydraulics Scope of Work found elsewhere in the RFP)

### **Sound Barrier Walls and Retaining Walls**

The Design-Build Team shall design and construct all sound barrier walls required by the Design-Build Team's design. If possible, sound barrier walls on bridges shall be avoided. If the final design requires a sound barrier wall on a bridge, the maximum height of the sound barrier wall shall be limited to ten feet, measured from the top of the roadway deck to top of the sound barrier wall. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Regardless of wall height, sound barrier walls shall be designed in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specifications*.

All proposed sound barrier wall and retaining wall surfaces shall have equivalent surface treatment. (Reference the *Architectural Concrete Surface Treatment* Project Special Provision found elsewhere in this RFP)

Unless noted otherwise elsewhere in this RFP, all ground mounted sound barrier walls shall be detailed in accordance with Structure Standard Drawings that utilize concrete piles. (Reference the *Sound Barrier Wall* and *Architectural Concrete Surface Treatment* Project Special Provisions, the Geotechnical Engineering Scope of Work, and the Roadway Scope of Work found elsewhere in this RFP)

The Design-Build Team shall apply non-sacrificial anti-graffiti coating on all exposed surfaces of sound barrier walls and all retaining walls, including MSE walls. (Reference the *Architectural Concrete Surface Treatment* Project Special Provision found elsewhere in this RFP)

### **General**

The Design-Build Team's primary design firm shall be on the Department's list of firms qualified for structure design and maintain an office in North Carolina.

Unless allowed or directed otherwise in this RFP, designs shall be in accordance with the latest editions of the *AASHTO LRFD Bridge Design Specifications* (with exceptions noted in the *NCDOT Structures Management Unit Manual*), *NCDOT LRFD Driven Pile Foundation Design Policy*, *NCDOT Structures Management Unit Manual* (including Policy Memos) and Chapter 5 of the *NCDOT Roadway Design Manual*.

Use of Florida Department of Transportation Prestressed Florida I-Beams (FIB), the Prestressed Concrete Committee for Economic Fabrication (PCEF) prestressed concrete girders, and Modified Bulb Tee girders will be allowed. However, the structural details associated with the aforementioned items, including but not limited to mild reinforcing and reinforcing cover, shall be subject to Department review and acceptance post-award.

Unless allowed or directed otherwise in this RFP, all construction and materials shall be in accordance with 2018 *NCDOT Standard Specifications for Roads and Structures*, *NCDOT Structures Management Unit Project Special Provisions* and *NCDOT Structures Management Unit Standard Drawings*. Reference the Structures Management Unit website noted below:

**<https://connect.ncdot.gov/resources/Structures/Pages/default.aspx>**

Alternate designs, details or construction practices (such as those employed by other states, but not standard practice in NC) are subject to Department review and approval, and will be evaluated on a case-by-case basis.



**TEMPORARY TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS SCOPE OF WORK** (6-23-22)

**I. GENERAL**

The Design-Build Team shall design and prepare plans for the temporary traffic signal installations required by the construction phasing and / or detour routes, traffic signal revisions, and signal system timing plans, if warranted. This work shall include, but not be limited to, the preparation of Traffic Signal Plans, Electrical and Programming Details, and Project Special Provisions. These plans shall be prepared in accordance with the *Design-Build Submittal Guidelines* and the *Guidelines for the Preparation of ITS & Signal Plans by Private Engineering Firms* available on the Design-Build Unit's website located at:

**<https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx>**

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing Traffic Signal, Electrical Detail, and Signal System Timing Plans for NCDOT on comparable projects. The Private Engineering Firm selected shall also have experience preparing Utility Make Ready plans.

A pre-design meeting **shall** take place between the NCDOT Transportation Systems Management & Operations (TSMO) Unit, the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Traffic Operations Center (STOC), local municipalities (if applicable), and any other pertinent NCDOT personnel before signal submittals begin. Traffic Signal, Electrical Detail, and Signal System Timing Plan submittals shall only be reviewed and accepted by the Department after this pre-design meeting. All Traffic Signal and Signal System Timing Plans shall be accepted by the TSMO Unit prior to beginning traffic signal construction or plan implementation.

The Design-Build Team shall coordinate and implement all signal designs at the appropriate time as directed by the Engineer. Prior to final design and installation, the Design-Build Team shall coordinate all signal phasing recommendations with the Division Traffic Engineer, the Regional Traffic Engineer, local municipalities (if applicable), and the NCDOT TSMO Unit. Prior to placing traffic in a new pattern, all traffic signals shall be installed and operational, including but not limited to, signal system timing plans.

Except as noted otherwise elsewhere in this RFP, the Design-Build Team shall maintain, monitor, and adjust the traffic signals as needed throughout the project construction. The Design-Build Team shall be responsible for the design and implementation of all temporary signal designs, including but not limited to signal system timing plans, needed to maintain vehicular traffic during construction. If necessary, temporary traffic signal designs and implementation, shall include, but not be limited to, new local controller, signal timing, cables, poles, signal span, controllers, cabinets, and / or signal heads. Prior to implementation, all signal timing plans shall be reviewed and accepted by the TSMO Unit.

Where construction activities necessitate a detour, the Design-Build Team shall evaluate the effects of that detour on all signals along the detour route. The Design-Build Team shall make operational changes as necessary and as directed by the Engineer.

**Throughout the project construction, the Design-Build Team shall maintain full actuation of the traffic signals located within the project limits, unless allowed otherwise by the Engineer in writing.**

All temporary signal installations shall utilize wood poles for signal supports.

Signal Inventory Numbers (SIN) will be assigned for each new signalized location by the NCDOT TSMO Unit. Once all the traffic signal locations have been finalized and accepted by the Department, the Design-Build Team shall submit a written request for the SINS to the NCDOT TSMO Unit, via the Division. At a minimum, this request shall list each signal location that requires a SIN and include the following:

- County
- Nearest Municipality
- Names of all intersecting roads that will be under signal control, including state route numbers (Interstate, US, NC or SR) and common street names
- The dominant through movement

The Design-Build Team shall be responsible for providing a safe and economical design for the public. The Design-Build Team shall prepare all plans and designs in accordance with the current NCDOT TSMO Unit design standards, including but not limited to, the version of the following documents effective on the Technical Proposal submittal date:

- *NCDOT Standard Specifications for Roads and Structures*
- *NCDOT Standard Roadway Drawings*
- *Signals and ITS Project Special Provisions*
- *ITS and Signals Design Manual*
- *Manual on Uniform Traffic Control Devices (MUTCD)*
- *North Carolina Supplement to the Manual on Uniform Traffic Control Devices (NCMUTCD)*
- *Guidelines for the Preparation of ITS & Signal Plans by Private Engineering Firms*
- *NCDOT Signal System Timing Philosophy Manual*

Links to additional TSMO Unit design standards and aides are available on website noted below:

**<https://connect.ncdot.gov/resources/safety/Pages/ITS-and-Signals.aspx>**

## **II. TRAFFIC SIGNALS**

If the Design-Build Team's Traffic Control Plans alter the traffic patterns at existing intersections, including but not limited to converting a full movement intersection to a reduced conflict intersection (RCI), the Design-Build Team shall:

- Provide temporary traffic signals, as warranted in accordance with the NCDOT Research and Development *Guidelines for Signalization of Intersections with Two or Three Approaches* at:
  - Intersections with two or three approaches where the traffic volumes will be increased

- Intersections to be converted to a RCI, including the associated U-turn bulbs
- Provide temporary traffic signals as warranted in accordance with the MUTCD at all other existing intersections where the traffic volumes will be increased.
- The Design-Build Team shall provide vehicle detection for all temporary signals during construction. The vehicle detection shall be inductive loop detection or out of street detection. The out of street detection shall be approved by the Department, in writing, prior to incorporation, and appear on the NCDOT Qualified Products List.
- Design and install new, fully actuated traffic signals with 2070 controllers operating ASC/3 Software in a 170 pole mounted cabinet.
- Provide Flashing Yellow Arrow signal heads at all protected / permissive and permissive left turn movements, including time of day phasing options, as appropriate.

### **III. SIGNAL COMMUNICATION**

Reference the ITS Scope of Work found elsewhere in this RFP for additional ITS requirements.

#### **A. TEMPORARY SIGNAL COMMUNICATIONS**

The Design-Build Team shall design, install, and maintain a cellular communications network signal system for all temporary signals. The Design Build Team shall install Department furnished cellular modems within the signal cabinets and coordinate with the Division Traffic Engineer to add them to the Statewide ITS Network. The Design-Build Team shall request the modems through the Engineer a minimum of eight (8) weeks prior to their scheduled installation.

#### **B. MATERIALS**

All material, equipment and work shall adhere to the 2018 NCDOT *Standard Specifications for Roads and Structures* requirements. Materials, where applicable, shall be pre-approved on the Department's QPL website below:

**<https://connect.ncdot.gov/resources/safety/Pages/default.aspx>**

Prior to incorporation, the Design-Build Team shall provide detailed specifications for all material, equipment and / or work that is not covered in the 2018 NCDOT *Standard Specifications for Roads and Structures* for Department approval. The Design-Build Team shall provide specifications and plans that address the material requirements and construction methods. No equipment or material shall be installed until it has been approved by the Department, in writing. Catalog cuts will not be required for items on the QPL. Items not listed on the QPL will require Department written approval prior to incorporation.

The Design-Build Team shall remove and deliver all cellular modems used for temporary signals to the Division. A minimum of one week prior to removal of cellular modems, the Design-Build Team shall contact Steven Hamilton, Division Traffic Engineer, at (252) 439-2816 during normal business hours, to coordinate a specific day and time for the Design-Build Team to deliver the cellular modems. Prior to delivery to the Division, the Design-Build Team shall stockpile all cellular modems to prevent damage.

### **C. MAINTENANCE AND REPAIR REQUIREMENTS**

From the beginning of construction until the final project acceptance, the Design-Build Team shall maintain and repair all system components within the project scope, including but not limited to, signal cabinets, detection systems, signal heads, etc.

## **IV. SIGNAL SYSTEM TIMING PLANS**

If the Design-Build Team's Traffic Control Plans require temporary signals to be installed at a spacing of 2500 feet or less, the Design-Build Team shall develop and implement temporary coordinated Signal System Timing Plans for those signals. This work shall include the design, implementation and fine-tuning of the Signal System Timing Plans. The Signal System Timing Plans shall be designed to address all possible traffic needs within the project construction limits, including but not limited to:

- Roadway capacity modifications due to construction, including but not limited to, through / turn lane additions / removals, signal phasing changes, and traffic pattern changes
- Weekday peak / non-peak traffic periods (i.e. a.m., p.m., noon, off-peak, etc.)
- School / Universities start / end and / or class change peak traffic periods
- Seasonal traffic patterns
- Pre-scheduled holiday(s) traffic patterns
- Incident management traffic patterns (i.e. detour routes, hurricane evacuations, etc.)
- Other special events traffic patterns

The Design-Build Team shall select a Private Engineering Firm (PEF) that is prequalified by NCDOT in *Discipline Code 210 - Signal System Timing Development and Implementation* and under the direct charge of a North Carolina certified Professional Engineer.

The Design-Build Team shall coordinate the number of Signal System Timing Plans with the Division and the Signal System Timing and Operations (SSTO) Section. The Design-Build Team shall submit a set of preliminary Signal System Timing Plans, with supporting *Tru-Traffic*, *SYNCHRO* 9.0, and *Translink32* database files, to the SSTO Section and Division 2. All Signal System Timing Plans shall be reviewed and accepted by the SSTO Section and / or Division 2 prior to implementation. The Design-Build Team shall coordinate the development and implementation of all Signal System Timing Plans at the appropriate times, as directed by the Engineer.

The Design-Build Team shall field implement Signal System Timing Plans in accordance with the SSTO Section's and Division 2's requirements. In the event of conflicting design parameters in

the requirements noted above, the proposed design shall adhere to the most conservative values. The Design-Build Team shall:

- Ensure all Signal System Timing Plans are operational in the Central Control Center, Master and local controller(s)
- Observe new traffic operations at the intersections and along the corridor and collect trip logs for each Signal System Timing Plan implemented, by riding the system with Tru-Traffic synched with the plan in operation at the time
- Fine-tune Signal System Timing Plans, as necessary, for optimal system performance.

**TRANSPORTATION MANAGEMENT SCOPE OF WORK** (6-23-22)**LAWS, STANDARDS, AND SPECIFICATIONS**

The Design-Build Team shall design the Transportation Management Plan (TMP) in accordance with the requirements of this RFP and the version of the standards listed below that are effective on the Technical Proposal submittal date.

- *NCDOT Standard Specifications for Roads and Structures*
- *NCDOT Roadway Standard Drawings*
- *FHWA Manual on Uniform Traffic Control Devices (MUTCD)*
- *NCDOT Supplement to the Manual on Uniform Traffic Control Devices (NCSMUTCD)*
- *AASHTO A Policy on Geometric Design of Highways and Streets*
- *NCDOT Roadway Design Manual*
- *AASHTO Roadside Design Guide*
- *Americans with Disabilities Act of 1990 (ADA)*
- *FHWA Standard Highway Signs*
- *NCDOT Design-Build Submittal Guidelines*
- *FHWA Rule on Work Zone Safety and Mobility (23 CFR 630 Subpart J and K)*
- *Transportation Research Board Highway Capacity Manual*
- *NCDOT Transportation Management Plans Design Manual*

**References**

The Design-Build Team shall use the references provided on the site below as supplementary guidelines and requirements for the design and implementation of the TMP.

<https://connect.ncdot.gov/projects/WZTC/>

**Prequalification**

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience developing TMPs on comparable projects for the North Carolina Department of Transportation (NCDOT) and prequalified through NCDOT in Work Code 00541 (Traffic Management Plan - Level 1 and 2).

**TRANSPORTATION MANAGEMENT PLANS**

A pre-design meeting shall take place between the NCDOT Transportation Systems Management & Operations Unit (TSMOU), the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Operations Center (STOC), local municipalities (if applicable), and any other pertinent NCDOT

personnel. TMP submittals shall only be reviewed and accepted by the Department after this pre-design meeting.

The Design-Build Team shall prepare TMPs that include Temporary Traffic Control Plans (TTCP), an Incident Management Plan (IMP), and a Traffic Operations Plan (TOP), the requirements of which are included in this Scope of Work. In accordance with the Public Involvement and Information Scope of Work found elsewhere in this RFP, the Design-Build Team shall assist the Department in the development of a Public Involvement and Information Plan (PIIP).

The Design-Build Team shall produce TMPs for each phase of work that impacts road users. The TMPs shall include details of all planned detours, traffic control devices, striping, and signage applicable to each phase of work. The information on the TMP shall be of sufficient detail to allow verification of design criteria and safety requirements, including but not limited to, typical sections, alignment, striping layout, drop off conditions, and temporary drainage. The Design-Build Team shall develop TMPs that include procedures to communicate TMP information to the public about road and travel conditions within the work zone and affected roadway network.

### **Transportation Management Phasing Concept**

A Transportation Management Phasing Concept (TMPC) shall be prepared by the Design-Build Team to present the Design-Build Team's approach to all areas covered under the TMP, including but not limited to, hauling of materials to, from, and within the project right of way. The Design-Build Team shall include the TMPC in the Technical Proposal. The Design-Build Team shall submit the TMPC for Department review and acceptance and shall address NCDOT comments on the TMPC prior to commencing production of the TMP for each phase of work or any construction. Any changes to the TMPC after acceptance by NCDOT shall require a submittal for review prior to any future phasing submittals.

### **Incident Management Plan**

The Design-Build Team shall be an active partner in developing an Incident Management Plan (IMP) in and around the work zone.

The Design-Build Team shall develop an IMP that documents 1) the roles and responsibilities of each response agency that may participate in traffic incident management activities, and 2) the procedural and coordination aspects of managing unplanned incidents on US 70 that impact the flow of traffic. These incidents shall include, but are not limited to, environmental events, stalled vehicles, multi-vehicle crashes, and hazardous materials incidents that impact the shoulder, travel lane or close the entire roadway. The objective of the IMP is to reduce the severity of the capacity reduction, incident duration, and / or traffic demand around the incident scene. The IMP shall be reviewed, revised and updated as necessary throughout the project construction.

The IMP shall be developed in coordination with the Division Traffic Engineer, State Traffic Operations Engineer and response agencies; and shall be reviewed and accepted by the Department and the STOC. During development of the IMP, a minimum of two coordination meetings shall take place between the Design-Build Team and all relevant NCDOT incident management

personnel and response agencies. Once accepted by the Department and the STOC, the Design-Build Team shall share the IMP with all response agencies to ensure they have a clear understanding of the procedures and available resources for responding to, processing of, and clearing unplanned incidents.

The Design-Build Team shall not begin any construction activity that disrupts traffic operations on US 70, in the Department's sole discretion, until 1) the Department and the STOC have accepted the IMP, 2) the Design-Build Team has installed all portable ITS devices for incident management and they are communicating with the STOC, and 3) the Design-Build Team has installed all temporary stationary signing for all Incident Management Routes.

At a minimum, the IMP shall include the following components:

#### IMP - Incident Levels and Associated Actions

Incident levels define the extent and duration of the impact anticipated on the roadway. For consistency across NCDOT, the STOC, and Regional TMCs, the Design-Build Team shall utilize the following incident levels and document the actions that shall occur for each incident level:

- **Minor:** Minor traffic incidents are typically disabled vehicles and minor crashes with minimal disruption to the flow of traffic. On-scene responders are typically law enforcement, towing companies, and occasionally Incident Management Assistance Patrol (IMAP). Impacts to the traveled roadway are estimated to be less than 30 minutes with no lane blockage.
- **Intermediate:** Intermediate traffic incidents typically affect travel lanes for a time period. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks. Impacts to the traveled roadway are estimated to be greater than 30 minutes, but less than two hours with lane blockages, but not necessarily a full closure of the roadway.
- **Major:** Major traffic incidents typically involve hazardous materials, fatal traffic crashes, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility. Congestive impact to traveled roadway is estimated to be greater than two hours or the roadway is fully closed in a single direction.

#### IMP List of Response Agencies

The Design Build Team shall develop a list of response agencies for NCDOT review and acceptance. This list may include, but is not limited to the following:

- NCDOT
- Municipalities (e.g. New Bern, James City and Havelock)
- Law enforcement
- Fire / Rescue



- 911 dispatch
- Emergency Medical Service (EMS)
- Hazardous materials
- Media
- Coroner and Medical Examiner
- Emergency Management

During construction, the Design-Build Team shall hold monthly meetings with incident management personnel and response agencies. These meetings may be incorporated into regular Maintenance of Traffic (MOT) or Traffic Task Force Meetings. Additionally, the Design-Build Team shall hold After Action Review meetings with incident management personnel, response agencies, and all other relevant parties following fatal and major traffic incidents.

#### IMP Contact Information

The Design-Build Team shall develop a contact matrix of local emergency response agencies and Design-Build Team points of contact for traffic incidents.

#### IMP Incident Management Routes

Preliminary Incident Management Routes with portable incident management ITS device locations will be provided by the Department. The Design-Build Team shall finalize development of the Preliminary Incident Management Routes provided by the Department into Incident Management Route Plans. At a minimum, the Incident Management Route Plans shall include the following:

- All incident management routes
- Changeable and / or static trailblazer sign locations
- The location of ITS devices for incident management (portable changeable message signs (PCMS) and portable CCTV cameras)
- Existing stationary and temporary alternate route signing locations (reference *NCUTCD Item No. 18A-GMI-01*)
- Police traffic control during incident response plan activation (e.g. at stop-controlled intersections)
- Signal locations
- Median access locations available for emergency response vehicles on US 70
- Route identification using NCDOT naming convention (e.g. US70W MM 422-427)

If the Design-Build Team's design or construction methods impact the Preliminary Incident Management Routes provided by the Department, the Design-Build Team shall develop alternate routes and update the Incident Management Route Plans, as necessary, to mitigate impacts to the Department's Preliminary Incident Management Routes. Prior to incorporating alternate routes into the Incident Management Route Plans, the alternate routes shall be reviewed and accepted by STOC and NCDOT.

The Design-Build shall provide, install and maintain a minimum of twenty (20) static trailblazer signs along the Department's Preliminary Incident Management Routes.

Prior to routing traffic on an Incident Management Route, 1) the Design-Build Team shall install all portable incident management ITS devices and signs, including but not limited to trailblazing signs, 2) the Design-Build Team shall modify traffic signals, if necessary, and 3) all ITS devices shall be communicating with the STOC.

## **LANE AND ROAD CLOSURE NOTIFICATION**

### **Lane Closure Notice (LCN)**

The Design-Build Team shall issue a Lane Closure Notice (LCN) to NCDOT and affected government entities a minimum of thirty (30) calendar days prior to the publication of any notices or placement of any traffic control devices associated with lane closures, detour routing, or other change in traffic control requiring lane closures. The Design-Build Team will be allowed to issue a single LCN for multiple / consecutive lane closures that occur in the same location. For a LCN utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence, in writing, from the controlling government entity.

A LCN shall contain the estimated date, time, duration, and location of the proposed work. The Design-Build Team shall keep NCDOT informed of any and all changes or cancellations of proposed lane closures prior to the date of their implementation.

If an emergency condition should occur, a LCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

### **Road Closure Notice (RCN)**

Proposed road closures on any road shall be approved by the Engineer prior to incorporation in the TMP and shall adhere to the following requirements:

- Unless allowed otherwise elsewhere in this Scope of Work, all roads, including but not limited to all proposed ramps and loops once opened to traffic, shall remain open.
- The Design-Build Team shall not concurrently close -Y- Lines with overlapping detours.

Unless required otherwise by this RFP, the Design-Build Team shall issue a Road Closure Notice (RCN) to NCDOT and affected government entities a minimum of thirty (30) calendar days prior to the publication of any notices or placement of any traffic control devices associated with road closures, detour routing, or other change in traffic control requiring road closures. For a RCN utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence, in writing, from the controlling government entity.

A RCN shall contain the estimated date, time, duration, and location of the proposed work. The Design-Build Team shall keep NCDOT and any other affected government entity informed of any and all changes or cancellations of proposed road closures prior to the date of their implementation.

If an emergency condition should occur, a RCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

## **STOC Coordination**

### Lane Closures

In addition to the aforementioned minimum thirty (30) calendar day notice for a LCN, the Design-Build Team shall notify the STOC when the process of closing a lane, ramp, loop or paved shoulder begins.

### Lane Opening

The Design-Build Team shall notify the STOC when the process of re-opening a lane, ramp, loop or paved shoulder begins, and again when the lane, ramp, loop or paved shoulder is completely open.

## **GENERAL DESIGN AND CONSTRUCTION REQUIREMENTS**

### **Maintenance of Access**

Maintain access to all businesses, schools, residences, bus stops, mass transit facilities, park and ride lots, and emergency services at all times. Prior to incorporation, obtain written approval from the Engineer on the method to maintain access.

In accordance with the Department's Policy on Evaluating Temporary Accommodations for Pedestrians during Construction, found on the website noted below, the Design-Build Team shall maintain pedestrian accommodations in all areas as follows:

| <b>Roadway</b> | <b>Minimum Level of Pedestrian Accommodation</b> |
|----------------|--|
| All Roads      | Absence of Need                                  |

<https://connect.ncdot.gov/projects/WZTC/Pages/PedSafety.aspx>

On all roadways within the project limits, the Design-Build Team shall provide safe access for wide-loads and oversized permitted vehicles through the work zone. Safe access shall include, but not be limited to, a sufficient pavement structure (Reference the Pavement Management Scope of Work found elsewhere in this RFP), maintaining the existing vertical clearance of overhead structures, providing the required vertical clearance of proposed overhead structures, and providing the minimum horizontal clear widths as follows:

| <b>Roadway</b>   | <b>Minimum Clear Width *</b> |
|--|------------------------------|
| Interstates, US Routes, NC Routes, and all ramps and loops | 20 feet                      |
| All other roadways   | 18 feet                      |

\* For temporary alignments, the Design-Build Team shall provide the wider of the width in the Table above or the required design criteria found elsewhere in this Scope of Work.

### **Traffic Control Supervisor**

The Design-Build Team shall furnish a Traffic Control Supervisor for the project who is knowledgeable of TMP design, devices, and application, and has full authority to ensure traffic is maintained in accordance with the plans and specifications.

The Traffic Control Supervisor shall be on the project site overseeing all road closures and median crossover operations to ensure traffic control devices are properly installed and adjusted as necessary. The Traffic Control Supervisor shall also make necessary changes to the traffic control operations and aide in the monitoring of traffic queuing.

The Design-Build Team shall identify a Traffic Control Supervisor in their Technical Proposal that has the following qualifications:

- A minimum 24 months of On-the-Job Training in supervision and work zone set up and implementation on similar projects.
- Be certified by an approved NCDOT training provider. If the Design-Build Contractor or their traffic control subcontractor is approved by NCDOT to train their own staff, a notarized certification letter shall be furnished to the Engineer at the preconstruction meeting. The letter shall state certification and re-certification dates. It shall also state the Traffic Control Supervisor has the knowledge and experience as well as the authority to ensure traffic is maintained in accordance with the contract documents.

The Traffic Control Supervisor for the project shall perform the following:

- During construction, be available or on call 24 hours per day, 7 days per week to address mobility and / or safety concerns within the work zone and direct / make any necessary changes in the traffic control operations in a timely and safe manner. The Design-Build Team shall provide NCDOT the name of the Traffic Control Supervisor and support personnel, and the phone number(s) where they can be reached 24 hours per day, seven days per week.
- Coordinate and cooperate with traffic control supervisors of adjacent, and overlapping construction projects, as well as construction projects in proximity to the subject project,

to ensure safe and adequate traffic control is maintained throughout the project at all times, including periods of construction inactivity.

- Coordinate and cooperate with the NCDOT Division Incident Management staff and Resident Engineer.
- Coordinate and cooperate with the STOC to ensure proper messages are displayed on the DMSs and any PCMSs that are required to communicate with the STOC.
- Coordinate with hospitals, EMS, fire departments, and law enforcement throughout construction to alert these entities to traffic control impacts that may affect their services. Prior to the start of construction and prior to a temporary railroad crossing closure, coordinate with Township 7 VFD (252-637-3812), Township 6 VFD (252-447-2700), and Craven County Emergency Services (252-636-6608) regarding the construction schedule and anticipated construction related impacts to emergency services.
- Prior to the start of construction activities that could result in school bus delays, including but not limited to temporary railroad crossing closures, coordinate with Craven County Schools.
- Provide traffic control setup that ensures safe traffic operations and workers' safety throughout the construction area.
- Attend all scheduled traffic control coordination meetings, as required by the Engineer.
- Monitor traffic delays and backups within the work zone.
- Ensure all employees working inside NCDOT right of way have received the proper training appropriate to the job decisions each individual is required to make.

### **Traffic Control Devices**

The Design-Build Team shall use traffic control devices that conform to all NCDOT requirements and are listed on the NCDOT Approved Products List. The Approved Products List may be referenced on the website noted below:

**<https://apps.ncdot.gov/vendor/approvedproducts/>**

The use of any devices that are not shown on the NCDOT Approved Products List shall require written approval from the Design-Build Unit prior to incorporation.

Excluding areas within 1,000 feet of a signalized intersection, channelizing device spacing shall not exceed a distance in feet equal to twice the posted speed limit. When channelizing devices are installed within 1,000 feet of a signalized intersection, their spacing shall not exceed a distance in feet equal to the posted speed limit. Channelizing devices shall be spaced ten feet on-center in radii. Channelizing devices shall be two feet off the edge of an open travelway when lane closures

are not in effect. Skinny drums shall only be allowed as defined in Section 1180 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

Place Type III barricades, with "ROAD CLOSED" signs (R11-2) attached, of sufficient length to close entire roadway. Stagger or overlap barricades as needed to allow for ingress or egress.

PCMS should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where placement of a traffic barrier is not practical to shield the PCMS, the PCMS should be placed off the shoulder and outside of the clear zone. If a PCMS must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retroreflective temporary traffic control (TTC) devices. When PCMSs are not being used to display TTC messages, they shall be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic.

If any trailer mounted traffic control device must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retroreflective temporary traffic control (TTC) devices.

All traffic control devices, including but not limited to, temporary or permanent barrier systems, shall be placed / located a minimum two-foot offset (shy distance) from the edge of an open travel lane.

#### Temporary Portable ITS Devices

In addition to the PCMSs required by the NCDOT Roadway Standard Drawings and portable devices required in the ITS Scope of Work found elsewhere in this RFP, the Design-Build Team shall provide a minimum of twelve (12) temporary PCMSs and seven (7) portable CCTV cameras to be used solely for incident management. The Design-Build Team shall provide additional temporary PCMSs and portable CCTV cameras for incident management, as necessary, along alternate Incident Management Routes developed by the Design-Build Team. (Reference the IMP Incident Management Routes Section of this Scope of Work) The Design-Build Team will be allowed to relocate temporary PCMSs and portable CCTV cameras from an inactive Incident Management Route to an active Incident Management Route.

The PCMSs for incident management shall be used to display alternate route information ahead of detour points for incidents in the project area. The Design-Build Team shall coordinate with the STOC when alternate route information needs to be displayed. In the event of an incident, the STOC will control the applicable PCMSs to provide incident management information to motorists.

The temporary portable ITS devices for incident management shall be installed, relocated as necessary, operated, and maintained from the initiation of project construction to project completion or completion of their usefulness as determined by the Engineer.

A preliminary location plan for the incident management ITS devices has been provided by the Department. Final locations and positioning of these devices shall be coordinated with the STOC and NCDOT and included in the IMP for STOC and NCDOT for review and acceptance prior to

installation. Once the location of the ITS devices for incident management have been accepted by the STOC and NCDOT, the locations shall not be changed without STOC and NCDOT approval.

Unless noted otherwise elsewhere in this Scope of Work, all portable ITS devices shall be capable of communicating with the “Statewide ITS Network” and existing software utilized by the STOC and have the functionality to be operated locally in the field and controlled remotely from the STOC. All portable ITS devices provided must be fully National Transportation Communications for ITS Protocol (NTCIP) compliant and on the NCDOT ITS and Signals QPL as of the Technical Proposal submittal date. No vendor specific or third-party software will be allowed. PCMSs used solely by the Design-Build Team for daily traffic control operations do not need to communicate with the STOC.

The Department will provide cellular modems to establish the communications link between the portable ITS devices for incident management and the STOC. The portable ITS devices shall have a fully configurable, standard ethernet port for connection to the cellular modem. Devices with built-in or onboard modems shall have an available ethernet port to allow communications with the Department-furnished modem. Devices designed specifically for serial communications and devices without an available ethernet port will not be accepted. All modems provided by the NCDOT shall be returned to the NCDOT once the project is complete or the Engineer determines the device is no longer needed. (Reference the ITS Scope of Work found elsewhere in this RFP)

### **Temporary Traffic Barrier Systems**

Placement of temporary traffic barrier systems shall be shown on the TMPC and shall be designed in accordance with the requirements below.

At a minimum, the Design-Build Team shall maintain all existing positive median cross-over protection throughout the entire R-5777C project limits, including but not limited to positive median crossover protection constructed on the R-1015 and U-5713 / R-5777A & B projects. The Design-Build Team shall indicate in the Technical Proposal the type of positive protection proposed and replacement / resetting requirements.

Determine the need for temporary traffic barrier in accordance with the FHWA *Rule on Temporary Traffic Control Devices* (23 CFR 630 Subpart K). Reference the NCDOT Work Zone Traffic Control website noted below for examples and *Guidelines for the Use of Positive Protection in Work Zones*.

**<https://connect.ncdot.gov/projects/WZTC/Pages/Design-Resources.aspx>**

The Design-Build Team shall adhere to the AASHTO *Roadside Design Guide* in determining the length of need, flare rate, and clear zone. The Design-Build Team shall adhere to the maximum deflections from crash testing of the proposed temporary traffic barrier system in accordance with NCHRP-350 *Recommended Procedures for the Safety Performance Evaluation of Highway Features* and 2016 AASHTO *Manual for Assessing Safety Hardware* (MASH).

The Design-Build Team shall only use an NCDOT approved temporary traffic barrier system.

The temporary traffic barrier system shall not be installed more than two weeks prior to beginning work in any location. Once the temporary traffic barrier system is installed at any location, the Design-Build Team shall proceed in a continuous manner to complete the proposed work in that location.

Excluding water filled barrier, protect the approach end of temporary traffic barrier systems from oncoming traffic at all times with a truck mounted impact attenuator (maximum 72-hour duration) or an approved end unit such as a temporary crash cushion unless the approach end of the temporary traffic barrier system is offset from oncoming traffic as follows:

| <b>Posted speed limit (mph)</b> | <b>Minimum offset (feet)</b> |
|---------------------------------|------------------------------|
| 40 or less                      | 15                           |
| 45 - 50                         | 20                           |
| 55                              | 25                           |
| 60 mph or higher                | 30                           |

Crash cushions shall be installed according to the manufacturer's recommendations, including offsets from fixed objects.

The Design-Build Team shall provide the proper connection between the existing guardrail or bridge rail and the temporary traffic barrier system. Connection details shall be included in the TTCP.

Install temporary traffic barrier system with the traffic flow, beginning with the upstream side of traffic. Remove the temporary traffic barrier system against the traffic flow, beginning with the downstream side of traffic.

All temporary traffic barrier systems utilized for traffic control shall be placed on a paved surface. A minimum two-foot width of 1) paved surface, 2) standard sloped turf shoulder, or 3) a combination of paved surface and standard sloped turf shoulder shall extend behind all unanchored barrier, unless permitted otherwise by the Department, in writing.

The Design-Build Team shall use a minimum six-foot offset to temporary traffic barrier along any shifting or merging taper, including but not limited to, existing, temporary, and / or proposed shifting or merging tapers. At the start of a taper, temporary traffic barrier shall continue along the tangent to achieve this six-foot offset. For all ramp / loop merge tapers, temporary traffic barrier shall continue parallel to the travel lanes a minimum of 200 feet beyond the start of the merge taper before flaring back towards the travel lanes in accordance with Roadway Standard Drawing No. 1101.11, Sheet 3 of 4.

When temporary traffic barrier is placed on a roadway shoulder, the Design-Build Team shall install shoulder closure signs and devices in advance of the barrier in accordance with the NCDOT Roadway Standard Drawings.



The Design-Build Team shall not place temporary traffic barrier in any paved gore area. If the work cannot be safely performed without placing temporary traffic barrier in the paved gore area, the Design-Build Team shall temporarily close the ramp or loop in accordance with ICT #8.

Temporary traffic barrier used for traffic control shall not act as a retaining wall.

### **Temporary Alignments and Traffic Shifts**

The Design-Build Team shall notify the Engineer in writing at least thirty (30) calendar days prior to any traffic pattern alteration. (Reference the Public Involvement and Information Scope of Work found elsewhere in this RFP)

Excluding median crossovers, the design speed for temporary alignments of interstates, US routes, and NC routes shall not be lower than the current posted speed limit. The minimum allowable design speed for temporary alignments on secondary roads shall be the higher of 10 mph below the posted speed limit or 35 mph.

All on-site detours shall meet the minimum number of existing lanes per direction and shall adhere to all temporary alignment requirements noted elsewhere in the RFP. All pavement transitions, including but not limited to cross slopes / superelevation, at on-site detour tie-ins shall adhere to the on-site detour design speed.

The Design-Build Team shall provide a smooth pavement surface for traffic at all times. The Design-Build Team shall not place traffic on lanes containing rumble strips unless the Design-Build Team mills the rumble strips and installs a uniform overlay on the lane prior to placing traffic on the lane. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

For temporary traffic patterns that will remain in place for a period longer than three days, including but not limited to traffic shifts, merges, and temporary alignments, breaks in the superelevation and / or breaks in a normal crown section will not be allowed within the shifting taper. Excluding the aforementioned temporary traffic patterns, breaks in the superelevation and / or breaks in a normal crown section shall only occur on a lane line or lane midpoint, and shall not exceed 0.04.

The Design-Build Team shall provide proper drainage for all temporary alignments and / or traffic shifts.

The NCDOT Roadway Standard Drawing No. 1101.11 shall be used to calculate the length of temporary merges for lane closures and temporary traffic shifts. All straight-line traffic shifts on interstate and US routes shall be designed for the full L distance ( $L = \text{width of traffic shift times speed limit in mph}$ ).

Straight line traffic shifts of six feet or greater shall have the appropriate lane shift warning signs and solid white line pavement markings that separate the travel lanes. For straight line traffic shifts less than six feet, the need for signing and solid line pavement markings shall be determined by the Design-Build Team and accepted by the Department.

Temporary traffic shifts that are not covered by a standard and / or require vertical grades shall be considered a temporary alignment. All temporary alignments shall adhere to the NCDOT *Roadway Design Manual*, including all revisions, 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* and the most current Transportation Research Board *Highway Capacity Manual*.

### **Lane and Shoulder Requirements**

Unless permitted otherwise elsewhere in this RFP, maintain the existing number of travel lanes on all roads. The Design-Build Team shall adhere to the minimum lane width requirements noted below. Maintaining these requirements will not be considered lane narrowing:

- Existing travel lanes that are equal to or greater than 11 feet wide, maintain minimum 11-foot travel lanes.
- Existing travel lanes that are narrower than 11 feet, maintain the existing travel lane widths.

Maintain minimum four-foot median and outside paved shoulder widths in each direction of US 70 unless temporary traffic barrier is placed on the paved shoulder. This requirement may be reduced to two-foot paved shoulders under structures and one-foot paved shoulders along ramps. If temporary traffic barrier is placed on the shoulder, refer to the Traffic Control Devices and Temporary Traffic Barrier Systems subsections for shy distance and placement requirements.

On two-lane, two-way facilities, the Design-Build Team shall not install more than one (1) mile of lane closure in any one direction on any roadway within the project limits or in conjunction with this project, measured from the beginning of the merge taper to the end of the lane closure.

On multi-lane facilities, the Design-Build Team shall not install more than two (2) miles of lane closure in any one direction, measured from the beginning of the merge taper to the end of the lane closure.

For simultaneous lane closures in any one direction on any road within the project limits, a minimum of three (3) miles shall be provided between lane closures. The distance between lane closures shall be measured from the end of one closure to the beginning of the taper of the next lane closure.

Through traffic traveling in the same direction shall not be split, including separation by any type of barrier, bridge piers, existing or proposed median, or any other device.

The Design-Build Team shall remove lane closure devices from the lane when work is not being performed behind the lane closure or when a lane closure is no longer needed.

Place sets of three drums perpendicular to the edge of the travelway on 500-foot centers when unopened lanes are closed to traffic. These drums shall be in addition to channelizing devices.

When personnel and / or equipment are working within 15 feet of an open travel lane, the Design-Build Team shall close the nearest open shoulder using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to an undivided facility and within five feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to a divided facility and within ten feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working within a lane of travel of an undivided or divided facility, the Design-Build Team shall, at a minimum, close the lane using the NCDOT Roadway Standard Drawings. The Design-Build Team shall conduct the work so that all personnel and / or equipment remain within the closed travel lane.

The Design-Build Team shall not perform work involving heavy equipment within 15 feet of the edge of travelway when work is being performed behind a lane closure on the opposite side of the travelway.

Except as allowed otherwise below, the Design-Build Team shall provide paved motorist pull-offs along US 70 in accordance with the Motorist Pull-Off Area detail found on the NCDOT Work Zone Traffic Control's webpage below. The Design-Build Team shall submit a temporary pavement design for the pull off areas to the Department for review and acceptance prior to installation. In lieu of providing a paved motorist pull-off, the Design-Build Team may maintain access to a -Y- Line. (Reference the Pavement Management Scope of Work found elsewhere in this RFP).

**<https://connect.ncdot.gov/projects/WZTC/Pages/Design-Resources.aspx>**

### **Off-site Detours**

Prior to incorporation, obtain written approval from the Engineer for all road and / or access point closures. Access point closures will only be allowed for locations that have multiple access points and all access point closures shall be coordinated with the property owner and the Engineer.

Excluding ICM detours provided by the Department, all offsite detour routes shall receive Department written approval prior to incorporation. All roads and lanes along the detour route shall remain open to traffic while the detour is in effect. Submit detour routes and all associated sign designs for review and acceptance prior to incorporation.

Excluding ICM detours provided by the Department, the Design-Build Team shall investigate all proposed detour routes. At a minimum, this investigation shall include analyzing the detour route capacity and geometry / characteristics to ensure the additional volume can be supported,

investigating impacts to emergency services (access and response times) and schools, and investigating the structural integrity of the bridges and pavement along the detour route, including the existing shoulders. The Design-Build Team shall submit recommendations resulting from the aforementioned investigations / analyses for the Department's review and acceptance. The recommendations shall include mitigation for any impacts to emergency services (access and response times).

As determined by the Engineer, the Design-Build Team shall provide all improvements required to accommodate detoured traffic prior to utilizing detour routes.

Offsite detours that have non-signalized at-grade railroad crossings shall not be allowed.

Unless approved otherwise by the controlling government entity, in writing, use only state-maintained roads for off-site detour routes.

All proposed road closures, detour routes, durations, and justifications shall be incorporated into the Technical Proposal. (All proposed road closures, detour routes, durations and justifications incorporated into the Technical Proposal shall require Department approval.)

### **Impacts to Other Network Roadways**

The Design-Build Team shall coordinate with the Division Maintenance Engineer, Resident Engineer, Division Traffic Engineer, Rail Division, and STOC to manage traffic operations within the work zone and other roadways within the network that may be affected by the work zone activities. Coordination shall include, but not be limited to, providing notification of planned lane or road closures, traffic detours, public information, traffic management, access management, and incidents.

On all roads, the Design-Build Team shall make all modifications to existing pavement markings, markers, and / or signing located outside the project limits that are necessitated by the TMP. Additionally, the Design-Build Team shall readjust the markings, markers, and / or signing located outside the project limits to the existing / proposed pattern when the temporary changes are no longer needed.

The Design-Build Team shall take steps to minimize disruptions to existing roadway facilities during construction and shall demonstrate in the TMPC how the traffic control phasing minimizes inconvenience to motorists on all roads.

### **Pavement Edge Drop-off Requirements**

Using suitable compacted material, the Design-Build Team shall backfill with a 6:1 or flatter slope up to the edge and elevation of the existing pavement in areas adjacent to an open travel lane that has an edge of pavement drop-off as follows:

- Elevation differences greater than two inches on roadways with posted speed limits of 45 mph or greater and a paved shoulder four-foot wide or less.

- Elevation differences greater than three inches on roadways with posted speed limits less than 45 mph and a paved shoulder four-foot wide or less.
- Refer to the current AASHTO *Roadside Design Guide* for proper treatment of all other conditions.

Do not exceed a difference of two inches in elevation between open lanes of traffic for nominal lifts of 1.5 inches. Install advance warning “UNEVEN LANES” signs (W8-11) 1,000 feet in advance and a minimum of every half mile throughout the uneven area.

### **Signing**

The Design-Build Team shall install advance work zone warning signs when work is within 40 feet from the edge of travel lane. The advance work zone warning signs shall be installed no more than three days prior to beginning construction.

When no work is being conducted for a period longer than one week, the Design-Build Team shall remove or cover all advance work zone warning signs, as directed by the Engineer. Stationary work zone warning signs shall be covered with an opaque material that prevents reading of the sign at night by a driver traveling in either direction.

When portable work zone signs are not in use for periods longer than 30 minutes, the Design-Build Team shall lay the portable work zone sign flat on the ground and collapse the sign stand and lay it flat on the ground.

The Design-Build Team shall install and maintain all detour signing and devices required for road closures. The Design-Build Team shall cover or remove all detour signs and devices required for road closures, within and outside of the project limits, when a detour is not in operation.

The Design-Build Team shall ensure proper signing is in place at all times during construction as required by the MUTCD. Guide signs shall be maintained and modified, as required by the TMP, throughout the entire project construction duration. All temporary signing shall be shown on the TTCP, IMP, and / or Temporary Signing Plans to be reviewed and approved by the Work Zone Traffic Control Section, the Signing and Delineation Unit and STOC as appropriate, prior to incorporation.

### **Temporary Pavement Markings, Markers, and Delineation**

The Design-Build Team shall install pavement markings and markers in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

The Design-Build Team shall install temporary pavement markings and markers for temporary traffic patterns as follows.

| Road                                 | Marking  | Marker           |
|--------------------------------------|--|------------------|
| US 70, including all ramps and loops | Work Zone Performance Pavement Markings (Reference the <i>Work Zone Performance Pavement Markings</i> Project Special Provision found elsewhere in this RFP) | Raised Temporary |
| All other roads                      | Any Marking on the Approved Product List   | Raised Temporary |

Prior to shifting traffic to a new pattern, the Design-Build Team shall 1) remove all conflicting markers and snowplowable marker castings, and patch all casting holes, and 2) remove or conceal all conflicting markings in accordance with the following requirements: (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

- Pavement markings on concrete surfaces shall only be removed by hydroblasting.
- Conflicting pavement markings on asphalt surfaces shall be concealed by applying a uniform overlay, removed, or milled and filled.

Removal of the temporary pavement markings on asphalt surfaces shall be accomplished by an NCDOT approved system to minimize damage to the road surface. Pavement markings shall not be obscured with any type of black pavement markings (paint or other material). The Design-Build Team shall remove all temporary pavement markings without removing more than 1/32 inch of the pavement surface.

By the end of each day's operation, and in accordance with the requirements above, the Design-Build Team shall remove or conceal, as appropriate, all conflicting markings, replace all damaged markings, and remove / replace all conflicting / damaged markers.

Excluding pavement markings and markers not visible to traffic, conflicting pavement markings and markers shall be defined as any pavement marking or marker not being used for the current traffic pattern which is within six feet of any pavement marking required for the current traffic pattern.

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

The Design-Build Team shall show temporary pavement markings on the TMP that meet the requirements of the RFP and the NCDOT *Transportation Management Plans Design Manual*.

The Design-Build Team shall only use pavement marking and marker products that conform to all NCDOT requirements and are listed on the NCDOT Approved Products List. The use of any

devices that are not shown on the NCDOT Approved Products List shall require written approval from the Design-Build Unit prior to incorporation.

The Design-Build Team shall install temporary pavement markings that are the same width as existing pavement markings. For roadways that do not have existing pavement markings, the Design-Build Team shall install temporary pavement markings that are the same width required for the final pavement markings in the Pavement Markings Scope of Work found elsewhere in this RFP.

For Work Zone Performance Pavement Markings, the Design-Build Team shall maintain a minimum retroreflectivity in accordance with the *Work Zone Performance Pavement Markings* Project Special Provision found elsewhere in this RFP. For all other pavement markings, the Design-Build Team shall maintain a minimum retroreflectivity for existing and temporary pavement markings at all times during construction as follows:

|         |                            |
|---------|----------------------------|
| White:  | 125 mcd/lux/m <sup>2</sup> |
| Yellow: | 100 mcd/lux/m <sup>2</sup> |

When using Cold Applied Plastic Type 4 pavement markings, place temporary raised markers half on and half off edge lines and centerlines to help secure the tape to the roadway. Markers shall be spaced an appropriate distance apart as described by the NCDOT Roadway Standard Drawing No. 1250.01, Sheet 1 of 3.

The Design-Build Team shall trace existing and / or proposed monolithic island locations with the proper color pavement marking prior to removal and / or installation. The Design-Build Team shall place drums to delineate existing and / or proposed monolithic islands after the removal and / or before installation.

The Design-Build Team shall not place temporary markings other than Cold Applied Plastic Type 4 - Removable Tape on any final asphalt pavement surface unless the temporary markings are placed in the exact location of the final pavement markings.

The Design-Build Team shall not place temporary markings other than Polyurea Pavement Marking Material - Type 2 on any final concrete pavement surface unless the temporary markings are placed in the exact location of the final pavement markings.

The Design-Build Team shall readjust the markings , markers, and / or signing located outside the project limits to the existing / proposed pattern when the temporary changes are no longer needed.

### **Temporary Traffic Signals**

At all intersections, multi-lane turn lanes shall be 15 feet in width at the midpoint of the turn.

If the Design-Build Team proposes temporary traffic signals for maintenance of traffic, include the following as part of the TMP General Notes:

- Notify the Engineer in writing a minimum of two months before a temporary traffic signal installation is required.
- Shift and revise all signal heads as shown on the accepted Traffic Signal Plans.

### **Lighting**

The Design-Build Team shall provide portable temporary construction and equipment lighting to conduct night work in accordance with the 2018 NCDOT *Standard Specifications for Road and Structures*.

For nighttime lane closures along US 70, furnish and install Work Zone Presence Lighting and Sequential Flashing Warning Lights. (Reference the *Work Zone Presence Lighting and Sequential Flashing Warning Lights* Project Special Provision found elsewhere in this RFP)

### **Temporary Shoring for Maintenance of Traffic**

Temporary shoring for the maintenance of traffic shall be defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than five feet from the edge of pavement of the open travelway.

The Design-Build Team shall be responsible for all required temporary shoring including designing, furnishing, installing, maintaining, and removing the shoring.

The Design-Build Team shall identify where temporary shoring will be used for maintenance of traffic on the TMPC and include cut sections showing offsets to the travelway.

The Design-Build Team shall install temporary traffic barrier as shown on the “PCB at Temporary Shoring Locations” detail available on the Work Zone Traffic Control website noted below. This detail provides design information on the temporary traffic barrier location in relation to the temporary shoring and traffic location. Notes related to Temporary Shoring are not required in the General Notes sheet for the TMP.

The NCDOT Geotechnical Engineering Unit and Work Zone Traffic Control websites contain more information on the design and use of temporary shoring. The Design-Build Team shall adhere to all additional requirements for temporary shoring located on the websites below:

<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>

<https://connect.ncdot.gov/projects/WZTC/Pages/Design-Resources.aspx>



## **Law Enforcement**

Law enforcement officers may be used as a pilot vehicle during any rolling roadblock operation, as permitted in the NCDOT Roadway Standard Drawing No. 1101.03, sheet 9 of 9. Law enforcement officers shall be used to direct traffic when installing / removing / shifting traffic signal heads at intersections and during flagging operations at signalized intersections. Law enforcement officers may be used to maintain traffic through other work areas and / or unsignalized intersections. The use of law enforcement officers shall adhere to the *Law Enforcement Standard Special Provision* found elsewhere in this RFP and the following requirements:

- The Design-Build Team shall be responsible for coordinating with the law enforcement agency for the use of law enforcement officers.
- The Design-Build Team shall only utilize officers who are outfitted with law enforcement uniforms and marked vehicles equipped with proper lights mounted on top of the vehicle and agency emblems.
- The Design-Build Team shall coordinate with the Engineer where and how law enforcement officers will be used during construction.

The Design-Build Team shall address where and how law enforcement officers will be used in the Technical Proposal.

## **PROJECT REQUIREMENTS AND TIME RESTRICTIONS**

All time restrictions and notes shall be included in the TMP General Notes, unless noted otherwise elsewhere in this RFP.

In the event any self-imposed liquidated damages are included in the Technical Proposal, an Intermediate Contract Time(s) shall be established and shall become part of the contract.

### **Intermediate Contract Times #5 and #6 for Lane Narrowing, Lane Closure, Holiday and Special Event Restrictions**

Except as allowed otherwise elsewhere in this RFP, the Design-Build Team shall maintain the existing traffic pattern and shall not close or narrow a lane of traffic during the times listed below. Construction operations requiring a lane closure on a ramp / loop section with a single lane shall be defined as a road closure and shall be subject to the intermediate contract times for road closures noted in ICT # 8 found elsewhere in this Scope of Work.

| <b>Intermediate Contract Time</b> | <b>Facility</b>  | <b>Days</b>             | <b>Time Restrictions</b>                                |
|-----------------------------------|--|-------------------------|---|
| #5                                | US 70 including all ramps and loops, between September 16 <sup>th</sup> and May 14 <sup>th</sup> | Monday through Friday   | 6:00 a.m. to 9:00 a.m.<br>and<br>3:00 p.m. to 6:00 p.m. |
|                                   | US 70 including all ramps and loops, between May 15 <sup>th</sup> and September 15 <sup>th</sup> | Monday through Thursday | 6:00 a.m. to 7:00 p.m.                                  |
|                                   |  | Friday through Sunday   | From Friday at 6:00 a.m. to Sunday at 7:00 p.m.         |
| #6                                | All other roads  | Monday through Friday   | 6:00 a.m. to 8:00 a.m.<br>and<br>3:00 p.m. to 6:00 p.m. |

In addition, the Design-Build Team shall not close or narrow a lane of traffic on the aforementioned facilities, detain, and / or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy. At a minimum, these requirements / restrictions shall apply to the following schedules:

- For any unexpected occurrence that creates unusually high traffic volumes, as directed by the Engineer.
- For New Year's between the hours of 5:00 a.m. December 31st and 7:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday then between the hours of 5:00 a.m. December 31st and 7:00 p.m. the following Tuesday.
- For Easter, between the hours of 5:00 a.m. Thursday and 9:00 p.m. Monday.
- For Memorial Day, between the hours of 5:00 a.m. Friday and 7:00 p.m. Tuesday.
- For Independence Day, between the hours of 5:00 a.m. July 3rd and 7:00 p.m. July 5th. If Independence Day is on a Friday, Saturday, Sunday or Monday, then between the hours of 5:00 a.m. the Thursday before Independence Day and 7:00 p.m. the Tuesday after Independence Day.
- For Labor Day, between the hours of 5:00 a.m. Friday and 7:00 p.m. Tuesday.
- For Thanksgiving Day, between the hours of 5:00 a.m. Tuesday and 7:00 p.m. Monday.
- For Christmas, between the hours of 5:00 a.m. the Friday before the week of Christmas Day and 7:00 p.m. the following Tuesday after the week of Christmas Day.

- For the Cherry Point Air Show, from two (2) hours before the gate opening time to two (2) hours after the end of the Cherry Point Air Show.

**Liquidated Damages for Intermediate Contract Time #5 for the above lane narrowing, lane closure, holiday and special event time restrictions on US 70 are \$500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #6 for the above lane narrowing, lane closure, holiday and special event time restrictions on all other roads are \$500.00 per hour or any portion thereof.**

### **Intermediate Contract Times #7, #8 and #9 for Road Closure Restrictions for Construction Operations**

Unless allowed otherwise elsewhere in this RFP, at a minimum, the Design-Build Team shall maintain the existing traffic pattern and follow the road closure restrictions for all roadways listed below. When a road closure is used, the Design-Build Team shall reopen the travel lanes by the end of the road closure duration to allow the traffic queue to deplete before re-closing the roadway.

Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall not close any direction of travel on the following roads or any ramps / loops during the times noted below; and only close the following roads or any ramps / loops for the operations listed in this intermediate contract time. Using a median crossover, exclusively for the operations listed below, shall be defined as a closure of a direction of travel.

A crossover providing one lane in each direction on US 70 will be allowed for the purpose of girder, overhang, and falsework installation and / or removal during the times set forth below. No other roads shall be put in a crossover pattern. If the Design-Build Team elects to use a crossover for the aforementioned activities, during the times set forth below, the crossover shall be designed and constructed to meet a design speed of no more than 20 mph below the posted speed limit prior to implementation of a reduced work zone speed limit. Unless approved otherwise by the Engineer, in writing, the maximum allowable distance between the crossovers shall be 2,750 feet. The Design-Build Team shall monitor the traffic queue during operation of the crossover. Should the traffic queue extend to the advance warning signs, traffic shall be returned to the existing number of lanes in each direction until the traffic queue is depleted.

| <b>Intermediate Contract Time</b> | <b>Facility</b>     | <b>Days</b>           | <b>Time Restrictions</b>           |
|-----------------------------------|---------------------|-----------------------|------------------------------------|
| #7                                | US 70               | Monday through Sunday | 5:00 a.m. to 12:00 a.m. (midnight) |
| #8                                | All ramps and loops | Monday through Sunday | 5:00 a.m. to 12:00 a.m.            |
| #9                                | All other roads     | Monday through Sunday | 5:00 a.m. to 11:00 p.m.            |

For the operations noted below, the maximum road closure duration shall not exceed thirty (30) minutes without an approved offsite detour. With an approved offsite detour, the roadways listed may be closed according to the time restrictions listed in the appropriate Road Closure ICT for the operations listed below:

- Girder, overhang, and falsework installation and / or removal
- Installation of temporary traffic signal poles and cables across roadways
- Tie-in work to implement or remove an on-site detour

Proposed road closures for any road within the project limits shall be approved by the Engineer, in writing, prior to incorporation in the TMP.

**Liquidated Damages for Intermediate Contract Time #7 for the above road closure time restrictions for construction operations on US 70 are \$1,000.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #8 for the above road closure time restrictions for construction operations on all ramps and loops are \$500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #9 for the above road closure time restrictions for construction operations for all roads except US 70 and all ramps / loops are \$250.00 per 15-minute period or any portion thereof.**

### **Hauling Restrictions**

The Design-Build Team shall adhere to the hauling restrictions noted in the 2018 NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall conduct all hauling operations as follows:

- The Design-Build Team shall not conduct any hauling operations against the flow of traffic of an open travelway unless an approved temporary traffic barrier or guardrail separates the traffic from the hauling operation.
- All entrances, exits and crossings for hauling to and from the work zone shall be shown on the TMP. Entrances and exits for access to and from medians shall be in accordance with the NCDOT Roadway Standard Drawings and the *Typical Median Access Areas* Project Special Provision found elsewhere in this RFP.
- Haul vehicles shall not enter and / or exit an open travel lane at speeds more than 10 mph below the posted speed limit. Haul vehicle acceleration to within 10 mph of the posted speed limit shall only occur on a paved surface.
- Signs with activated Beacons or LED flashers shall be installed and used when hauling from the median. These signs shall be activated once haul vehicles are detected to warn motorists of vehicles entering the highway from the median. (Reference the *Typical Median Access Areas* Project Special Provision found elsewhere in this RFP)
- Hauling operations that perpendicularly cross a roadway shall require Transportation Management Plans and shall be subject to the lane narrowing / lane closure time restrictions, and holiday and special event time restrictions listed in ICT #9. Hauling operations shall not perpendicularly cross US 70, including all ramps and loops.

Excluding hauling operations that are conducted entirely behind a temporary traffic barrier or guardrail, multi-vehicle hauling shall not be allowed ingress and egress from any open travel lane during the following time restrictions:

#### Multi-Vehicle Hauling

| Facility  | Days                       | Time Restrictions                                    |
|---|----------------------------|--|
| US 70 including all ramps and loops,<br>between May 15 <sup>th</sup> and September 15 <sup>th</sup> | Monday through<br>Thursday | 6:00 a.m. to 9:00 a.m. and<br>4:00 p.m. to 7:00 p.m. |
|   | Friday through Sunday      | Friday at 6:00 a.m. through<br>Sunday at 7:00 p.m.   |
| US 70 including all ramps and loops,<br>between September 16 <sup>th</sup> and May 14 <sup>th</sup> | Monday through Friday      | 6:00 a.m. to 9:00 a.m. and<br>3:00 p.m. to 6:00 p.m. |

The Design-Build Team shall address how hauling will be conducted in the Technical Proposal, including hauling of any materials to and from the site and hauling material within the NCDOT right of way.

**Work Zone Speed Limit Reduction and \$250 Speeding Penalty**

In order to have a lawfully enforceable speed limit, all speed limits shall be ordinance by the State Traffic Engineer. No speed limit messages / signs shall be installed prior to receiving a signed ordinance. NCDOT has sole authority of the speed limits displayed within the work zone.

NCDOT may pursue a Variable Work Zone Speed Limit Reduction Ordinance and \$250 Speeding Penalty Ordinance along the US 70 project limits.

A Work Zone Variable Speed Reduction is intended to temporarily reduce the speed within the work zone based on specific traffic control strategies needed during construction. When a Variable Work Zone Speed Limit Reduction Ordinance is in effect, all existing speed limit signs located within the active work area shall be removed or covered. The speed limit shall only be displayed using Digital Speed Limit Signs. Additionally, supplemental signing will be required to notify motorists of the increased fines throughout the ordinance area. Reference *Digital Speed Limit Signs Project Special Provision* found elsewhere in this RFP.

If the Department pursues Variable Work Zone Speed Limit Reduction Ordinance and \$250 Speeding Penalty Ordinance, the Design-Build Team shall include all relevant details required of the Work Zone Speed Limit Reduction Ordinance and \$250 Speeding Penalty Ordinance in the TMP. The Design-Build Team shall include all devices and signs required to implement the Variable Work Zone Speed Limit Reduction Ordinance and \$250 Speeding Penalty Ordinance in the lump sum bid for the entire project.

**UTILITIES COORDINATION SCOPE OF WORK** (6-23-22)

**\*\* NOTE \*\* Within 45 days of contract execution, the Design-Build Team shall meet with representatives of all the utility companies, US Forestry Service representatives, and the appropriate NCDOT Utility and Design-Build personnel.**

The Design-Build Team shall obtain the services of a Professional Services Firm (PSF) knowledgeable in the NCDOT Utility Coordination Process involved with utility relocation / installation and highway construction. The aforementioned PSF shall be responsible for coordinating all utility relocations, removals and / or adjustments where the Design-Build Team and utility owner, with concurrence from the Department, determine that such work is essential for highway safety and performance of the required highway construction. Coordination shall be for all utilities, whether or not they are specifically identified in this Scope of Work, and shall include any necessary utility agreements when applicable. NCDOT will be the approving authority for all utility agreements and approval of plans.

During the procurement phase and throughout the project duration, the Design-Build Team will only be allowed direct contact with the utility owners when the aforementioned PSF is present. The Design-Build Team shall not contact any utility owner until after the first Question and Answer Sessions with the Design-Build Teams have been conducted. (Reference the *Individual Meetings with Proposers* Project Special Provision found elsewhere in this RFP)

In accordance with the requirements herein, the Design-Build Team shall relocate / coordinate the relocation of all existing facilities that are 1) parallel to a roadway in full control of access, 2) in physical conflict with the construction, 3) within the existing or proposed right of way and structurally inadequate, and / or 4) within the existing or proposed right of way, consist of unacceptable material, and the project will change the grade over the facilities and / or heavy equipment is likely to be operated over the facilities. (Reference the NCDOT *Utilities Accommodation Manual*) Proposed / relocated underground facilities that are located beneath the pavement structure shall only be allowed to cross the roadway as close to perpendicular as possible.

**Project Details**

The Design-Build Team shall be responsible for verifying the utility locations, type of facilities, and identifying the utility owners in order to coordinate the relocation of any utilities, known and unknown, in conflict with the project. The following utilities are known to be located within the project construction limits:

| <b>Utility Owner List</b>  |                     |   |
|--|---------------------|---|
| <b>Utility Owner</b>   | <b>Utility Type</b> | <b>Cost Responsibility</b>                              |
| Century Link   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Charter / Spectrum   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| City of New Bern -<br>Public Works   | Water / Sewer       | Design-Build Team                                       |
| City of New Bern - Electric  | Power               | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| City of New Bern - Fiber   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Craven County - Fiber  | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Craven County - Water<br>Department  | Water               | Design-Build Team                                       |
| MCNC   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Piedmont Natural Gas (PNG)   | Gas                 | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Segra (formally Spirit)  | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Sprint   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| Suddenlink   | Telecommunications  | Utility Company or NCDOT<br>(w / approved Prior Rights) |
| <b>Reference the NCDOT Utilities Accommodation Manual for additional cost<br/>responsibility information</b> |                     |   |

### **Water and Sewer**

After the Department accepts the Preliminary Roadway Plans developed by the Design-Build Team, a pre-design meeting shall take place between the utility owners and / or their representatives, the Design-Build Team, and appropriate NCDOT Utilities Unit and Design-Build Unit representatives. The Department will only review and accept water and sewer design submittals after the aforementioned pre-design meeting has been held and the 100% Hydraulic Design provided by the Design-Build Team has been accepted by the Department.

The Design-Build Team shall develop water and sewer designs; prepare all water and sewer plans required for agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.



The Design-Build Team shall provide water and sewer designs for all water and sewer facilities impacted by the project, including but not limited to all haul roads and temporary conditions resulting from the Design-Build Team's methods of operation and / or sequence of work. **All** water and sewer designs, including all temporary relocations and / or protection of existing water and sewer facilities, shall be coordinated with the NCDOT Utilities Unit and the utility owners or their representatives.

The Design-Build Team shall not impact the Craven County potable water supply well sites. If the Design-Build Team's design and / or construction methods damage any of the aforementioned well sites and / or require their relocation, all costs associated with the required repairs and / or relocation shall be borne by the Design-Build Team.

The relocation and / or protection of all water and sewer facilities shall be done in accordance with the NCDOT policies and standards, as well as the latest water and sewer design requirements / specifications for each individual utility company that are current on the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later. In the event of conflicting design parameters in the requirements noted above, the proposed design shall adhere to the most conservative values. The materials and appurtenances proposed by the Design-Build Team shall require approval by both NCDOT and the appropriate utility owner prior to installation.

The Design-Build Team shall design and construct water / sewer facility extensions to all parcels with access to existing water and / or sewer facilities, including parcels subdivided by the project. The aforementioned water facility extensions shall be installed completely within the right of way. The aforementioned sewer facility extensions shall be installed completely within the right of way or a recorded easement.

Excluding water and / or sewer extensions due to encroachment into wells and / or septic systems, all costs associated with the design and construction for relocation, extension, and / or protection of water and / or sewer facilities shall be the responsibility of the Design-Build Team and shall be included in the lump sum bid for the entire project. Protection of water and sewer facilities shall include, but not be limited to encasement, lining and bridging. (Reference the General Section below for requirements associated with encroachment into wells and / or septic systems)

The Design-Build Team shall concurrently submit all water and sewer design submittals to the NCDOT State Utilities Manager, via the Design-Build Unit, and the appropriate utility owner for review and acceptance. All water and sewer design submittals shall include a title sheet, plan sheets, profile sheets and special provisions, if required. All water and sewer design submittals shall include all the aforementioned information in a full-size .pdf. Excluding the Release for Construction Water and / or Sewer Plans, the Design-Build Team shall allow the utility owners 30 days to review each water and / or sewer design submittal. At a minimum, the water and / or sewer design submittals shall consist of the following:

- (A) Preliminary Water and / or Sewer Plans shall be submitted after the Department accepts the 100% Hydraulic Plans.
- (B) Final Water and / or Sewer Plans shall be submitted after the Department accepts the Right of Way / 60% Roadway Plans.

- (C) Release for Construction Water and / or Sewer Plans shall be submitted after the Department accepts the Final Water and / or Sewer Plans.

The Design-Build Team shall provide a set of Agreement Plans that will be used in a Utility Agreement (UCA or U&O) to be prepared by NCDOT and executed with the utility owners. The Agreement Plans shall include Release for Construction Plans, special provisions, and a construction estimate with unit quantities. The Department will send the appropriate agreement, with the Agreement Plans, to the utility owner for their review and concurrence.

Upon completion of the water and sewer relocations and protective measures, the Design-Build Team shall concurrently provide 1) lump sum construction costs for the relocations and protective measures that are separated by individual utility owner to the Department; and 2) electronic As-Built Plans to the Department and the utility owner. At a minimum, the As-Built Plans shall include all revisions that occurred during construction, as well as all field adjustments. The As-Built Plans shall be in accordance with NCDOT requirements or the utility owner's requirements, whichever is more conservative. The As-Built Plans shall be provided in .pdf format and MicroStation format to the Department and in the CADD format required by the utility owner.

### **Utility Relocation Plans**

Excluding water and sewer conflicts, if the Design-Build Team's design and / or construction creates a utility conflict, the Design-Build Team shall request that the utility owner submit relocation plans (Highway Construction Plans to be provided by the Design-Build Team to utility owners) that show existing utilities and proposed utility relocations for approval by the NCDOT.

In .pdf format, the Design-Build Team shall electronically submit one half-size set and one full size set of the Utility Relocation Plans to the NCDOT State Utilities Manager, via the Design-Build Unit, for review and approval. The Design-Build Team shall include a cover letter with the Utility Relocation Plans verifying that the proposed utility relocations are not in conflict with the Design-Build Team's proposed design or construction activities. The Department shall approve the Utility Relocation Plans prior to any utility relocation work beginning. The Design-Build Team shall also be responsible for submitting the appropriate agreements to be used with the Utility Relocation Plans (See Agreements Section found elsewhere in this Scope of Work). After the review process is complete, the NCDOT Utilities Unit will submit an electronic copy of the authorization letter to the Design-Build Team. The NCDOT Utilities Unit will also submit an electronic copy of the approved Utility Relocation Plans, estimate and agreement to the Department's Resident Engineer. If the Utility Relocation Plans are approved subject to changes, it shall be the Design-Build Team's responsibility to coordinate these changes with the appropriate utility owner.

The Design-Build Team is cautioned that additional coordination with utility owners, the US Forestry Service (USFS) and the Department may be required to ensure that existing / relocated utility poles and lines will not impact the flight path to the existing or proposed helipads at the USFS Ranger District Station located at 141 East Fisher Avenue New Bern, North Carolina 28560. All additional utility coordination required to avoid impacts to the existing and proposed USFS helipads will be considered incidental to the lump sum price bid for the entire project.

### **Prior Rights and Compensable Interest**

The Design-Build Team shall verify / determine the prior rights and compensable interest for all utility relocations. Typically, affidavits, recorded easements or NCDOT agreements can serve as evidence of prior rights. The Design-Build Team shall provide documentation that verifies / determines the prior rights and / or compensable interest. If the verification process is not complete prior to right of way acquisition, the Design-Build Team shall provide documentation of all Utility Easement costs. A compensable interest shall be identified as follows:

- (A) Existing or prior easement rights within the project limits, either by recorded right of way or adverse possession.
- (B) Entities covered under *General Statute 136-27.1* and *136-27.2*. Statute requires the NCDOT to pay the non-betterment cost for certain water, sewer and gas relocations.
- (C) Utilities that have a joint-use agreement that constitutes a compensable interest with entities that have existing or prior easement rights within the project limits.

### **Work Performed by Design-Build Team for Utility Owners**

If the Design-Build Team elects to make arrangements with a utility owner for proposed utility construction not required herein, in which the utility owner shall be responsible for the costs of work to be performed by the Design-Build Team, the Design-Build Team shall be responsible for negotiating all costs associated with the proposed construction. Once the Design-Build Team and the utility owner agree on a plan and a lump sum cost for the utility construction, the Design-Build Team shall electronically submit one half-size set and one full size set of the utility construction drawings, in .pdf format, to the NCDOT State Utilities Manager, via the Design-Build Unit, for further handling. Each set shall include a title sheet, plan sheets, profiles, and special provisions, if required. This submittal shall also include 1) a letter from the utility owner agreeing to the plans and lump sum cost, and 2) a letter from the Design-Build Team verifying the proposed utility construction is not in conflict with the Design-Build Team's proposed design or construction activities. The NCDOT will reimburse the Design-Build Team the lump sum cost under a Supplemental Agreement. The necessary Utility Construction Agreement (UCA) to the utility owner for reimbursement shall be a two-party agreement between the NCDOT and the utility owner; and will be developed and executed by the Department.

If the Design-Build Team is requested, in writing, by a utility owner to relocate facilities not impacted by the project's construction, upgrade existing facilities and / or incorporate new facilities as part of the highway construction, designs shall be coordinated with the utility owner and NCDOT Utilities Unit. The associated design and construction costs shall be negotiated and agreed upon between the Design-Build Team and the utility owner. The Design-Build Team shall develop designs; prepare all plans for needed agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.

**Cable TV**

The cost in relocating CATV due to highway construction shall be the responsibility of the CATV Company; however, 1) if the CATV Company can validate a recorded easement for facilities outside the maintained NCDOT right of way, the Department will bear the relocation expense; and 2) if the adjustment is needed on existing utility poles to accommodate a proposed NCDOT Traffic Management System Fiber Optic Communication Cable Project, the Design-Build Team shall be responsible for the relocation cost.

The NCDOT will not permit CATV to place poles within the highway right of way but will allow down guys for their facilities within the highway right of way. Under most circumstances, the CATV Company will continue a joint-use attachment with the local power and telephone company. If the CATV proposed relocation places buried facilities within the highway right of way, then plans and encroachment agreements shall be required by the NCDOT.

**Communication Cables / Electrical Services for ITS**

Prior to establishing the location for new meter poles, the Design-Build Team shall coordinate with the local power distribution company concerning accessibility of E/C service and safety in maintenance of the meter.

Prior to installation, the Design-Build Team shall provide plans for review and approval for all service taps that require a parallel installation within the control of access (C/A).

Parallel service installation within a C/A shall be buried and located as close to the right of way line as practical. Only due to unusual circumstances will parallel aerial service installations within the C/A be allowed. The Design-Build Team shall justify the allowance of parallel aerial service installation and obtain NCDOT written approval prior to installation.

The Design-Build Team shall be responsible for all coordination activities, including deposit fees, required for the utility company to provide service taps. Prior to the Design-Build Team developing the associated design and / or instructing the utility company to proceed with providing the service taps, the Design-Build Team shall obtain written approval of the service tap locations from the NCDOT Resident Engineer.

The Design-Build Team shall be responsible for all costs associated with providing communication cables / electrical service from the service tap to the ITS devices.

**Adjusting Existing Utilities due to Proposed Traffic Management Systems Fiber Optic Communications Cables**

The Design-Build Team shall be responsible for all costs for coordinating and adjusting any existing utilities that are in conflict with any proposed communication cables to be installed as part of the project.

### **Requirements for Attachments to Existing and / or Proposed Structures**

The Design-Build Team shall avoid attachments to structures where feasible. Attachments shall only be considered when other alternatives are cost prohibitive and / or are not feasible due to environmental or geographical features, in the Department's sole discretion. All utility related attachments must be evaluated and approved by the NCDOT State Utilities Manager, including any existing attachments to any structure(s) that require modification or replacement. Attachments shall be prohibited under the following conditions:

- (A) No attachments shall be allowed to a bridge located parallel within the C/A carrying the freeway over streams, other roadways or railroads. (No parallel utility installations within the C/A)
- (B) No attachments shall be allowed to cored-slab bridges.
- (C) No attachments shall be allowed to curved bridges.

Attachments to structures, if approved by the NCDOT State Utilities Manager, shall meet the following criteria:

- (A) No attachments shall be allowed below the bottom of the beams and / or girders.
- (B) Drilling of, or attachments to, beams and / or girders shall not be allowed. Attachments shall only be allowed to the bottom of the bridge deck.
- (C) For water and sewer force mains, only restrained joint ductile iron pipe shall be allowed.
- (D) A minimum of 18 inches of clearance to beams and / or girders shall be maintained, if possible.

Documentation of adverse conditions or cost estimates of all feasible alternatives shall be submitted to the NCDOT State Utilities Manager, via the Design-Build Unit, when seeking approval of a structure attachment. Cost estimates shall consider all costs involved with each alternative and impacts to the utility and the highway project as a whole.

### **General**

The Design-Build Team shall not commence work at points where the highway construction operations are adjacent to utility facilities, until making arrangements with the utility owner to protect against damage that might result in expense, loss, disruption of service or other undue inconvenience to the public or utility owner. The Design-Build Team shall be responsible for damage to the existing or relocated utilities resulting from the Design-Build Team's operations. In the event of interruption of any utilities by the project construction, the Design-Build Team shall promptly notify the utility owner and cooperate with the utility owner in the prompt restoration of service.

The Design-Build Team shall accommodate utility adjustments, reconstruction, new installation and routine maintenance work that may be underway or take place during the progress of the contract.

If total property acquisition is unavoidable due to encroachment into wells and / or septic systems, the Design-Build Team shall investigate and determine if extending water and / or sewer lines to the affected property is cost effective. If the Department concurs with the determination that a utility extension is cost effective, the costs associated with the utility design and construction shall be paid for as extra work in accordance with Article 104-7 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be required to use the guidelines as set forth in the following:

- (A) NCDOT *Utilities Accommodation Manual* posted on the following website:

**<https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx>**

- (B) *Federal Aid Policy Guide* - Subchapter G, Part 645, Subparts A & B

- (C) *Federal Highway Administration's Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects*

- (D) NCDOT *Construction Manual* - Section 105-8

- (E) NCDOT *Right of Way Manual* - Chapter 16 Utility Relocations

- (F) *NCDEQ Public Water Supply* - Rules governing public water supply

- (G) *NCDEQ Division of Water Resources* - Title 15A - Environment and Natural Resources

## **Agreements**

If a utility company can provide evidence of prior rights of way or a compensable interest in their facilities, the Design-Build Team shall coordinate the non-betterment utility relocation costs with the utility company and develop the Utility Relocation Agreement (URA).

The NCDOT State Utilities Manager must execute approved agreements on Design-Build projects. The URAs and Encroachment Agreements are available from the NCDOT Utilities Unit. Reference the *NCDOT Utilities Accommodation Manual* for the different types of Encroachment Agreements available for use.

In accordance with the NCDOT *Project Delivery Network*, the Design-Build Team shall develop a preliminary Utility Risk Analysis and Inventory (URAI) to identify potential utility conflicts, determine preliminary alignments and schedules for the relocation of each utility, and identify any anticipated Permanent Utility Easements (PUE) and Aerial Utility Easements (AUE). The

aforementioned URAI shall be submitted to the NCDOT Utility Unit, via the Design-Build Unit, for review a minimum of ten days before the Right of Way Plans submittal.

The Design-Build Team shall submit all utility agreements, and all supporting documents to the NCDOT State Utilities Manager, via the Design-Build Unit, in electronic format. Prior to submittal, all agreements shall be signed electronically by an authorized representative of the utility owner. These electronic agreement packets will be reviewed, approved and signed electronically by the NCDOT State Utilities Manager, or designated representative, before being distributed to the field.

The Design-Build Team shall utilize the NCDOT Standard Utility Encroachment Agreements, as necessary, in relocating utilities. The Encroachment Agreements shall be used under the following conditions:

- (A) If a utility company is not occupying a valid right of way / compensable interest and the proposed relocation will place the relocated utilities within the existing or proposed highway right of way.
- (B) For **all** new utility installations, not covered under a Utility Construction Agreement and within the existing or proposed highway right of way. This includes all water, sewer and gas lines owned by entities covered under General Statute 136-27.1 and 136-27.2.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****RAILROAD GRADE CROSSING**

(7-1-95) (Rev. 9-9-20)

107-9

DB1 G17R

When the use of slow moving or stopped equipment is required over at-grade railroad crossings, the Design-Build Team shall contact the appropriate track owner to gain Right of Entry. The Design-Build Team shall be responsible for ascertaining and contacting the railroad track owner.

All questions regarding the Right of Entry shall be addressed to Ms. Meredith McLamb, NCDOT Surfaces and Encroachment Manager with the NCDOT Rail Division, at (919) 707-4132.

**RESTRICTIONS ON ITS EQUIPMENT AND SERVICES**

(10-2-20)

DB01 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.**

**EQUIPMENT IDLING GUIDELINES**

(12-29-20)

107

DB1 R096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Except as allowed otherwise elsewhere in this project special provision, employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) consecutive minutes and off-highway equipment (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 / equipment is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle / equipment 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 / equipment.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning, except as allowed below, such as hydraulic systems for pavers.
9. When specific traffic, safety, or emergency situations arise.
10. Limited idling, no longer than 30 minutes, to provide for the safety of occupants (e.g. to run the heater) when the ambient temperature is less than 32 degrees Fahrenheit.



11. Limited idling, no longer than 30 minutes, to provide for the safety of occupants (e.g. to run the air conditioning) when the ambient temperature is greater than 90 degrees Fahrenheit.
12. Diesel powered vehicles / equipment may idle for up to 30 minutes to minimize restart problems.

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

### **PLANT AND PEST QUARANTINES**

#### **(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guave Root Knot Nematode and Other Noxious Weeds)**

(8-31-13)(Rev. 4-1-19)

DB1 G130

#### **Within Quarantined Area**

This project may be within a county regulated for plant and / or pests. If the project or any part of the Design-Build Team'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/plantindustry/Plant/quaran/table2.htm> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

#### **Regulated Articles Include**

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut / waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod
3. Plant crowns and roots
4. Bulbs, corms, rhizomes, and tubers of ornamental plants
5. Hay, straw, fodder, and plant litter of any kind
6. Clearing and grubbing debris

7. Used agricultural cultivating and harvesting equipment
8. Used earth-moving equipment
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guave root knot nematode or other noxious weeds.

### **ROCK AND BROKEN PAVEMENT FILLS**

(12-29-15) (Rev. 8-31-17)

235

DB2 R85

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 2-23, Article 235-2 MATERIALS, add the following after Line 15:**

| <b>Item</b>   | <b>Section</b> |
|---|----------------|
| Geotextile for Rock and Broken Pavement Fills, Type 2 | 1056           |

Provide Type 2 geotextile for filtration geotextiles. Use rip rap and No. 57 stone from either a quarry or onsite material to fill voids in rock and broken pavement fills. Provide small and large size rip rap with stone sizes that meet Class A and B in accordance with Table 1042-1 and No. 57 stone with a gradation that meets Table 1005-1 or use similar size onsite material approved by the Engineer.

**Page 2-24, Subarticle 235-3(B) Embankment Formation, Lines 18 - 19,** delete the third sentence in the seventh paragraph.

**Page 2-24, Subarticle 235-3(B) Embankment Formation, Lines 21 - 23,** replace the eighth paragraph with the following:

Before placing embankment fill material or filtration geotextiles over rock and broken pavement, fill voids in the top of rock and broken pavement fill with rip rap and No. 57 stone. Place and compact larger rip rap first followed by smaller rip rap. Then, fill any remaining voids with No. 57 stone so geotextiles are not torn, ripped or otherwise damaged when installed and covered. Compact rip rap and No. 57 stone with tracked equipment or other approved methods. Install filtration geotextiles on top of rock, broken pavement, rip rap and No. 57 stone in accordance with Article 270-3 before placing remaining embankment fill material.

Remove any rocks, debris or pavement pieces from the roadbed larger than two inches within 12" of the subgrade or finished grade, whichever is lower.

**CORRUGATED ALUMINUM ALLOY CULVERT PIPE**

(9-21-21)

305, 310

DB3 R34

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 3-5, Article 305-2, MATERIALS**, add the following after **Line 16**:

| <b>Item</b>      | <b>Section</b> |
|------------------|----------------|
| Waterborne Paint | 1080-9         |
| Hot Bitumen      | 1081-3         |

**Page 3-5, Article 305-3, CONSTRUCTION METHODS**, add the following after **Line 24**:

Coating must be applied to the aluminum when in contact with concrete. Immediately prior to coating, aluminum surfaces to be coated shall be cleaned by a method that will remove all dirt, oil, grease, chips, and other foreign substances. Aluminum to be coated shall be given one coat of suitable quality coating such as:

Approved waterborne paint (Section 1080-9)  
Approved Hot Bitumen (Section 1081-3)

Other coating materials may be submitted to the Engineer for approval.

**CULVERT PIPE**

(7-1-19) (Rev. 4-26-22)

305, 310

DB3 R35

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 3-5, Article 305-1 DESCRIPTION, Lines 12 - 14**, replace with the following:

Where shown in the plans developed by the Design-Build Team, the Design-Build Team may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, HDPE pipe, polypropylene pipe, or PVC pipe in accordance with the following requirements.

**Page 3-5, Article 305-2 MATERIALS**, add the following after **Line 16**:

| <b>Item</b>                      | <b>Section</b> |
|----------------------------------|----------------|
| Polypropylene Pipe               | 1032-9         |
| Galvanized Corrugated Steel Pipe | 1032-3         |

**Page 3-6, Article 310-2 MATERIALS**, add the following after **Line 9**:

| <b>Item</b>                      | <b>Section</b> |
|----------------------------------|----------------|
| Polypropylene Pipe               | 1032-9         |
| Galvanized Corrugated Steel Pipe | 1032-3         |

**Page 3-6, Article 310-4 SIDE DRAIN PIPE, Lines 24 - 25**, replace the first sentence of the second paragraph with the following:

Where shown in the plans developed by the Design-Build Team, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

**Page 3-7, Article 310-5 PIPE END SECTIONS, Lines 2 - 4**, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

**Page 10-60, add Article 1032-9:**

**(A) General**

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA / QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

**(B) End Treatments, Pipe Tees and Elbows**

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

**(C) Marking**

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QA / QC Program:

- (1) AASHTO or ASTM designation
- (2) The date of manufacture
- (3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker shall be applied to the inside of the pipe. Do not use pipe sections, flared end sections, tees or elbows that do not have this seal of approval.

**BRIDGE APPROACH FILLS**

(10-19-10) (Rev. 11-22-17)

422

DB4 R02A

**Description**

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground 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. Construct bridge approach fills in accordance with the contract, accepted submittals and Roadway Standard Drawing No. 422.01, Roadway Standard Drawing No. 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

*Approach Fills* - Bridge approach fills in accordance with Roadway Standard Drawing No. 422.01, Roadway Standard Drawing No. 422.02 or Roadway Detail Drawing No. 422D10

*Standard Approach Fill* - Type I Standard Bridge Approach Fill in accordance with Roadway Standard Drawing No. 422.01

*Modified Approach Fill* - Type II Modified Bridge Approach Fill in accordance with Roadway Standard Drawing No. 422.02

*Reinforced Approach Fill* - Type III Reinforced Bridge Approach Fill in accordance with Roadway Detail Drawing No. 422D10

**Materials**

Refer to Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b>                   | <b>Section</b> |
|-------------------------------|----------------|
| Geotextiles, Type 1           | 1056           |
| Portland Cement Concrete      | 1000           |
| Select Materials              | 1016           |
| Subsurface Drainage Materials | 1044           |

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, reference the *Mechanically Stabilized Earth Retaining Walls* provision found on the website below:

<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>

Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

### **Construction Methods**

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

For reinforced approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within three 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 reinforced 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, pull geosynthetic reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with Roadway Standard Drawing No. 422.01 or Roadway Standard Drawing No. 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the 2018 *Standard Specifications for Roads and Structures* and place outlet pads in accordance with Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in eight-inch to ten-inch thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the 2018 *Standard Specifications for Roads and Structures* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at

least eight inches of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in Roadway Standard Drawing No. 422.01 or Roadway Detail Drawing No. 422D10.

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

### **ALTERNATE BRIDGE APPROACH FILLS FOR INTEGRAL ABUTMENTS**

(11-21-17)

422

DB4 R02B

#### **Description**

At the Design-Build Team's option, use Type A Alternate Bridge Approach Fills instead of Type I or II Bridge Approach Fills to support bridge approach slabs for integral bridge abutments. An alternate bridge approach fill shall consist 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 shall be designed for a crane surcharge, shall remain in place and shall be aligned so the wall face functions as a form for the end bent cap backwall and wing walls. Install drains, welded wire facing and geotextiles and backfill approach fills and temporary walls with select material as required. Define "geotextiles" as separation or reinforcement geotextiles, "temporary wall" as a temporary geotextile wall and "alternate approach fill" as a Type A Alternate Bridge Approach Fill in accordance with Roadway Standard Drawing No. 422.03.

#### **Materials**

Refer to Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b>                   | <b>Section</b> |
|-------------------------------|----------------|
| Geotextiles                   | 1056           |
| Portland Cement Concrete      | 1000           |
| Select Materials              | 1016           |
| Subsurface Drainage Materials | 1044           |
| Welded Wire Reinforcement     | 1070-3         |

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with

perforations that meet AASHTO M 278.

### **Construction Methods**

Excavate as necessary for alternate approach fills and temporary walls in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geotextiles until approach fill dimensions and foundation material are approved.

Install geotextiles as shown in Roadway Standard Drawing No. 422.03. Attach separation geotextiles to end bent cap backwalls and wing walls as needed with adhesives, tapes or other approved methods. Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geotextiles.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with Roadway Standard Drawing No. 422.03. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the 2018 *Standard Specifications for Roads and Structures* and place outlet pads in accordance with Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

At the Design-Build Team's option, construct bottom portion of integral end bents before temporary walls as shown in Roadway Standard Drawing No. 422.03. Erect and set welded wire facing so facing functions as a form for the end bent cap backwall. Place welded wire facing adjacent to each other in the horizontal and vertical directions to completely cover the temporary 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 temporary wall face in accordance with Roadway Standard Drawing No. 422.03 and cover geotextiles with at least three inches of select material. Place layers of reinforcement geotextiles within three inches of locations shown in Roadway Standard Drawing No. 422.03. Before placing select material, pull reinforcement geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install reinforcement geotextiles with the direction shown in Roadway Standard Drawing No. 422.03. Do not splice or overlap reinforcement geotextiles so seams are parallel to the temporary wall face.

Place select material in eight-inch to ten-inch thick lifts and compact select material with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geotextiles or drains when placing and compacting select material. End dumping directly on geotextiles is not permitted. Do not operate heavy equipment on geotextiles or drain pipes until they are covered with at least eight inches of select material. Replace any damaged geotextiles or drains to the



satisfaction of the Engineer. When alternate approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material as shown in Roadway Standard Drawing No. 422.03.

Temporary walls shall be designed for a surcharge pressure in accordance with Roadway Standard Drawing No. 422.03. If the crane surcharge will exceed the wall design, contact the Engineer before positioning the crane over reinforcement geotextiles.

## **PILES**

(8-30-21)

450

DB4 R05

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 4-66, Article 450-3(C) Pile Accessories, Line 14**, insert the following as the second, third and fourth sentence of the first paragraph:

Steel pile points for steel pipe piles include pipe pile cutting shoes and conical points. Use "inside fit" pipe pile cutting shoes, e.g., cutting shoes with an outside diameter equal to the pipe pile diameter. Use pipe pile plates with a diameter equal to the pipe pile diameter.

**Page 4-66, Article 450-3(D) Driven Piles, Lines 37 - 39**, replace the fourth paragraph with the following:

Redrive piles raised or moved laterally due to driving adjacent piles. For initial drive of prestressed concrete piles below a depth of ten feet or 20 percent of pile length, whichever is greater, drive each pile continuously except to pause driving for one hour or less to change pile cushions and remove templates. Design and construct templates so prestressed concrete piles can be driven to pile cut-off without exceeding the one-hour time limit. When a prestressed concrete pile attains the required resistance and pile embedment or penetration, do not drive the pile any further to avoid cutting off the pile. If a prestressed concrete pile does not have the minimum required driving resistance when the pile head is one foot above pile cut-off, stop driving the pile.

**Page 4-68, Article 450-3(D)(3) Required Driving Resistance, Lines 10 - 11**, replace the second paragraph with the following:

Stop driving piles if "refusal" is reached. Refusal occurs at 240 blows per foot (20 blows per inch) or any equivalent set (maximum set of 1/2 inch in ten blows) with the required stroke as per the pile driving criteria.

**Page 4-69, Article 450-3(F) Pile Driving Analyzer, Lines 16 - 18**, replace the second sentence of the second paragraph with the following:

Provide piles for PDA testing with lengths shown in the plans developed by the Design-Build Team.

**AUTOMATED FINE GRADING**

(9-1-11) (Rev. 9-13-17)

DB5 R05

On mainline portions and ramps / loops of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the 2018 *Standard Specifications for Roads and Structures* except use an automatically controlled fine grading machine utilizing string lines, laser controls, or other approved methods to produce final subgrade and base surfaces meeting the lines, grades, and cross sections required by the plans developed by the Design-Build Team or established by the Engineer.

**STABILIZATION OF COASTAL PLAIN SANDS**

(10-02-14) (Rev. 9-13-17)

510

DB05 R12

**Description**

As directed by the Engineer, stabilize sandy subgrade material with Class IV aggregate to prevent rutting of the subgrade prior to paving directly on the subgrade. Remove material as needed in cut areas prior to placing the Class IV aggregate.

**Materials**

Refer to Division 10 of the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b>               | <b>Section</b> |
|---------------------------|----------------|
| Select Material, Class IV | 1016           |

Use Class IV Select Material for Class IV Aggregate Stabilization.

**Construction Methods**

As directed by the Engineer, place aggregate by end dumping aggregate on approved subgrade soils to provide a working platform and reduce wheel rutting of subgrade material. Place the Class IV aggregate stabilization to a thickness of two to three inches.

**Maintenance**

Maintain aggregate stabilization in an acceptable condition and minimize the use of heavy equipment on aggregate in order to avoid damaging the subgrade. Provide and maintain drainage ditches and drains as required to prevent entrapping water in aggregate stabilization.

**AGGREGATE SUBGRADE**

(3-9-18)

DB05 R017A

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 5-8, Article 505-1 DESCRIPTION, Lines 4 - 6,** replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil

stabilization and place Class IV subgrade stabilization at locations shown in the plans developed by the Design-Build Team and as directed.

Undercut natural soil materials, if necessary, to construct aggregate subgrades. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each shall be as shown below.

**Type 1** - A six-inch to 24-inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

**Type 2** - A 12-inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

**Page 5-8, Article 505-3 CONSTRUCTION METHODS, Line 12**, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

**Page 5-8, Article 505-3 CONSTRUCTION METHODS, Lines 16 - 17**, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

### **FINAL SURFACE TESTING**

(4-26-16) (Rev. 9-13-17)

DB6 R45

On all mainline travel lanes, including but not limited to all auxiliary lanes, and all -Y- Line travel lanes with 1) two or more layers of asphalt, 2) one mile or greater in length, and 3) a posted speed limit of 45 mph or greater, perform smoothness acceptance testing of the longitudinal profile of the finished pavement surface using an Inertial Profiler in accordance with Sections 610 and 710 of the 2018 *Standard Specifications for Roads and Structures*. The North Carolina Hearne Straightedge will not be permitted.

### **MILLING ASPHALT PAVEMENT**

(12-17-18)

607

DB6 R59

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 6-5, Article 607-2, EQUIPMENT, Lines 14 - 16**, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

**ASPHALT CONCRETE PLANT MIX PAVEMENTS**

(12-12-18)

610, 1012

DB6 R65

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS**, replace with the following:

| <b>Mix Property</b>  | <b>Limits of Precision</b> |
|--|----------------------------|
| 25.0 mm sieve (Base Mix)   | ± 10.0%                    |
| 19.0 mm sieve (Base Mix)   | ± 10.0%                    |
| 12.5 mm sieve (Intermediate & Type P-57)                         | ± 6.0%                     |
| 9.5 mm sieve (Surface Mix)                                       | ± 5.0%                     |
| 4.75 mm sieve (Surface Mix)                                      | ± 5.0%                     |
| 2.36 mm sieve (All Mixes, except S4.75A)                         | ± 5.0%                     |
| 1.18 mm sieve (S4.75A)   | ± 5.0%                     |
| 0.075 mm sieve (All Mixes)                                       | ± 2.0%                     |
| Asphalt Binder Content   | ± 0.5%                     |
| Maximum Specific Gravity ( $G_{mm}$ )                            | ± 0.020                    |
| Bulk Specific Gravity ( $G_{mb}$ )                               | ± 0.030                    |
| TSR  | ± 15.0%                    |
| QA retest of prepared QC Gyratory Compacted Volumetric Specimens | ± 0.015                    |
| Retest of QC Core Sample   | ± 1.2% (% Compaction)      |
| Comparison QA Core Sample  | ± 2.0% (% Compaction)      |
| QA Verification Core Sample                                      | ± 2.0% (% Compaction)      |
| Density Gauge Comparison of QC Test                              | ± 2.0% (% Compaction)      |
| QA Density Gauge Verification Test                               | ± 2.0% (% Compaction)      |

**Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT**, replace with the following:

| <b>Binder Grade</b> | <b>JMF Temperature</b> |
|---------------------|------------------------|
| PG 58-28; PG 64-22  | 250 - 290° F           |
| PG 76-22            | 300 - 325° F           |

**Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), Lines 38 - 39**, delete the fourth paragraph.

**Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), Line 12**, replace “SF9.5A” with “S9.5B”.

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

| <b>TABLE 610-3<br/>MIX DESIGN CRITERIA</b> |  |                              |                   |                  |                     |                        |           |           |                         |
|--|--|------------------------------|-------------------|------------------|---------------------|------------------------|-----------|-----------|-------------------------|
| Mix Type                                   | Design ESALs millions <sup>A</sup>                           | Binder PG Grade <sup>B</sup> | Compaction Levels |                  | Max. Rut Depth (mm) | Volumetric Properties  |           |           |                         |
|  |  |                              | Gmm @             |                  |                     | VMA                    | VTM       | VFA       | %Gmm @ N <sub>ini</sub> |
|  |  |                              | N <sub>ini</sub>  | N <sub>des</sub> |                     | % Min.                 | %         | Min.-Max. |                         |
| S4.75A                                     | < 1  | 64 - 22                      | 6                 | 50               | 11.5                | 16.0                   | 4.0 - 6.0 | 65 - 80   | ≤ 91.5                  |
| S9.5B                                      | 0 - 3  | 64 - 22                      | 6                 | 50               | 9.5                 | 16.0                   | 3.0 - 5.0 | 70 - 80   | ≤ 91.5                  |
| S9.5C                                      | 3 - 30   | 64 - 22                      | 7                 | 65               | 6.5                 | 15.5                   | 3.0 - 5.0 | 65 - 78   | ≤ 90.5                  |
| S9.5D                                      | > 30   | 76 - 22                      | 8                 | 100              | 4.5                 | 15.5                   | 3.0 - 5.0 | 65 - 78   | ≤ 90.0                  |
| I19.0C                                     | ALL  | 64 - 22                      | 7                 | 65               | -                   | 13.5                   | 3.0 - 5.0 | 65 - 78   | ≤ 90.5                  |
| B25.0C                                     | ALL  | 64 - 22                      | 7                 | 65               | -                   | 12.5                   | 3.0 - 5.0 | 65 - 78   | ≤ 90.5                  |
| <b>Design Parameter</b>                    |  |                              |                   |                  |                     | <b>Design Criteria</b> |           |           |                         |
| All Mix Types                              | Dust to Binder Ratio (P <sub>0.075</sub> / P <sub>be</sub> ) |                              |                   |                  |                     | 0.6 - 1.4 <sup>C</sup> |           |           |                         |
|  | Tensile Strength Ratio (TSR) <sup>D</sup>                    |                              |                   |                  |                     | 85% Min. <sup>E</sup>  |           |           |                         |

A. Based on 20-year design traffic.  
 B. Volumetric Properties based on specimens compacted to N<sub>des</sub> as modified by the Department.  
 C. Dust to Binder Ratio (P<sub>0.075</sub> / P<sub>be</sub>) for Type S4.75A is 1.0 - 2.0.  
 D. NCDOT-T-283 (No Freeze-Thaw cycle required).  
 E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

| <b>TABLE 610-5<br/>BINDER GRADE REQUIREMENTS (BASED ON RBR%)</b> |                       |                       |            |
|--|-----------------------|-----------------------|------------|
| Mix Type   | %RBR ≤ 20%            | 21% ≤ %RBR ≤ 30%      | %RBR > 30% |
| S4.75A,<br>S9.5B, S9.5C,<br>I19.0C, B25.0C                       | PG 64-22              | PG 64-22 <sup>A</sup> | PG 58-28   |
| S9.5D, OGFC  | PG 76-22 <sup>B</sup> | n/a                   | n/a        |

- A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.  
 B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

**Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT**, replace with the following:

| <b>Asphalt Concrete Mix Type</b> | <b>Minimum Surface and Air Temperature</b> |
|----------------------------------|--|
| B25.0C                           | 35° F                                      |
| I19.0C                           | 35° F                                      |
| S4.75A, S9.5B, S9.5C             | 40° F <sup>A</sup>                         |
| S9.5D                            | 50° F                                      |

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

**Page 6-21, Article 610-8, SPREADING AND FINISHING, Lines 34 - 35**, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstates, US Routes, and NC Routes (primary routes) that have four or more lanes and are median divided.

**Page 6-21, Article 610-8, SPREADING AND FINISHING, Lines 36 - 38**, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops and -Y- Lines, that have four or more lanes and are median divided; and all full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

**Page 6-23, Table 610-7, DENSITY REQUIREMENTS**, replace with the following:

| <b>Mix Type</b>              | <b>Minimum % G<sub>mm</sub><br/>(Maximum Specific Gravity)</b> |
|------------------------------|--|
| S4.75A                       | 85.0 <sup>A</sup>  |
| S9.5B                        | 90.0   |
| S9.5C, S9.5D, I19.0C, B25.0C | 92.0   |

A. Compaction to the above specified density shall be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

**Page 6-24, Article 610-13, FINAL SURFACE TESTING, Lines 35 - 36,** delete the second sentence and replace with the following:

Final surface testing will not be required on ramps, loops or turn lanes.

**Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, Lines 29 - 30,** delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a ten-foot straightedge in accordance with Article 610-12.

**Page 6-27, Subarticle 610-13(B), Option 2 - North Carolina Hearne Straightedge, Lines 41 - 46,** delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement, exclusive of structures, approach slabs, paved shoulders, tapers, and other irregular shaped areas of pavement, unless otherwise approved by the Engineer. In accordance with this provision, test all mainline travel lanes, full width acceleration lanes, full width deceleration lanes and collector lanes.

**Page 6-28, Subarticle 610-13(B), Option 2 - North Carolina Hearne Straightedge, Lines 1 - 2,** delete these two lines.

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

| <b>TABLE 1012-1<br/>AGGREGATE CONSENSUS PROPERTIES<sup>A</sup></b> |  |  |                                  |   |
|--|--|--|----------------------------------|---|
| <b>Mix Type</b>  | <b>Coarse Aggregate Angularity<sup>B</sup></b> | <b>Fine Aggregate Angularity % Minimum</b> | <b>Sand Equivalent % Minimum</b> | <b>Flat and Elongated 5 : 1 Ratio % Maximum</b> |
| <i>Test Method</i>   | <i>ASTM D5821</i>                              | <i>AASHTO T 304</i>                        | <i>AASHTO T 176</i>              | <i>ASTM D4791</i>                               |
| S4.75A; S9.5B  | 75 / -   | 40   | 40                               | -   |
| S9.5C; I19.0C; B25.0C  | 95 / 90  | 45   | 45                               | 10  |
| S9.5D  | 100 / 100                                      | 45   | 50                               | 10  |
| OGFC   | 100 / 100                                      | 45   | 45                               | 10  |
| UBWC   | 100 / 85                                       | 45   | 45                               | 10  |

A. Requirements apply to the design aggregate blend.

B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has two or more fractured faces.

### **SUBSURFACE DRAINAGE**

(9-1-11) (Rev. 9-14-17)

DB8 R05

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

Page 8-11, Article 815-1, delete the first sentence and replace with the following:

The Design-Build Team shall construct subsurface drains, underdrains, blind drains and other types of drains where groundwater is within six feet of subgrade.

### **GUARDRAIL END UNITS, TYPE TL-3**

(4-20-04) (Rev. 9-14-17)

862

DB8 R65

#### **Description**

Furnish and install guardrail end units in accordance with the details in the plans developed by the Design-Build Team, the applicable requirements of Section 862 of the 2018 *Standard Specifications for Roads and Structures*, and at locations shown in the plans developed by the Design-Build Team.



## Materials

The Design-Build Team shall furnish guardrail end units listed on the NCDOT Approved Products List at <https://apps.dot.state.nc.us/vendor/approvedproducts/> or approved equal.

Prior to installation, the Design-Build Team shall submit to the Engineer:

1. FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the 2018 *Standard Specifications for Roads and Structures*.
2. Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*.

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

## Construction Methods

Guardrail end delineation shall be required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation shall consist of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the 2018 *Standard Specifications for Roads and Structures*.

### **GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS**

(11-22-17)

862

DB8 R70

Guardrail anchor units shall be in accordance with the details in the plans developed by the Design-Build Team and the applicable requirements of Section 862 of the 2018 *Standard Specifications for Roads and Structures*.

### **IMPACT ATTENUATOR UNIT, TYPE TL-3**

(4-20-04) (Rev. 12-12-18)

DB8 R75

## Description

The Design-Build Team shall furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans developed by the Design-Build Team, and at locations shown in the plans developed by the Design-Build Team.

**Materials**

The Design-Build Team shall furnish impact attenuator units listed on the NCDOT Approved Products List at <https://apps.dot.state.nc.us/vendor/approvedproducts/> or approved equal.

Prior to installation, the Design-Build Team shall submit to the Engineer:

1. FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of the Manual for Assessing Safety Hardware (MASH-16), Test Level 3, in accordance with Article 106-2 of the 2018 *Standard Specifications for Roads and Structures*.
2. Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*.

No modifications shall be made to the impact attenuator unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans developed by the Design-Build Team, and details and assembling instructions furnished by the manufacturer.

**Construction Methods**

If the median width is 40 feet or less, the Design-Build Team shall supply NON-GATING Impact Attenuator Units.

If the median width is greater than 40 feet, the Design-Build Team may use GATING or NON-GATING Impact Attenuator Units.

**PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY**

(7-27-20)

1000, 1014, 1024

DB10 R01

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

| TABLE 1000-1<br>REQUIREMENTS FOR CONCRETE |   |                            |                   |                            |                   |  |                        |                |              |              |              |
|---|---|----------------------------|-------------------|----------------------------|-------------------|--|------------------------|----------------|--------------|--------------|--------------|
| Class of Concrete                         | Min. Compressive Strength at 28 days            | Maximum Water-Cement Ratio |                   |                            |                   | Consistency Maximum Slump                          |                        | Cement Content |              |              |              |
|   |   | Air-Entrained Concrete     |                   | Non-Air-Entrained Concrete |                   | Vibrated   | Non-Vibrated           | Vibrated       |              | Non-Vibrated |              |
|   |   | Rounded Aggregate          | Angular Aggregate | Rounded Aggregate          | Angular Aggregate |  |                        | Min.           | Max.         | Min.         | Max.         |
| <i>Units</i>                              | <i>psi</i>                                      |                            |                   |                            |                   | <i>inch</i>  | <i>inch</i>            | <i>lb/cy</i>   | <i>lb/cy</i> | <i>lb/cy</i> | <i>lb/cy</i> |
| AA  | 4500  | 0.381                      | 0.426             | ---                        | ---               | 3.5 <sup>A</sup>                                   | ---                    | 639            | 715          | ---          | ---          |
| AA Slip Form                              | 4500  | 0.381                      | 0.426             | ---                        | ---               | 1.5  | ---                    | 639            | 715          | ---          | ---          |
| Drilled Pier                              | 4500  | ---                        | ---               | 0.450                      | 0.450             | ---  | 5 - 7 dry<br>7 - 9 wet | ---            | ---          | 640          | 800          |
| A   | 3000  | 0.488                      | 0.532             | 0.550                      | 0.594             | 3.5 <sup>A</sup>                                   | 4.0                    | 564            | ---          | 602          | ---          |
| B   | 2500  | 0.488                      | 0.567             | 0.559                      | 0.630             | 1.5 machine placed<br>2.5 <sup>A</sup> hand placed | 4.0                    | 508            | ---          | 545          | ---          |
| Sand Light-weight                         | 4500  | ---                        | 0.420             | ---                        | ---               | 4.0 <sup>A</sup>                                   | ---                    | 715            | ---          | ---          | ---          |
| Latex Modified                            | 3000 (at 7 days)                                | 0.400                      | 0.400             | ---                        | ---               | 6.0  | ---                    | 658            | ---          | ---          | ---          |
| Flowable Fill excavatable                 | 150 max. (at 56 days)                           | as needed                  | as needed         | as needed                  | as needed         | ---  | Flowable               | ---            | ---          | 40           | 100          |
| Flowable Fill non-excavatable             | 125   | as needed                  | as needed         | as needed                  | as needed         | ---  | Flowable               | ---            | ---          | 100          | as needed    |
| Pavement                                  | 4500 Design, field<br>650 flexural, design only | 0.559                      | 0.559             | ---                        | ---               | 1.5 slip form<br>3.0 hand placed                   | ---                    | 526            | ---          | ---          | ---          |
| Precast                                   | See Table 1077-1                                | as needed                  | as needed         | ---                        | ---               | 6.0  | as needed              | as needed      | as needed    | as needed    | as needed    |
| Prestressed                               | per contract                                    | See Table 1078-1           | See Table 1078-1  | ---                        | ---               | 8.0  | ---                    | 564            | as needed    | ---          | ---          |

- A. The slump may be increased to six inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and / or excessive bleeding will be rejected. Utilizing an admixture to modify slump does not relinquish the Design-Build Team’s responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

**THERMOPLASTIC INTERMIXED BEAD TESTING**

7-19-22

1087

DB10 R04

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 10-183, Subarticle 1087-7(B) Thermoplastic Pavement Marking Material Composition, delete Lines 34 and 35.**

**Page 10-184, Article 1087-8 MATERIAL CERTIFICATION, after Line 34, delete and replace with the following:**

|                      |   |
|----------------------|---|
| Drop-on Glass Beads  | Type 3 Material Certification and Type 4 Material Certification |
| Intermix Glass Beads | Type 2 Material Certification and Type 3 Material Certification |
| Paint                | Type 3 Material Certification                                   |
| Removable Tape       | Type 3 Material Certification                                   |
| Thermoplastic        | Type 3 Material Certification and Type 4 Material Certification |
| Cold Applied Plastic | Type 2 Material Certification and Type 3 Material Certification |
| Polyurea             | Type 2 Material Certification and Type 3 Material Certification |

**NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKERS**

(10-19-21) (Rev. 10-19-21)

1086, 1250, 1253

DB10 R08

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Pages 10-177 and 10-178, Article 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:**

**(A) General**

Use non-cast iron snowplowable pavement markers evaluated by NTPEP. The non-cast iron snowplowable pavement markers shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. The marker shall be designed or installed in a manner that minimizes damage from snowplow blades. Plastic lens faces shall use an abrasion resistant coating.

**(B) Housings**

## (1) Dimensions

The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans developed by the Design-Build Team. The minimum area of each reflecting surface shall be 1.44 square inch.

## (2) Materials

Use non-cast iron snowplowable pavement markers that are on the NCDOT Approved Products List.

## (3) Surface

The housing surface shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

## (4) Identification

Mark the housing with the manufacturer's name and marker model number.

**(C) Reflectors**

## (1) General

Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04 inch.

**Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, Lines 19 - 29,** delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers, including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes, as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers, including housings, that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal shall not be an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers.

**Pages 12-16, Article 1253-1 DESCRIPTION, Lines 4 - 5,** delete and replace with the following:

Furnish, install and maintain non-cast iron snowplowable pavement markers in accordance with the contract.

**Pages 12-16 and 12-17, Article 1253-3 CONSTRUCTION METHODS,** delete items (A), (B) and (C) and replace with the following:

**(A) General**

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.

If saw cutting, milling, or grooving operations are used, promptly remove all resulting debris from the pavement surface. Install the marker housings within seven 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 non-cast iron snowplowable pavement markers according to the manufacturer's recommendations.

Protect the non-cast iron snowplowable pavement markers until the epoxy has initially cured and is track free.

**(B) Reflector Replacement**

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the marker manufacturer and approved by the Engineer.

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.

**Pages 12-17, Article 1253-4 MAINTENANCE, Line 5,** delete and replace with the following:

Maintain all installed non-cast iron snowplowable pavement markers until final project acceptance.

**MATERIALS FOR PORTLAND CEMENT CONCRETE**

(8-4-20)

1000, 1024

DB10 R24

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 10-52, Article 1024-4, WATER, Lines 3 - 6,** delete and replace with the following:

Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

**Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER,** replace with the following:

| <b>Property</b>  | <b>Requirement</b>                              | <b>Test Method</b> |
|--|---|--------------------|
| Compression Strength,<br>minimum percent of control at<br>three and seven days | 90%   | ASTM C1602         |
| Time of set, deviation from<br>control   | From 1:00 hour<br>earlier to 1:30 hour<br>later | ASTM C1602         |
| pH   | 4.5 to 8.5                                      | ASTM D1293 *       |
| Chloride Ion Content, Max.   | 250 ppm   | ASTM D512 *        |
| Total Solids Content<br>(Residue), Max.  | 1,000 ppm                                       | SM 2540B *         |
| Resistivity, Min.  | 0.500 kohm-cm                                   | ASTM D1125 *       |

\* Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

**TEMPORARY SHORING**

(2-20-07) (Rev. 9-7-21)

DB11 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 Design-Build Team's option, use any type of temporary shoring, unless noted otherwise in the plans developed by the Design-Build Team or as directed.

Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract, the plans developed by the Design-Build Team and accepted submittals. Construct temporary shoring at locations shown in the plans developed by the Design-Build Team and as directed. Temporary shoring shall be 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 five feet from the edge of pavement of an open travelway. This standard special provision does not apply to pipe, inlet or utility installations unless noted otherwise in the plans developed by the Design-Build Team.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans developed by the Design-Build Team and as directed. Positive protection shall be 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 geotextile or geogrid reinforcement wrapped behind welded wire facing or geostrip reinforcement connected to welded wire facing. Define “temporary geotextile 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 2018 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 2018 Roadway Standard Drawing No. 862.02.

**Materials**

Refer to the 2018 *Standard Specifications for Roads and Structures*.

| <b>Item</b>                    | <b>Section</b> |
|--------------------------------|----------------|
| Concrete Barrier Materials     | 1170-2         |
| Flowable Fill, Excavatable     | 1000-6         |
| 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 2018 *Standard Specifications for Roads and Structures*. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the 2018 *Standard Specifications for Roads and Structures* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least three inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

## (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 shall 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 2018 *Standard Specifications for Roads and Structures*. Splice bars in accordance with Article 1070-9 of the 2018 *Standard Specifications for Roads and Structures*. 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 three 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. 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 5 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 four 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](http://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 (three-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:

| <b>Material Type</b> | <b>Shoring Backfill</b>                       |
|----------------------|---|
| 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 2018 *Standard Specifications for Roads and Structures* 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 shall be shown in the plans developed by the Design-Build Team. At the Design-Build Team’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 shall be required above temporary walls.

(B) Temporary Guardrail

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Design-Build Team’s option or if clear distance for cantilever, braced and anchored shoring is less than four feet, attach guardrail to traffic side of shoring as shown in the plans developed by the Design-Build Team. 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 2018 *Standard Specifications for Roads and Structures*. 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 developed by the Design-Build Team. Assume the following soil parameters for shoring backfill:

- (a) Unit weight ( $\gamma$ ) = 120 pcf;

| (b) | Friction Angle ( $\phi$ ) | 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 shall 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 six inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of three 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 six inches. Design cantilever and braced shoring in accordance with the plans developed by the Design-Build Team and AASHTO *Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans developed by the Design-Build Team 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 five 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 six inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles shall be 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 shall also be 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 developed by the Design-Build Team 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 six feet, whichever is longer. Extend the reinforced zone at least six 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 three-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than four 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 three 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-inch 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 three 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 three feet back behind facing into backfill.

(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, Design-Build Team 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 2018 *Standard Specifications for Roads and Structures* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the 2018 *Standard Specifications for Roads and Structures* and 2018 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 six inches of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within two 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 2018 *Standard Specifications for Roads and Structures* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

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 seven 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 five feet. Remove flowable fill and material in between H-piles, as needed, to install timber lagging. Position lagging with at least three 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 shall be 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 *2018 Standard Specifications for Roads and Structures*. 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.

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 three 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 shall be based in part on the following criteria.

- (i) For ground and helical anchors, total movement is less than 0.04 inch between the one and ten minute readings or less than 0.08 inch between the six 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 developed by the Design-Build Team 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.

Erect welded wire facing so the wall position is as shown in the plans developed by the Design-Build Team 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 developed by the Design-Build Team and accepted submittals. Cover geotextiles with at least three inches 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 three inches of locations shown in the plans developed by the Design-Build Team and accepted submittals. Before placing shoring backfill, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles and creases. Install reinforcement with the direction shown in the plans developed by the Design-Build Team 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 eight-inch to ten-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 2018 *Standard Specifications for Roads and Structures*. Use only hand operated compaction equipment to compact backfill within three feet of welded wire facing. At a distance greater than three feet, compact shoring backfill with at least four passes of an eight-ton to ten-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 geosynthetic reinforcement shall not be permitted. Do

not operate heavy equipment on reinforcement until it is covered with at least eight 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 2018 *Standard Specifications for Roads and Structures*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within five 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.

**MATERIAL AND EQUIPMENT STORAGE & PARKING OF PERSONAL VEHICLES**

(10-19-21)

1101

DB11 R03

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 11-2, Article 1101-8 MATERIAL AND EQUIPMENT STORAGE, Lines 35 - 38,** delete and replace with the following:

Except as allowed otherwise below, when work is not in progress, keep all personnel, equipment, machinery, tools, construction debris, materials and supplies away from active travel lanes in accordance with Table 1101-1.

| <b>Posted Speed Limit (mph)</b> | <b>Distance (ft)</b> |
|---------------------------------|----------------------|
| 40 or less                      | ≥ 18                 |
| 45 - 50                         | ≥ 28                 |
| 55                              | ≥ 32                 |
| 60 or higher                    | ≥ 40                 |

When vehicles, equipment and / or materials are protected by concrete barrier or guardrail, they shall be offset at least five feet from the barrier or guardrail.

**Page 11-2, Article 1101-9 PARKING OF PERSONAL VEHICLES, Lines 40 - 41,** delete and replace with the following:

In accordance with Section 1101-8, or as directed by the Engineer, provide staging areas for personal vehicle parking before use.

**WORK ZONE INSTALLER**

(7-20-21) (Rev. 8-16-22)

1101, 1150

DB11 R04

The Design-Build Team shall provide the service of at least one qualified work zone installer during the setup, installation, and removal of temporary traffic control devices within any highway right of way. The qualified work zone installer shall serve as crew leader and shall be on site and directing the installation and removal of temporary traffic control devices. If multiple temporary traffic control installations and / or removals are occurring simultaneously, then each crew leader shall be a qualified work zone installer.

The work zone installer shall be qualified by an NCDOT approved training agency or other NCDOT approved training provider in the safe and competent set up of temporary traffic control devices. For a complete listing of approved training agencies, reference the Work Zone Safety Training webpage noted below:

<https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx>

In accordance with Article 1101-13 of the 2018 *Standard Specifications for Roads and Structures*, a work zone supervisor may fulfill the role of the work zone installer during the setup, installation and removal of temporary traffic control devices within any highway right of way, provided they are on site and directing the installation and removal of temporary traffic control devices.

At a minimum, all other individuals participating in the setup, installation, and removal of temporary traffic control devices within any highway right of way shall be certified as a qualified flagger in accordance with Article 1150-3 of the 2018 *Standard Specifications for Roads and Structures*, even if flagging is not being performed as part of the traffic control operation.

Prior to or at the preconstruction conference, the Design-Build Team shall provide the name and contact information of all qualified work zone installers to the Engineer. Additionally, the Design-Build Team shall provide a qualification statement that all other individuals participating in the setup, installation and removal of temporary traffic control devices are qualified flaggers that have been properly trained through an NCDOT approved training agency or other NCDOT approved training provider.

Prior to the qualified work zone installer or flagger performing any traffic control duties on the project, all certification records for qualified work zone installers and flaggers shall be uploaded by the NCDOT approved training agency or other NCDOT approved training provider to the Department's Work Zone Education Verification App (WZ-EVA). For more information about WZ-EVA, reference the Work Zone Safety Training webpage noted above.

## **LAW ENFORCEMENT**

(4-26-22)

1190

DB11 R30

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 11-19, Article 1190-1 DESCRIPTION, Lines 4 - 5**, replace the paragraph with the following:

Furnish Law Enforcement Officers and official Law Enforcement vehicles to direct traffic in accordance with the contract.

**Page 11-19, Article 1190-2 CONSTRUCTION METHODS, Lines 7 - 9**, replace the first paragraph with the following:

Use off-duty uniformed Law Enforcement Officers and official Law Enforcement vehicles equipped with blue lights to direct or control traffic as required by the plans developed by the Design-Build Team or by the Engineer.

**EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS**

(3-19-19)(Rev. 4-26-22)

DB12 R005

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Page 12-6, Subarticle 1205-4(A)(1) General, Lines 5 - 8**, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from four inches to 12 inches and multiple thickness settings to achieve the required thickness above the surface of the pavement as shown in Table 1205-3.

**Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC**, replace with the following:

| <b>TABLE 1205-3</b>                                     |   |
|---|---|
| <b>MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC</b> |   |
| <b>Thickness</b>  | <b>Location</b>   |
| 240 mils  | In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in two passes  |
| 90 mils   | Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols |

**BRIDGE APPROACH FILLS - GEOTEXTILE**

(4-26-22)

DB4 R03

Place a single layer of Type 5 Geotextile one foot below the approach slab for the full width and length of the approach fill. Type 5 Geotextile shall meet the requirements of Section 1056 of the 2018 *Standard Specifications for Roads and Structures*. This revision applies to the 2018 Roadway Standard Drawing Nos. 422.01, 422.02, 422.03 and Detail in Lieu of Standard Drawing No. 422DO10.

**POLYUREA PAVEMENT MARKING MEDIA AND THICKNESS**

(8-27-20)

SP

Revise the 2018 NCDOT *Standard Specifications for Roads and Structure* as follows:

**Page 12-8, Subarticle 1205-5(B), Lines 14-16**, replace with the following:

Produce polyurea pavement marking lines that have a minimum dry thickness of 20 mils above the pavement surface when placed on concrete and asphalt pavements. Produce polyurea pavement marking lines that have a minimum dry thickness of 30 mils above the pavement surface on textured surfaces such as OGFC and on surfaces where the polyurea will be placed over a previously removed pavement marking.

Page 12-9, replace Table 1205-4 Minimum Reflectometer Requirement for Polyurea with the following:

| <b>TABLE 1205-4<br/>MINIMUM REFLECTOMETER REQUIREMENTS<br/>FOR POLYUREA</b> |              |                            |
|---|--------------|----------------------------|
| <b>Item</b>   | <b>Color</b> | <b>Reflectivity</b>        |
| Standard Glass Beads  | White        | 375 mcd/lux/m <sup>2</sup> |
|   | Yellow       | 250 mcd/lux/m <sup>2</sup> |

The installer may choose to use an AASHTO Type 4 / Type 1 or AASHTO Type 3 / Type 1 double drop system and these systems will be incidental to the polyurea pavement marking.

### **SNOWPLOWABLE PAVEMENT MARKERS**

(1-16-19)

SP

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Pages 10-177 and 10-178, Article 1086-3 SNOWPLOWABLE PAVEMENT MARKERS**, delete items (A), (B) and (C)(1) and replace with the following:

#### **(A) General**

Use snowplowable pavement markers evaluated by NTPEP. The snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. Shape the housing to deflect a snowplow blade upward in both directions without being damaged. Plastic lens faces shall use an abrasion resistant coating.

Use recycled snowplowable pavement markers that meet all the requirements of new snowplowable pavement markers except Subarticle 1086-3(B)(1). Recycled snowplowable pavement markers with minimal variation in dimensions are acceptable only when the reflector fits in the housing of the recycled snowplowable pavement marker as originally designed.

#### **(B) Housings**

##### 1. Dimensions

The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans developed by the Design-Build Team. The minimum area of each reflecting surface shall be 1.44 square inch.

## 2. Materials

Use snowplowable pavement markers that are on the NCDOT Approved Products List.

## 3. Surface

The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

## 4. Identification

Mark the housing with the manufacturer's name and model number of marker.

### (C) Reflectors

#### 1. General

Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04 inch.

**Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, Lines 19 - 29,** delete and replace with the following:

Remove the existing raised pavement markers and / or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers and / or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers.

**Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS,** delete items (A), (B) and (C) and replace with the following:

#### (A) General

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 snowplowable pavement marker housings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the housing of the snowplowable pavement markers.



Promptly remove all debris resulting from the saw cutting operation from the pavement surface. Install the marker housings within seven calendar days after saw cutting slots in 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. Fill the cleaned slots totally with epoxy adhesive flush with the surface of the existing pavement. Install snowplowable pavement markers according to the manufacturer's recommendations.

Protect the snowplowable pavement markers until the epoxy has initially cured and is track free.

### **(B) 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.

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.

### **(C) Recycled Snowplowable Pavement Marker Housings**

Use properly refurbished snowplowable pavement marker housings as approved by the Engineer such that approved new reflectors can be installed inside the housings.

## **THERMOPLASTIC PAVEMENT MARKING MATERIAL - COLOR TESTING**

(1-16-19)

SP

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, Lines 9 - 11,** delete and replace with the following:

Obtain Color Values Y, x, y per ASTM E1349 using C/2° illuminant / observer.

Results shall be  $Y \geq 45\%$ , and x, y shall fall within PR#1 chart chromaticity limits.

## **TACK FOR MULCH FOR EROSION CONTROL**

(7-19-22)

SP

### **Description**

This work consists of supplying and installing an approved material for binding mulch for erosion control in accordance with Section 1060-5, Section 1615 and Section 1660 of the 2018 *Standard Specifications for Roads and Structures*. This special provision defines acceptable materials and rates for tacking material for holding mulch in place.

## Materials

### (a) Emulsified Asphalt

Asphalt emulsion tack shall conform to the requirements of AASHTO M 140, Specification for Emulsified Asphalt. The emulsified asphalt may be rapid setting, medium setting, or slow setting. Apply emulsified asphalt tackifier at a rate of 0.10 gallons per square yard (approximately 484 gallons per acre).

### (b) Cellulose Hydromulch

Cellulose hydromulch products shall be non-toxic, weed-free, prepackaged cellulose fiber (pulp) material containing no more than 3% ash or other inert materials. Cellulose hydromulches may contain dyes or binders specifically formulated to enhance the adhesive qualities of the hydromulch. Apply cellulose hydromulches at a rate of 1000 pounds (dry weight) per acre.

Wood fiber or wood fiber blend hydromulches may be substituted for cellulose hydromulch at the same application rate.

### (c) Other tackifiers

Other approved materials, specifically designed and manufactured for application as a straw mulch tacking agent, may be used at the manufacturer's recommended rate.

## Construction Methods

Apply the Tack for Mulch for Erosion Control uniformly across straw mulch per Section 1615 and Section 1660 of the 2018 *Standard Specifications for Roads and Structures*.

### **ON-THE-JOB TRAINING**

(2-24-15) (Rev. 7-20-17)

Z-10

### **Description**

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

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

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

### **Minorities and Women**

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

### **Assigning Training Goals**

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from one to 15 per contractor per calendar year. The Contractor shall sign an agreement 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. Preference shall be given to providing training in the following skilled work classifications:

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

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

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

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

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

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

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

### **Records and Reports**

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

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

### **Trainee Interviews**

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

**Trainee Wages**

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

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

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

**Achieving or Failing to Meet Training Goals**

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

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

**Measurement and Payment**

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

**STANDARD SPECIAL PROVISION****AVAILABILITY OF FUNDS - TERMINATION OF CONTRACTS**

(9-1-11)

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 North Carolina Department of Transportation *Standard Specifications for Roads and Structures*, dated January 2018 and as amended by the Standard Special Provision, Division One found elsewhere in this RFP.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****NCDOT GENERAL SEED SPECIFICATIONS FOR SEED QUALITY**

(5-7-11)

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.

Within NFS Lands, specialty seed for use outside the mowing areas may be exempt from the aforementioned North Carolina Department of Agriculture and Consumer Services testing and labeling requirements, at the Engineer's sole discretion. (Reference the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP)

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:

| <b>Restricted Noxious Weed</b> | <b>Limitations per Lb. of Seed</b> | <b>Restricted Noxious Weed</b> | <b>Limitations per Lb. of Seed</b> |
|--------------------------------|------------------------------------|--------------------------------|------------------------------------|
| 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.

Centipede grass  
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**

(10-16-18) (Rev. 7-19-22)

Z-4

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

**Division 6**

**Page 6-7, Article 609-1 DESCRIPTION, Line 29,** replace article number “609-10” with “609-9”.

**Page 6-26, Subarticle 610-13(A)(1) Acceptance for New Construction, Line 31,** replace Table number “610-7” with “610-8”.

**Page 6-29, Subarticle 610-13(B) Option 2 - North Carolina Hearne Straightedge, Line 32,** replace Table number “610-8” with “610-9”.

**Page 6-31, Article 610-14 DENSITY ACCEPTANCE, Specified Density, prior to Line 30, and Line 32,** replace Table number “610-6” with “610-7”.

**Division 10**

**Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2,** replace “Table 6<sup>D</sup>” with “Table 7<sup>D</sup>” and **Permittivity, Type 3<sup>B</sup>,** replace “Table 7<sup>D</sup>” with “Table 8<sup>D</sup>”.

**Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, Line 8,** replace article number “1080-9” with “1080-7”.

**Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, Line 1,** replace article number “1080-50” with “1080-10”.

**Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, Line 5,** replace article number “1080-61” with “1080-11”.

**Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, Line 22,** replace article number “1080-72” with “1080-12”.

**Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, Line 25,** replace article number “1080-83” with “1080-13”.

**Division 17**

**Page 17-15, Subarticle 1715-3(E) Bore and Jack, Line 5,** replace article number “1540-4” with “1550-4”.

**Page 17-15, Subarticle 1715-3(E) Bore and Jack, Lines 10 - 11**, replace "*NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights-of-Way*" with "*NCDOT Utilities Accommodations Manual*".

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****TITLE VI AND NONDISCRIMINATION**

(6-28-77) (Rev 5-2-18)

Z-6

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

Replace Subarticle 103-4(B) with the following:

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 Nondiscrimination 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) shall be 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 shall be 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;<br>49 CFR Part 21;<br>23 CFR 200;<br>49 U.S.C. 5332(b);<br>49 U.S.C. 47123.<br><i>(Executive Order 13166)</i> |
| Color   | Color of skin, including shade of skin within a racial group   | Black, White, Brown, Yellow, etc.  |   |
| National Origin ( <i>Limited English Proficiency</i> )  | Place of birth. Citizenship is not a factor. ( <i>Discrimination based on language or a person's accent is also covered</i> )  | Mexican, Cuban, Japanese, Vietnamese, Chinese  |   |
| Sex   | Gender. The sex of an individual.<br><i>Note: Sex under this program does not include sexual orientation.</i>  | Women and Men  | 1973 Federal-Aid Highway Act;<br>49 U.S.C. 5332(b);<br>49 U.S.C. 47123.   |
| Age   | Persons of any age   | 21-year-old person   | Age Discrimination Act of 1975<br>49 U.S.C. 5332(b);<br>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;<br>Americans with Disabilities Act of 1990   |
| Religion (in the context of employment)<br><i>(Religion / Creed in all aspects of any aviation or transit-related construction)</i> | 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. <i>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.</i> | Muslim, Christian, Sikh, Hindu, etc.   | Title VII of the Civil Rights Act of 1964;<br>23 CFR 230;<br>FHWA-1273 Required Contract Provisions.<br><i>(49 U.S.C. 5332(b); 49 U.S.C. 47123)</i>     |

**(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:

- 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
- 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)
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex)
- 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
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age)
- 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 shall 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 shall 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 shall 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 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) 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 Nondiscrimination 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.)

**MINIMUM WAGES**

(07-21-09)

Z-5

**FEDERAL:** The Fair Labor Standards Act provides that with certain exceptions every employer must 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.

The determination of the intent of the application of these Acts to the project's contract shall be the Design-Build Team's responsibility.

The Design-Build Team shall have no claim against the Department of Transportation for any changes in the minimum wage laws, State or Federal. It shall be the responsibility of the Design-Build Team to be fully informed of all Federal and State Laws affecting the project's contract.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\***

(10-23-17) (Rev. 3-22-22)

**DIVISION ONE OF STANDARD SPECIFICATIONS**

**Division One of the 2018 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)* shall apply except as follows:**

**Definitions:** Throughout Division One of the 2018 *Standard Specifications for Roads and Structures*, the term “Contractor” is replaced with “Design-Build Team”, the term “Bidder” is replaced with “Proposer,” the term “Bid” is replaced with “Price Proposal,” and the phrase “lowest Responsible Bidder” is replaced with “responsible Proposer with the lowest adjusted price.” The replacement of “Contractor” with “Design-Build Team” does not apply to Article 102-2. The replacement of the above terms also does not apply when the terms are part of a phrase (e.g. bid bond, prime contractor, total amount bid, etc.)

**Deletions:** Articles 102-3(B), 102-4, 102-8(B), 102-9(C)(2), 103-2(B), and 103-4(C) of the 2018 *Standard Specifications for Roads and Structures* are deleted from Design-Build Contracts.

**Modifications:** The remainder of this Standard Special Provision includes modifications to Division One of the 2018 *Standard Specifications for Roads and Structures*.

## **SECTION 101 DEFINITION OF TERMS**

**Page 1-3, Article 101-3, replace and add certain definitions as follows:**

### **ADDITIONAL WORK**

Additional work is that which results from a change or alteration to the contract and for which there are contract unit prices in the original contract or an executed supplemental agreement.

### **ADVERTISEMENT**

The public advertisement inviting Statements of Qualifications for the design and construction of specific projects.

### **AWARD**

The decision of the Department of Transportation to accept the Technical and Price Proposals of the selected Design-Build Team for work which is subject to the furnishing of payment and performance bonds, and such other conditions as may be otherwise provided by law, the Request for Proposals, and the 2018 *Standard Specifications for Roads and Structures*.

**CONTRACT**

The executed agreement between the Department and the successful Proposer, covering the performance of, and compensation for, the work. The term contract is all inclusive with reference to all written agreements affecting a contractual relationship and all documents referred to therein. The contract shall include, but not be limited to, the Request for Proposals, the Technical Proposal, the Price Proposal, the printed contract form and attachments, contract bonds, plans and associated special provisions prepared by the Design-Build Team, standard specifications and supplemental specifications, standard special provisions and project special provisions contained in the Request for Proposals or as developed by the Design-Build Team and accepted by the Department, and all executed supplemental agreements. The contract shall constitute one instrument.

**DATE OF AVAILABILITY**

That date, established as set forth in the Request for Proposals, by which it is anticipated that the Contract will be executed and sufficient design efforts or work sites within the project limits will be available for the Design-Build Team to begin the controlling operations or design.

**DESIGN-BUILD**

A form of contracting in which the successful Proposer undertakes responsibility for both the design and construction of a project.

**DESIGN-BUILD TEAM**

An individual, partnership, joint venture, corporation or other legal entity that furnishes the necessary design and construction services, whether by itself or through subcontracts.

**DESIGN-BUILD PROPOSAL**

A proposal to contract consisting of a separately sealed Technical Proposal and a separately sealed Price Proposal submitted in response to a Request for Proposals on a Design-Build project.

**PLANS**

The project plans, Standard Drawings, working drawings and supplemental drawings, or reproductions thereof, accepted by the Engineer, which show the location, character, dimensions and details of the work to be performed. Unless noted otherwise within the Request for Proposals, the term “plans” refers to plans as developed by the Design-Build Team and accepted by the Department.



(A) Standard Drawings

Drawings approved for repetitive use, showing details to be used where appropriate. All Standard Drawings approved by the Department plus subsequent revisions and additions. Standard Drawings are available for purchase from:

State Contract Officer  
1591 Mail Service Center  
Raleigh, NC 27699-1591

(B) Preliminary Plans

Department-furnished drawings distributed in concert with a Request for Proposals, or as developed by the Design-Build Team.

(C) Project Plans

Construction drawings prepared, sealed and completed by the Design-Build Team, or as provided by the Department, that contain specific details and dimensions peculiar to the work.

(D) Working Drawings and Supplemental Drawings

Supplemental design sheets, shop drawings, or similar data which the Design-Build Team is required to submit to the Engineer.

(E) As-Constructed Drawings

Red-lined mark-up of the latest Released for Construction (RFC) Plans containing the information listed under As-Constructed Plans in the Records and Reports Section of the NCDOT Construction Manual.

(F) As-Built Plans

Coordinately correct plans documenting the details, dimensions and locations of the completed work.

## **PRICE PROPOSAL**

The offer of a Proposer, submitted on the prescribed forms, to perform the work and furnish the labor and materials at the price quoted.

## **PROPOSER**

An individual, partnership, firm, corporation, LLC, or joint venture formally submitting a Technical Proposal and Price Proposal in response to a Request for Proposals.

## **REQUEST FOR PROPOSALS**

The paper document provided by the Department that the Proposer uses to develop his paper offer to perform the work at designated bid prices.

## **RIGHT OF WAY**

The land area shown on the plans as right of way within which the project is to be constructed.

## **SCHEDULE OF VALUES**

A schedule of work items necessary to complete work, along with the progress of each work item, primarily for the purpose of partial payments.

## **TABLE OF QUANTITIES**

A listing of work items (corresponding to the items in the Trns\*port pay item list) that contributes to a project completion. The table shall include estimated quantities for each work item.

## **TECHNICAL PROPOSAL**

A submittal from a Proposer, in accordance with the Request for Proposals requirements, for the purpose of final selection. The Technical Proposal is defined to also include any supplemental information requested by the Department from a Proposer prior to opening bids.

## **SECTION 102 PROPOSAL REQUIREMENTS AND CONDITIONS**

**Page 1-9, delete Article 102-1 and replace with the following:**

### **102-1 INVITATION TO BID**

After the advertisement has been made, an Invitation to Bid will be made available to known prequalified contractors and any other contracting firms, material suppliers and other interested parties who have requested they be placed on the Invitation to Bid mailing list, informing them that Statements of Qualifications and Design-Build Proposals will be received for the design and construction of specific projects. Such invitation will indicate the contract identification number, length, locations and descriptions; a general summary of the scope of work to be performed; and information on how to receive a Request for Qualifications.

All projects will be advertised in daily newspapers throughout the state before the Price Proposal opening.

**Page 1-12, delete Article 102-3 and replace with the following:**

### **102-3                   CONTENTS OF REQUEST FOR PROPOSALS**

A Request for Proposals will be furnished by the Department to the selected Proposers from among the respondents to the Request for Qualifications. Each Request for Proposals will be marked on the front cover by the Department with an identifier of the Proposer to whom it is being furnished. This Request for Proposals will state the location of the project and will show a schedule of contract items for which Technical and Price Proposals are invited. It will set forth the dates and times Technical and Price Proposals are to be submitted and when the Price Proposals will be opened. The Request for Proposals will also include special provisions or requirements that vary from or are not contained in any preliminary design information or standard specifications.

The Request for Proposals will also include the printed contract forms and signature sheets for execution by both parties to the contract. In the event the Proposer is awarded the contract, execution of the Request for Proposals by the Proposer is considered the same as execution of the contract.

Standard specifications, sealed plans specifically identified as the Department's responsibility and other documents designated in the Request for Proposals shall be considered a part of the Request for Proposals whether or not they are attached thereto. All papers bound to the Request for Proposals are necessary parts thereof and shall not be detached, taken apart, or altered.

The names and identity of each prospective Proposer that receives a copy of the Request for Qualifications for the purposes of submitting a Statement of Qualifications shall be made public, except that a potential Proposer who obtains a Request for Qualifications may, at the time of ordering, request that his name remain confidential.

One copy of the Final Request for Proposals will be furnished to each prospective Proposer. Additional copies may be purchased for the sum of \$25 each. The copy of the Final Request for Proposals marked with the Proposer's name and prequalification number shall be returned to the Department as the Proposer's Price Proposal.

**Page 1-14, Article 102-7, 4<sup>th</sup> paragraph, delete the first two sentences and replace with the following:**

Details shown in the subsurface investigation report are preliminary only. The subsurface investigation and subsurface report, if provided, is done so for information purposes only.

**Pages 1-14, delete Article 102-8 and replace with the following:**

### **102-8                   PREPARATION AND SUBMISSION OF BIDS**

All Price Proposals shall be prepared and submitted in accordance with the following requirements:

1. The Request for Proposals provided by the Department shall be used and shall not be taken apart or altered. The Price Proposal shall be submitted on the same form, which has been furnished to the Proposer by the Department as identified by the Proposer's name marked on the front cover by the Department.
2. All entries including signatures shall be written in ink.
3. The Proposer shall submit a lump sum or unit price for every item in the Request for Proposals. The lump sum or unit prices bid for the various contract items shall be written in figures.
4. An amount bid shall be entered in the Request for Proposals for every item and the price shall be written in figures in the "Amount Bid" column in the Request for Proposals.
5. An amount bid shall be entered in the Request for Proposals for every item on which a unit price has been submitted. The amount bid for each item other than lump sum items shall be determined by multiplying each unit bid price by the quantity for that item and shall be written in figures in the Amount Bid column in the Request for Proposals.
6. The total amount bid shall be written in figures in the proper place in the Request for Proposals. The total amount bid shall be determined by adding the amounts bid for each lump sum item.
7. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Proposer shall initial the change in ink.
8. The Price Proposal shall be properly executed. To constitute proper execution, the Price Proposal shall be executed in strict compliance with the following:
  - a. If a Price Proposal is by an individual, it shall show the name of the individual and shall be signed by the individual with the word "Individually" appearing under the signature. If the individual operates under a firm name, the Price Proposal shall be signed in the name of the individual doing business under the firm name.
  - b. If the Price Proposal is by a corporation, it shall be executed in the name of the corporation by the President, Vice President, or Assistant Vice President. It shall be attested by the Secretary or Assistant Secretary. The seal of the corporation shall be affixed. If the Price Proposal is executed on behalf of a corporation in any other manner than as above, a certified copy of the minutes of the Board of Directors of said corporation authorizing the manner and style of execution and the authority of the person executing shall be attached to the Price Proposal or shall be on file with the Department.

- c. If the Price Proposal is made by a partnership, it shall be executed in the name of the partnership by one of the general partners.
  - d. If the Price Proposal is made by a limited liability company, it shall be signed by the manager, member, or authorized agent.
  - e. If the Price Proposal is made by a joint venture, it shall be executed by each of the joint venturers in the appropriate manner set out above. In addition, the execution by the joint venturers shall appear below their names.
9. The Price Proposal shall not contain any unauthorized additions, deletions, or conditional bids.
  10. The Proposer shall not add any provision reserving the right to accept or reject an award or to enter into a contract pursuant to an award.
  11. The Price Proposal shall be accompanied by a bid bond on the form furnished by the Department or by a bid deposit. The bid bond shall be completely and properly executed in accordance with the requirements of Article 102-10 and as modified herein. The bid deposit shall be a certified check or cashier check in accordance with Article 102-10 and as modified herein.
  12. The Price Proposal shall be placed in a sealed package and shall have been delivered to, and received by, the Department prior to the time specified in the Request for Proposals.

**Page 1-17, Article 102-10, 3<sup>rd</sup> paragraph, delete the fifth sentence and replace with the following:**

The condition of the bid bond or bid deposit is: the Principal shall not withdraw its bid within 75 days after the submittal of the same, and if the Department shall award a contract to the Principal, the Principal shall, within 14 calendar days after the written notice of award is received by him, give payment and performance bonds with good and sufficient surety as required for the faithful performance of the contract and for the protection of all persons supplying labor and materials in the prosecution of the work.

**Page 1-18, Article 102-10, delete the end of the Article beginning with, and inclusive of, the 6<sup>th</sup> paragraph.**

**Pages 1-18, delete Article 102-12 and replace with the following:**

#### **102-12 WITHDRAWAL OR REVISION OF BIDS**

A Design-Build Team will not be permitted to withdraw its Technical Proposal and / or Price Proposal after they have been submitted to the Department, unless allowed under Article 103-3 or unless otherwise approved by the Chief Engineer.

**Page 1-19, delete Article 102-13 and replace with the following:**

**102-13 RECEIPT AND OPENING OF BIDS**

Price Proposals from short-listed Proposers will be opened and read publicly on the date and time indicated in the Request for Proposals. The Technical Scores of the previously conducted evaluation of the Technical Proposals will also be read publicly in accordance with the procedures outlined in the Request for Proposals. Proposers, their authorized agents, and other interested parties are invited to be present.

**Page 1-19, Article 102-14, replace the 1<sup>st</sup> paragraph with the following:**

**102-14 REJECTION OF BIDS**

Any Price Proposal submitted which fails to comply with any of the requirements of Articles 102-8, 102-9 or 102-10, or with the requirements of the project scope and specifications shall be considered irregular and may be rejected. A Price Proposal that does not contain costs for all items in the Request for Proposals shall be considered irregular and may be rejected.

**SECTION 103  
AWARD AND EXECUTION OF CONTRACT**

**Page 1-21, delete Article 103-1 and replace with the following:**

**103-1 CONSIDERATION OF PRICE PROPOSALS**

After the Price Proposals are opened and read, they will be tabulated. The Price Proposal and Technical Score of the Technical Proposal will be made available in accordance with procedures outlined in the Request for Proposals. In the event of errors, omissions, or discrepancies in the Price Proposal, corrections to the Price Proposal will be made in accordance with the provisions of Article 103-2. Such corrected bid prices will be used to determine the lowest adjusted price.

After the reading of the Price Proposals and Technical Scores, the Department will calculate the lowest adjusted price as described in the Request for Proposals.

The right is reserved to reject any or all Price Proposals, to waive technicalities, to request the Proposer with the lowest adjusted price to submit an up-to-date financial and operating statement, to advertise for new Price Proposals, or to proceed to do the work otherwise, if in the judgment of the Department, the best interests of the State will be promoted thereby.

**Page 1-21, Subarticle 103-2(A), add items (6) and (7) as follows:**

- (6) Discrepancy in the “Total Amount Bid” and the addition of the “Amount Bid” for each line Item**

In the case of the Total Amount Bid does not equal the summation of each Amount Bid for the line items, the summation of each Amount Bid for the line items shall be deemed to be the correct Total Amount Bid for the entire project.

**(7) Omitted Total Amount Bid - Amount Bid Completed**

If the Total Amount Bid is not completed and the Amount Bid for all line items is completed the Total Amount Bid shall be the summation of the Amount Bid for all the line items.

**Page 1-23, Subarticle 103-4(A), first paragraph, replace the 3<sup>rd</sup> and 4<sup>th</sup> sentences with the following:**

Where award is to be made, the notice of award will be issued within 75 days after the submittal of Price Proposals, except with the consent of the responsible Proposer with the lowest adjusted price 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 Proposer. In the absence of such agreement, the Proposer may withdraw his Price Proposal at the expiration of the 75 days without penalty if no notice of award has been issued.

**Page 1-29, Article 103-6, delete the 1<sup>st</sup> and 2<sup>nd</sup> paragraphs and replace with the following:**

Checks that have been furnished as a bid deposit will be retained until after the contract bonds have been furnished by the successful Proposer, at which time the checks that were furnished as a bid deposit will be returned.

## **SECTION 104 SCOPE OF WORK**

**Page 1-30, delete Article 104-1 and replace with the following:**

### **104-1 INTENT OF CONTRACT**

The intent of the contract is to prescribe the work or improvements that the Design-Build Team undertakes to perform, in full compliance with the contract documents. In case the method of construction or character of any part of the work is not covered by the contract, this section shall apply. The Design-Build Team shall perform all work in accordance with the contract or as may be modified by written orders, and shall do such additional, extra, and incidental work as may be considered necessary to complete the work to the full intent of the contract. Unless otherwise provided elsewhere in the contract, the Design-Build Team shall furnish all implements, machinery, equipment, tools, materials, supplies, transportation, and labor necessary for the design, prosecution and completion of the work.

**Page 1-30, Article 104-3, replace “plans or details of construction” with “contract” in all instances within this Article.**

**Page 1-39, delete Article 104-10 and replace with the following:**

#### **104-10 MAINTENANCE OF THE PROJECT**

The Design-Build Team shall maintain the project from the date of beginning construction on the project until the project is finally accepted. For sections of facilities impacted by utility construction / relocation performed by the Design-Build Team prior to beginning construction on the roadway project, maintenance of the impacted sections of facilities shall be performed by the Design-Build Team beginning concurrently with the impact. This maintenance shall be continuous and effective and shall be prosecuted with adequate equipment and forces to the end that all work covered by the contract is kept in satisfactory and acceptable conditions at all times.

All existing and constructed guardrail / guiderail within the project limits shall be included in this maintenance. The Design-Build Team shall perform weekly inspections of all 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 seven consecutive calendar days of such inspection report.

The Design-Build Team shall maintain all existing drainage facilities, except where the work consists of resurfacing only, such that they are in the same condition upon acceptance of the project as they were when the project was made available to the Design-Build Team. In the event that the Design-Build Team's work is suspended for any reason, the Design-Build Team shall maintain the work covered by the contract, as provided herein. When a portion of the project is accepted as provided in Article 105-17, immediately after such acceptance, the Design-Build Team will not be required to maintain the accepted portion. Should latent defects be discovered or become evident in an accepted portion of the project, the Design-Build Team shall repair or replace the defective work at no cost to the Department.

Where an observation period(s) is required that extends beyond the final acceptance date, the Design-Build Team shall perform any work required by the observation period until satisfactory completion of the observation period.

With the exception of the maintenance of existing and constructed guardrail / guiderail, the Design-Build Team will not be directly compensated for any maintenance operations. The Design-Build Team will not be compensated for the performance of weekly inspections of guardrail / guiderail, and the damage reports required as described above. Authorized maintenance activities for existing and constructed guardrail / guiderail within the project limits will be paid for as extra work in accordance with Articles 104-7 and 104-8 of the NCDOT *Standard Specifications for Roads and Structures*.



## **SECTION 105 CONTROL OF WORK**

**Pages 1-44, delete Article 105-2 and replace with the following:**

### **105-2 PLANS AND WORKING DRAWINGS**

All plans shall be supplemented by such approved working drawings as are necessary to adequately control the work. Working drawings furnished by the Design-Build Team and approved by the Engineer shall consist of such detailed drawings as may be required to adequately control the work. They may include stress sheets, shop drawings, erection drawings, falsework drawings, cofferdam drawings, bending diagrams for reinforcing steel, catalog cuts, or any other supplementary drawings or similar data required of the Design-Build Team. When working drawings are approved by the Engineer, such approval shall not operate to relieve the Design-Build Team of any of his responsibility under the contract for the successful completion of the work.

Changes on shop drawings after approval and / or distribution shall be subject to the approval of the Engineer and he shall be furnished a record of such changes.

**Page 1-45, Article 105-3, add the following after the 3<sup>rd</sup> paragraph:**

The Design-Build Team shall bear all the costs of providing the burden of proof that the nonconforming work is reasonable and adequately addresses the design purpose. The Design-Build Team shall bear all risk for continuing with nonconforming work in question until it is accepted.

The Engineer may impose conditions for acceptance of the nonconforming work. The Design-Build Team shall bear all costs for fulfilling the conditions.

The decisions whether the product satisfies the design purpose, whether the nonconforming work is reasonably acceptable and the conditions for acceptance are at the sole discretion of the Engineer.

**Pages 1-45, delete Article 105-4 and replace with the following:**

### **105-4 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS**

The Request for Proposals, all construction Plans, the Standard Specifications, Supplemental Specifications and Special Provisions and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are complementary and describe and provide the complete contract.

In case of discrepancy or conflict, the order in which they govern shall be as follows:

- (A) Request for Proposals, in which Project Special Provisions govern Standard Special Provisions
- (B) Technical Proposal from the Design-Build Team
- (C) Accepted Plans and Details from the Design-Build Team, or sealed plans provided by the Department, as applicable
- (D) Standard Drawings
- (E) Standard Specifications

Where dimensions on the plans are given or can be computed from other given dimensions they shall govern over scaled dimensions.

The Design-Build Team shall take no advantage of any error or omission in the plans, estimated quantities, or specifications. In the event the Design-Build Team discovers an error or omission, he shall immediately notify the Engineer.

**Page 1-48, delete Article 105-9 and replace with the following:**

#### **105-9            CONSTRUCTION STAKES, LINES, AND GRADES**

The Design-Build Team shall be responsible for all surveying, construction staking and layout required in the performance of the work. The Design-Build Team shall be responsible for the accuracy of lines, slopes, grades and other engineering work which the Design-Build Team provides under this contract.

### **SECTION 106 CONTROL OF MATERIAL**

**Page 1-53, Article 106-2, add the following after the second paragraph:**

Prior to beginning construction, the Design-Build Team shall provide a Table of Quantities as described in Article 101-3 of these specifications.

The Table of Quantities Work Items shall correspond to Pay Items as defined in the Standard Specifications. These Work Items have associated Materials and Conversion Factors. For non-standard Work Items, a Generic Work Item with the correct Unit of Measure and in an appropriate category will be used. For example, "GENERIC TRAFFIC CONTROL ITEM - EA" or "GENERIC RETAINING WALL ITEM - LF". For these Generic Work Items, Materials must be defined and appropriate conversion factors submitted.

An initial Table of Quantities shall be submitted no later than 30 calendar days after the date of award. The Table of Quantities shall be updated and resubmitted within 14 days of when a set of Plans is sealed as Release for Construction (RFC) Plans, and whenever there are substantial changes to the Quantities on previously incorporated RFC Plans.

A Certified Table of Quantities shall be submitted with each pay request. All Certified Tables of Quantities shall indicate that the information accurately represents the materials used for the work performed for which payment is requested, and be notarized by a Design-Build Team representative.

**Page 1-55, Article 106-6, add the following after the last paragraph:**

For items normally pretested by the Department, the Design-Build Team shall provide a minimum of 30 days notice prior to the beginning of production of the items for this project along with final approved shop drawings.

## **SECTION 107 LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC**

**Page 1-65, delete Article 107-18 and replace with the following:**

### **107-18 FURNISHING RIGHT OF WAY**

The responsibility for coordinating the securing of all necessary rights of way is as outlined in the Request for Proposals.

## **SECTION 108 PROSECUTION AND PROGRESS**

**Page 1-68, Article 108-2, replace the 2<sup>nd</sup> paragraph with the following:**

The Design-Build Team shall submit a Progress Schedule for review within thirty (30) calendar days of receiving Notice of Award. The Department will review the Progress Schedule within twenty-one (21) calendar days of receipt. The Design-Build Team shall make any necessary corrections and adjustments to the Progress Schedule as necessitated by the Department's review within seven (7) calendar days. The Department will review the revised Progress Schedule within seven (7) calendar days of receipt.

**Page 1-68, Subarticle 108-2(A)(1), add the following:**

(k) Utility relocation and construction

**Page 1-69, Subarticle 108-2(A)(2), add the following:**

- (h) Critical design submittal dates
- (i) Critical permitting dates
- (j) Completion of right of way acquisition
- (k) Completion of utility relocation and construction

**Page 1-69, Article 108-2, add the following:**

- (D)** The Design-Build Team shall provide a written narrative each month detailing the work and percentage of work completed, anticipated sequence of upcoming work (two-month forecast), controlling operation(s), intermediate completion dates, and milestones. If any milestones are exceeded or will not be achieved, the Design-Build Team shall provide in the written narrative details of the delay; controlling operation affected, impacts to other operations, revisions to future intermediate completion dates and milestones, and remedial action necessary to get the project back to the original completion date.

**Page 1-69, delete Article 108-3 and replace with the following:****108-3 PRECONSTRUCTION AND PRE-DESIGN CONFERENCES**

The selected Design-Build Team shall meet with the Engineer for a pre-design conference concerning the design phase of the work. This conference shall be held prior to the commencement of work, as it is determined according to Article 108-1, and will be scheduled by the Engineer. At the predesign conference, the Design-Build Team shall furnish authorized signature forms and a list of all proposed subcontractors associated with the project design.

A preconstruction conference shall be held at least ten working days before construction activity begins. This second conference, concerning the construction phase, shall also be scheduled by the Engineer. The Design-Build Team shall give the Engineer a minimum of 45 days written notice before the Design-Build Team plans to begin construction activities. This will allow the Engineer time for any environmental agency representatives involved in the permitting process, as well as any other pertinent entities, to be scheduled to attend the preconstruction conference. If the Design-Build Team is responsible for utilities in accordance with Article 105-8 and the Request for Proposals, the Design-Build Team shall be responsible for coordinating with the Engineer in scheduling the utility owners attendance and for notifying the utility owners. The Design-Build Team shall also be responsible for coordinating with the Engineer in scheduling the attendance of subcontractors and others deemed appropriate, and for notifying them.

At the preconstruction conference, a list of any proposed subcontractors and major material suppliers associated with the construction of the project will be submitted.

If the contract has a DBE or WBE / MBE requirement, the Design-Build Team shall submit copies of completed and signed DBE or WBE / MBE subcontracts, purchase orders, or invoices to the Department.

In accordance with Article 1101-1 and the Request for Proposals, the Design-Build Team shall submit Transportation Management Plans, including but not limited to Temporary Traffic Control Plans. The Design-Build Team shall designate an employee who is competent and experienced in transportation management to implement and monitor the Transportation Management Plans. The qualifications of the designated employee must be satisfactory to the Engineer.

The Design-Build Team shall submit a Safety Plan and designate an employee as the Safety Supervisor.

Both plans shall be submitted at the preconstruction conference and must be satisfactory to the Engineer. Should the design plan include activities that would place personnel on the work site, Temporary Traffic Control Plans and a Safety Plan for those activities shall be submitted at the predesign conference.

During the preconstruction conference, the Engineer will designate a Department employee or employees who will be responsible to see that the Transportation Management Plans, including but not limited to the Temporary Traffic Control Plans, and any alterations thereto are implemented and monitored to the end that traffic is carried through the work in an effective manner. If approved by the Engineer, the Design-Build Team may designate one employee to be responsible for both the Temporary Traffic Control Plans and the Safety Plan. The Design-Build Team shall not designate its superintendent as the responsible person for either the Temporary Traffic Control Plans or the Safety Plan, unless approved by the Engineer.

If the project requires the Design-Build Team or State personnel work from falsework, within shoring, or in any other hazardous area, the Design-Build Team shall submit, as part of the Design-Build Team's Safety Plan, specific measures that will be used to ensure worker safety.

The Design-Build Team shall also submit a program for erosion control and pollution prevention on all projects involving clearing and grubbing, earthwork, structural work, or other construction, when such work is likely to create erosion or pollution problems.

If the Design-Build Team fails to provide the required submissions, the Engineer may order the preconstruction conference suspended until such time as they are furnished. Work shall not begin until the preconstruction conference has been concluded and the Safety Plan has been approved, unless authorized by the Engineer. The Design-Build Team shall not be entitled to additional compensation or an extension of contract time resulting from any delays due to such a suspension.

The Design-Build Team shall designate a qualified employee as Quality Control Manager. The Quality Control Manager shall be responsible for implementing and monitoring the quality control requirements of the project.

**Page 1-69, Article 108-4, add the following sentence to the end of this article:**

The Design-Build Team shall record the proceedings of these conferences and distribute the final minutes of the conferences to all attendees.

**Page 1-70, Article 108-6, replace “40%” with “30%” in the 1<sup>st</sup> paragraph.****Page 1-71, Article 108-6, replace “35%” with “25%” in the 2<sup>nd</sup> paragraph.****Pages 1-72, delete Article 108-8 and replace with the following:****108-8                    FAILURE TO MAINTAIN SATISFACTORY PROGRESS**

The Engineer will check the Design-Build Team’s progress at the time each partial pay request is received. The Design-Build Team’s progress may be considered as unsatisfactory if, according to the Progress Schedule, the projected finish date for all work exceeds the scheduled finish date by more than 10%.

When the Design-Build Team's progress is found to be unsatisfactory as described above, the Engineer may make written demand of the Design-Build Team to state in writing the reason for the unsatisfactory progress and produce such supporting data as the Engineer may require or the Design-Build Team may desire to submit. The Engineer will consider the justifications submitted by the Design-Build Team and extensions of the completion date that have or may be allowed in accordance with Subarticle 108-10(B) and as modified herein.

When the Design-Build Team cannot satisfactorily justify the unsatisfactory progress the Engineer may invoke one or more of the following sanctions:

1. Withhold anticipated liquidated damages from amounts currently due or which become due.
2. Remove the Design-Build Team and individual managing firms of the Design-Build Team and / or prequalified design firms from the Department’s Prequalified Bidders List.

When any of the above sanctions have been invoked, they shall remain in effect until rescinded by the Engineer.

**Page 1-75, Subarticle 108-10(B), add the following as the first paragraph:**

Only delays to activities which affect the completion date or intermediate contract date will be considered for an extension of contract time. No extensions will be granted until a delay occurs which impacts the project’s critical path and extends the work beyond the contract completion date or intermediate completion date. Any extension to the completion date or intermediate contract date will be based on the number of calendar days the completion date or intermediate completion date is impacted as determined by the Engineer’s analysis.

**Pages 1-75, delete Subarticle 108-10(B)(1) in its entirety.**

**Page 1-78, delete Subarticle 108-13(D)(2) in its entirety.**

## **SECTION 109 MEASUREMENT AND PAYMENT**

**Page 1-80, Article 109-2, delete the last sentence of the 1<sup>st</sup> paragraph and replace with the following:**

Payment to the Design-Build Team will be made only for the work completed, certified and accepted in accordance with the terms of the contract.

**Pages 1-85, delete Subarticle 109-4(A) and replace with the following:**

### **109-4            PARTIAL PAYMENTS**

#### **(A)    General**

Partial payments will be based upon progress estimates prepared by the Engineer at least once each month on the date established by the Engineer. Partial payments may be made twice each month if in the judgment of the Engineer the amount of work performed is sufficient to warrant such payment. No partial payment will be made when the total value of work performed since the last partial payment amounts to less than \$10,000.00. Partial payments will be approximate only and will be subject to correction in the final estimate and payment.

When the contract includes one lump sum price for the entire work required by the contract, partial payments for the lump sum Design-Build price shall be based on a certified Schedule of Values submitted by the successful Design-Build Team and approved by the Engineer. The certification shall indicate the Design-Build Team has reviewed the information submitted and the information accurately represents the work performed for which payment is requested. The certified Schedule of Values shall be submitted no later than 30 calendar days after the date of award. Each item on the certified Schedule of Values shall be assigned a cost and quantity and shall be identified as an activity on the Progress Schedule. A revised certified Schedule of Values shall be submitted with each update of the Progress Schedule as described in Article 108-2, and as modified herein, or when requested by the Engineer. A certified copy of the Table of Quantities shall also be submitted with each payment request. The certification of the Table of Quantities shall indicate the Design-Build Team has reviewed the information submitted and the information accurately represents the materials for the work performed for which payment is requested.

When the contract includes lump sum items for portions of the work required by the contract, and the applicable section of the Specifications or Request for Proposals specify

the means by which the total amount bid be included in the partial pay estimates, the Engineer will determine amounts due on the partial pay estimate in accordance with the applicable portion of the Specifications or Request for Proposals.

The Engineer will withhold an amount sufficient to cover anticipated liquidated damages as determined by the Engineer.

**Page 1-86, Subarticle 109-5(D), delete the 4<sup>th</sup> and 5<sup>th</sup> paragraphs and replace with the following:**

Partial payments will not be made on seed or any living or perishable plant materials.

Partial payment requests shall not be submitted by the Design-Build Team until those items requested have corresponding signed and sealed RFC Plans accepted by the Department.

**Pages 1-88, Article 109-10, add the following as bullets (E), (F), (G) and (H) under the 1<sup>st</sup> paragraph.**

- (E) As-Constructed Drawings
- (F) As-Built Plans
- (G) All documents required elsewhere in this RFP
- (H) Documents or guarantees to support any warranty provided by the Design Build Team



**FUEL USAGE FACTOR CHART AND ESTIMATE OF QUANTITIES**

| Description of Work                            | Units     | Fuel Usage Factor Diesel #2 | Estimate of Quantities |
|--|-----------|-----------------------------|------------------------|
| Unclassified Excavation                        | Gal / CY  | 0.29                        | _____ CY               |
| Borrow Excavation                              | Gal / CY  | 0.29                        | _____ CY               |
| Class IV Subgrade Stabilization                |           |                             |                        |
| Aggregate Base Course                          | Gal / Ton | 0.55                        | _____ Tons             |
| Sub-Ballast                                    |           |                             |                        |
| Aggregate for Cement Treated Base Course       |           |                             |                        |
| Portland Cement for Cement Treated Base Course | Gal / Ton | 0.55                        | _____ Tons             |
| * Asphalt Concrete Base Course                 | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| * Asphalt Concrete Intermediate Course         | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| * Asphalt Concrete Surface Course              | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| * Open-Graded Asphalt Friction Course          | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| * Permeable Asphalt Drainage Course            | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| * Sand Asphalt Surface Course, Type SA-1       | Gal / Ton | _____ 0.90 _____ 2.90       | _____ Tons             |
| <b>Portland Cement Concrete Pavement</b>       |           |                             |                        |
| Through Lanes and Shoulders ( > 11" )          | Gal / SY  | 0.327                       | _____ SY               |
| Through Lanes and Shoulders ( 9" to 11" )      |           | 0.272                       | _____ SY               |
| Through Lanes and Shoulders ( < 9" )           |           | 0.245                       | _____ SY               |
| ** Structural Concrete (Cast-in-Place Only)    | Gal / CY  | 0.98                        | _____ CY               |

\* Select 0.90 **OR** 2.90

\*\* Structural Concrete shall be defined as cast-in-place Class A or Class AA concrete used in the construction of major structures for various work items identified in Division 4 of the 2018 *Standard Specifications for Roads and Structures*.

The above quantities represent a reasonable estimate of the total quantities anticipated, for each item, as pertaining to fuel price adjustments, and is representative of the design proposed in the Technical Proposal submitted under separate cover.

Or

The Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments on this project.

**The information submitted on this sheet is claimed as a "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.**

\_\_\_\_\_  
Signature, Title

\_\_\_\_\_  
Dated

\_\_\_\_\_  
Print Name, Title

*(Submit a copy of this sheet in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and deliver with the Technical Proposal submittal.)*

| <b>LISTING OF MBE / WBE SUBCONTRACTORS</b> |            |          |                  |                          |                          | Sheet _____ | of _____ |
|--|------------|----------|------------------|--------------------------|--------------------------|-------------|----------|
| Firm Name and Address                      | MBE or WBE | Item No. | Item Description | * Agreed upon Unit Price | ** Dollar Volume of Item |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no MBE and / or WBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF MBE / WBE SUBCONTRACTORS</b> |            |          |                  |                          |                          | Sheet _____ | of _____ |
|--|------------|----------|------------------|--------------------------|--------------------------|-------------|----------|
| Firm Name and Address                      | MBE or WBE | Item No. | Item Description | * Agreed upon Unit Price | ** Dollar Volume of Item |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |
| <b>Name</b><br><br>Address                 |            |          |                  |                          |                          |             |          |

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no MBE / WBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF MBE / WBE SUBCONTRACTORS</b> |            |          |                  |                          |                          | Sheet _____ | of _____ |
|--|------------|----------|------------------|--------------------------|--------------------------|-------------|----------|
| Firm Name and Address                      | MBE or WBE | Item No. | Item Description | * Agreed upon Unit Price | ** Dollar Volume of Item |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |             |          |

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no MBE / WBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF MBE / WBE SUBCONTRACTORS</b> |            |          |                  |                          |                          | Sheet | of |
|--|------------|----------|------------------|--------------------------|--------------------------|-------|----|
| Firm Name and Address                      | MBE or WBE | Item No. | Item Description | * Agreed upon Unit Price | ** Dollar Volume of Item |       |    |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |       |    |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |       |    |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |       |    |
| <b>Name</b><br>Address                     |            |          |                  |                          |                          |       |    |

**COST OF CONSTRUCTION WORK ONLY**

\$ \_\_\_\_\_

\* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE and / or WBE subcontractor, and these prices will be used to determine the MBE and / or WBE participation in the contract.

|   |          |
|---|----------|
| ** Dollar Volume of MBE Subcontractor   | \$ _____ |
| MBE Percentage of Total Construction Cost (Including Right of Way Acquisition Cost) | _____ %  |
| ** Dollar Volume of WBE Subcontractor   | \$ _____ |
| WBE Percentage of Total Construction Cost (Including Right of Way Acquisition Cost) | _____ %  |

\*\* - Must have entry even if figure to be entered is zero.

**This form must be completed in order for the Bid to be considered responsive and be publicly read. Bidders with no MBE / WBE participation must so indicate this on the form by entering the word or number *zero*.**

**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**CORPORATION**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the Bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

\_\_\_\_\_  
Full name of Corporation

\_\_\_\_\_  
Address as prequalified

Attest \_\_\_\_\_  
Secretary / Assistant Secretary  
*Select appropriate title*

By \_\_\_\_\_  
President / Vice President / Assistant Vice President  
*Select appropriate title*

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's name

**CORPORATE SEAL**

**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**PARTNERSHIP**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

\_\_\_\_\_  
Full Name of Partnership

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness

By

\_\_\_\_\_  
Signature of Partner

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's name

**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION  
LIMITED LIABILITY COMPANY**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

\_\_\_\_\_  
Full Name of Firm

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Member / Manager / Authorized Agent  
*Select appropriate title*

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's Name



**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**JOINT VENTURE (2) or (3)**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTORS**

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

(1) \_\_\_\_\_  
Name of Joint Venture

(2) \_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address as prequalified

\_\_\_\_\_  
Signature of Witness or Attest By Signature of Contractor

\_\_\_\_\_  
Print or type Signer's name Print or type Signer's name

*If Corporation, affix Corporate Seal* and

(3) \_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address as prequalified

\_\_\_\_\_  
Signature of Witness or Attest By Signature of Contractor

\_\_\_\_\_  
Print or type Signer's name Print or type Signer's name

*If Corporation, affix Corporate Seal* and

(4) \_\_\_\_\_  
Name of Contractor (for 3 Joint Venture only)

\_\_\_\_\_  
Address as prequalified

\_\_\_\_\_  
Signature of Witness or Attest By Signature of Contractor

\_\_\_\_\_  
Print or type Signer's name Print or type Signer's name

*If Corporation, affix Corporate Seal*

**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

Name of Contractor

\_\_\_\_\_ Individual name

Trading and doing business as

\_\_\_\_\_ Full name of Firm

\_\_\_\_\_ Address as Prequalified

\_\_\_\_\_ Signature of Witness

\_\_\_\_\_ Signature of Contractor, Individually

\_\_\_\_\_ Print or type Signer's name

\_\_\_\_\_ Print or type Signer's name

**EXECUTION OF BID  
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**INDIVIDUAL DOING BUSINESS IN HIS OWN NAME**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

Name of Contractor \_\_\_\_\_  
Print or type Individual name

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Contractor, Individually

\_\_\_\_\_  
Print or type Signer's Name

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print or type Signer's name

**DEBARMENT CERTIFICATION**

## Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

**DEBARMENT CERTIFICATION**

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

Check here if an explanation is attached to this certification.

**Contract No.:** **C204695**

**County:** **Craven County**

ACCEPTED BY THE  
DEPARTMENT OF TRANSPORTATION

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Contract Officer

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Date

Execution of Contract and Bonds  
Approved as to Form:

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Attorney General

Signature Sheet (Bid - Acceptance by Department)