

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

**FINAL REQUEST FOR PROPOSAL**



**DESIGN-BUILD PROJECT**

**TIP I-5719B / U-5800**

**March 5, 2025**

**Includes**

**Addendum No. 1 - April 11, 2025**



*VOID FOR BIDDING*

DATE AND TIME OF TECHNICAL PROPOSAL, AND FUEL USAGE FACTOR CHART / ESTIMATE OF QUANTITIES SUBMISSION: **May 28, 2025 BY 4:00 PM**

DATE AND TIME OF PRICE PROPOSAL SUBMISSION: **June 5, 2025 BY 4:00 PM**

DATE AND TIME OF PRICE PROPOSAL OPENING: **June 17, 2025 AT 2:00 PM**

CONTRACT ID: C205001

WBS ELEMENT NO. 50135.3.GV2, 44372.3.1

FEDERAL-AID NO. FUTR085, 4437201

COUNTY: Gaston

ROUTE NO. I-85

MILES: 4.1

LOCATION: I-85 Widening from NC 7 (McAdenville Road / Main Street – Exit 23) to east of NC 273 (Beatty Drive – Exit 27) at the western Catawba River bridge approach, Intersection improvements - NC 7 (Main St.) and US 29 / 74 (Wilkinson Blvd.) in Belmont

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. NOTWITHSTANDING 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. C205001**

**IN GASTON 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. C205001; 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. C205001 in Gaston 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 2024 *Standard Specifications for Roads and Structures (Standard Specifications)*, 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 *Standard Specification*.

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 2024, 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 *Standard Specification*; otherwise said deposit will be returned to the Design-Build Team.

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**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**

(4-17-12) (Rev. 1-16-24)

DB1 G008C

The date of availability for this contract is July 28, 2025, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Design-Build Team is held. 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 September 1, 2030.

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 Ten Thousand Dollars (\$10,000.00) 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 Ten Thousand Dollars (\$10,000.00) 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.

**BUILD AMERICA, BUY AMERICA (BABA)**

(11-15-22) (Rev. 7-16-24)

106

DB1 G05

Revise the *Standard Specifications* as follows:

**Page 1-48, Article 106-1 GENERAL REQUIREMENTS**, add the following after **Line 49**:

**(C) Build America, Buy America (BABA)**

All manufactured products and construction materials permanently incorporated into any project shall meet requirements of the Build America, Buy America (BABA) Act of the Infrastructure

Investment and Jobs Act (IIJA). Before any material or product shown on the Department's Build America, Buy America (BABA) List is included for payment on a monthly estimate, the Design-Build Team shall furnish the Engineer with a notarized certification certifying that the items conform to the BABA Act. The Department's Build America Buy America (BABA) List can be found on the Department's website below:

**<https://connect.ncdot.gov/letting/LetCentral/NCDOT%20BABA%20Materials%20List.pdf>**

Each purchase order issued by the Design-Build Team or a subcontractor for items on the BABA List to be permanently incorporated into any project shall contain in bold print a statement advising the supplier that the manufactured products and construction materials must be produced in the United States of America. The Design-Build Team and all affected subcontractors shall maintain a separate file for BABA List items so that verification of the Design-Build Team's efforts to purchase items produced in the United States can readily be verified by an authorized representative of the Department or the Federal Highway Administration (FHWA).

### **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.

### **OFCCP MEGA CONSTRUCTION PROJECT PROGRAM**

(9-17-24)

107

DB1 G107

Office of Federal Contract Compliance Programs (OFCCP) is part of the U.S. Department of Labor. OFCCP has selected this construction project for participation in its Mega Construction Project Program which shall engage with the project sponsor, the North Carolina Department of Transportation (NCDOT), as early as the design phase to help promote compliance with non-discrimination and affirmative action obligations. OFCCP offers contractors and subcontractors extensive compliance assistance, conducts compliance evaluations, and helps to build partnerships between the project sponsor, prime contractor, subcontractors, and relevant stakeholders. Contractors and all tier-level subcontractors shall be required to participate in OFCCP's Mega Construction Project Program, which includes an Equal Employment Opportunity (EEO) Committee and shall include this provision language in its subcontract agreements. In addition, contractors and all subcontractors shall comply with the nondiscrimination contract provisions as outlined in Form FHWA-1273 and incorporated into all federal-aid construction contracts.

### **OTHER LIQUIDATED DAMAGES AND INCENTIVES**

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

DB1 G11

**Reference the 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 report a damaged NCDOT fiber optic communications cable and / or a damaged Maintenance and Commercialization (OMC) Contractor fiber optic communications cable within one hour are \$1000.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #2 for a Broadband Fiber Compensation Event (BCFE) are \$5600.00 per hour or any portion thereof up to a maximum of \$135,000.00 per event.**

**Liquidated Damages for Intermediate Contract Time #3 for failure to reestablish NCDOT fiber optic communications within eight hours of a planned disruption are \$1,000.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #4 for failure to provide a plan 30 calendar days prior to work that defines 1) an anticipated planned disruption timeframe, 2) a plan of action for reestablishing NCDOT communications within eight hours of the planned disruption and 3) the coordinated plan from the OMC contractor to perform their portion of the work. are \$10,000.00 per failure.**

**Liquidated Damages for Intermediate Contract Time #5 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 #6 for failure to reestablish DMS operation within 72 hours of a planned disruption are \$500.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #7 for failure to provide a plan that defines 1) an anticipated DMS planned disruption timeframe and 2) a plan of action for reestablishing DMS operation a minimum of 21 calendar days prior to a planned disruption are \$10,000.00 per failure.**

**Liquidated Damages for Intermediate Contract Time #8 for failure to reestablish CCTV operation within 24 hours of a planned disruption are \$500.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #9 for failure to provide a plan that defines 1) an anticipated CCTV planned disruption timeframe and 2) a plan of action for reestablishing CCTV operation a minimum of 21 calendar days prior to a planned disruption are \$10,000.00 per failure.**

**Reference the Traffic Signals and Signal Communications 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 #10 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.**

**Liquidated Damages for Intermediate Contract Time #11 for failure to reestablish NCDOT fiber optic communications within 24 hours are \$ 2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #12 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 fiber optic 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 #13 for failure to restore communication or provide a replacement device within 24 hours are \$500.00 per hour or any portion thereof.**

**Reference the Transportation Management 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 #14 for lane narrowing, lane closure, holiday and special event time restrictions for a single lane on I-85, including lane closures on any multilane ramps and loops, are \$1,250.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #15 for lane narrowing, lane closure, holiday and special event time restrictions for two or more lanes on I-85 are \$2,500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #16 for lane narrowing, lane closure, holiday and special event time restrictions on NC 273 (Park Street / Beatty Drive) and US 29 / 74 (Wilkinson Boulevard) are \$750.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #17 for lane narrowing, lane closure, holiday and special event time restrictions on SR 2093 (Belmont Mt. Holly Road) (Single-Lane Closure); SR 2000 (Hickory Grove Road) Flagging Operations; NC 7 (McAdenville Road / Main Street) Flagging Operations; are \$500.00 per hour.**

**Liquidated Damages for Intermediate Contract Time #18 for the above lane narrowing, lane closure, holiday and special event time restrictions on SR 2093 (Belmont Mt. Holly Road) Flagging Operations North of I-85 are \$250.00 per hour.**

**Liquidated Damages for Intermediate Contract Time #19 for road closure time restrictions for construction operations on I-85 are \$5,000.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #20 for road closure time restrictions for construction operations on any ramp, loop, or -Y- line over I-85 are \$2,500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #21 for any ramp or loop other than those listed in ICT #22 through ICT #28 road closure time restrictions for ramp reconstruction are \$1,000.00 per calendar hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #22 for I-85 SB off-ramp and NB off-ramp to NC 7 (McAdenville Road / Main Street) road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #23 for I-85 NB on-ramp from NC 7 (McAdenville Rd / Main St) road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #24 for I-85 SB at SR 2093 (Belmont Mt Holly Road) road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #25 for I-85 NB off ramp at SR 2093 (Belmont Mt Holly Road) - relocation of the existing ramp road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #26 for I-85 NB off ramp at SR 2093 (Belmont Mt Holly Road) - new ramp road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #27 for I-85 NB on ramp at SR 2093 (Belmont Mt Holly Road) - relocation of the existing ramp road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #28 for I-85 SB ramp and loop at SR 2093 (Belmont Mt Holly Road - relocation of the existing ramp road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #29 for lane narrowing, lane closures time restrictions for a single lane on SR 2093 (Belmont Mt Holly Road/Main**



**Street) at US 29 / 74 (Wilkinson Boulevard) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #30 for lane narrowing, lane closures time restrictions for a single lane on US 29 / 74 (Wilkinson Boulevard) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #31 for lane narrowing, lane closures time restrictions for a single lane on SR 2093 (Belmont Mt Holly Road/Main Street) at SR 2021 (Woodlawn Street) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #32 for lane narrowing, lane closures time restrictions for a single lane on SR 2021 (Woodlawn Street) at SR 2093 (Belmont Mt Holly Road) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #33 for road closure time restrictions for work on the Bridge on NC 7 (McAdenville Road) over I-85 are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #34 for road closure time restrictions for work on the Bridge on SR 2000 (Hickory Grove Road) over I-85 are \$1,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #35 for road closure time restrictions for the interchange at I-85 and NC 7 (McAdenville Road / Main Street) (Exit 23) including any ramp, loop or bridge are \$2,500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #36 for NC 7 (McAdenville Road / Main Street) and US 29/74 lane closure time restrictions during the Christmas Lights Celebration in McAdenville are \$1,250.00 per 15-minute period or any portion thereof.**

**MOBILIZATION**

(1-16-24)

DB1 G15B

Revise the *Standard Specifications* 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

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**

(12-2-15)

DB1 G18C

No tree cutting will be allowed from **April 1<sup>st</sup>** through **October 15<sup>th</sup>** of any year. (Reference the Environmental Scope of Work found elsewhere in this RFP)

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

(9-19-22)

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 will be 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. The quantity estimate submitted shall be the final total quantity limit for which fuel price adjustments will be made for each item, regardless of Supplemental Agreements.

**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 **\$2.3918** 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.

**STEEL PRICE ADJUSTMENT**

(12-20-22)

DB1 G47

**Description and Purpose**

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

**Eligible Items**

The list of standard items the Department has determine are eligible for steel price adjustment can be found on the Departments website at the following address:

**<https://connect.ncdot.gov/letting/Pages/Central-Letting-Resources.aspx>**

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

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

A steel price adjustment shall not be made for any products manufactured from steel having an adjustment date, as defined by the Product Relationship Table below, prior to the Price Proposal Opening date.

### **Price Proposal Submittal Requirements**

The Design-Build Team shall provide Form SPA-1DB listing the steel material, (with corresponding Trns\*port Item Number, Item Description, and Category) for the steel products they wish to have a price adjustment calculated. Only the work items corresponding to the list of eligible item numbers for steel price adjustment may be entered on Form SPA-1DB. The Design-Build Team may choose to have steel price adjustment applied to any, all, or none of the eligible items. However, the Design-Build Team's selection of work items for steel price adjustment or non-selection (non-participation) shall not change once the Department has received Form SPA-1DB.

Work items the Design-Build Team chooses for steel price adjustment must be designated by writing the word "Yes" in the column titled "Option" by each Trns\*port Pay Item chosen for price adjustment. The Design-Build Team's designations on Form SPA-1DB shall be written in ink or typed. The completed SPA-1DB shall be signed and dated by an officer of the Design-Build Team to be considered complete. Items not properly designated, designated with "No", or left blank on the Design-Build Team's Form SPA-1DB shall automatically be removed from consideration for a price adjustment.

The Design-Build Team shall include the completed Form SPA-1DB in the sealed package containing the Price Proposal and deliver the completed Form SPA-1DB at the same time and location as the Price Proposal requirements found elsewhere in this RFP. If the Design-Build Team fails to return the completed Form SPA-1DB with the Price Proposal, no steel items will be eligible for price adjustments on this project.

Form SPA-1DB can be found on the Department's website below:

**<https://connect.ncdot.gov/letting/LetCentral/Form%20SPA-1%20DB%202022-7-26.xlsm>**  
**Establishing the Base Price**

The Department will use a blend of monthly average prices as reported from the Fastmarkets platform to calculate the monthly adjustment indices (BI and MI). This data is typically available

on the first day of the month for the preceding month. The Department will calculate the indices for the different categories found on the Product Relationship Table below. For work item numbers that include multiple types of steel products, the category listed for that Trns\*port item number shall be used for adjusting each steel component.

#### **CATEGORY STEEL ITEMS PRICE TO BE INCLUDED IN THE FINAL RFP**

The bidding index for Category 1 Steel items shall be **\$39.00** per hundredweight.  
The bidding index for Category 2 Steel items shall be **\$59.06** per hundredweight.  
The bidding index for Category 3 Steel items shall be **\$62.40** per hundredweight.  
The bidding index for Category 4 Steel items shall be **\$47.84** per hundredweight.  
The bidding index for Category 5 Steel items shall be **\$52.81** per hundredweight.  
The bidding index for Category 6 Steel items shall be **\$62.87** per hundredweight.  
The bidding index for Category 7 Steel items shall be **\$42.30** per hundredweight.

The bidding indices represent a selling price of steel based on Fastmarkets data for the month of **March 2025**.

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

BI = Bidding Index - in Dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the Final Request for Proposals, including all Addenda.

| <b>Product Relationship Table</b>   |  |                                   |                 |
|---|--|-----------------------------------|-----------------|
| <b>Steel Product (Title)</b>  | <b>BI, MI*</b>                           | <b>Adjustment Date for MI</b>     | <b>Category</b> |
| Reinforcing Steel, Bridge Deck and SIP Forms  | Based on one or more Fastmarkets indices | Delivery Date from Producing Mill | 1               |
| Structural Steel and Encasement Pipe  | Based on one or more Fastmarkets indices | Delivery Date from Producing Mill | 2               |
| Steel H-Piles and Soldier Pile Walls  | Based on one or more Fastmarkets indices | Delivery Date from Producing Mill | 3               |
| Guardrail Items and Pipe Piles  | Based on one or more Fastmarkets indices | Material Received Date**          | 4               |
| Fence Items   | Based on one or more Fastmarkets indices | Material Received Date**          | 5               |
| Overhead Sign Assembly, Signal Poles and High Mount Standards   | Based on one or more Fastmarkets indices | Material Received Date**          | 6               |
| Prestressed Concrete Members  | Based on one or more Fastmarkets indices | Cast Date of Member               | 7               |
| * BI and MI are in converted units of Dollars per Hundredweight (\$ / CWT)  |  |                                   |                 |
| ** Material Received Date shall be defined as the date the materials are received on the project site. If a material prepayment is made for a Category 4 - 6 item, the Adjustment Date to be used shall be the date of the prepayment request instead of the Materials Received Date. |  |                                   |                 |

Submit documentation to the Engineer for all items listed in the contract for which the Design-Build Team is requesting a steel price adjustment.

### **Submittal Requirements**

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

Furnish the following documentation for all steel products to be incorporated into the work and documented on Form SPA-2. Submit all documentation to the Engineer prior to incorporation of the steel into the completed work. The Department will withhold progress payments for the affected contract line item(s) if the documentation is not provided and, at the discretion of the Engineer, the work is allowed to proceed. Progress payments will be made upon receipt of the delinquent documentation.

Form SPA-2 can be found on the following website:

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

### Step 1 (Form SPA -2)

Utilizing Form SPA-2, submit separate documentation packages for each work item from Form SPA-1DB for which the Design-Build Team opted for a steel price adjustment. For work items with multiple steel components, each component shall be listed separately. Label each SPA-2 documentation package with a unique number as described below:

- a. Documentation package number: (Insert the work item) - (Insert sequential package number beginning with “1”)

Example: 412 - 1  
              412 - 2  
              424 - 1  
              424 - 2  
              424 - 3, etc.

- b. The steel product quantity in pounds

- i. The following sources shall be used, in declining order of precedence, to determine the weight of steel / iron, based on the Engineer’s decision:

1. Approved Shop Drawings
    2. Verified Shipping Documents
    3. Released for Construction (RFC) Plans
    4. Standard Drawing Sheets
    5. Industry Standards (e.g., AISC Manual of Steel Construction  
AWWA Standards, etc.)
    6. Manufacture’s data

- ii. Any item requiring approved shop drawings shall have the weights of steel calculated and shown on the shop drawings or submitted and certified separately by the fabricator.

- c. The date the steel product, subject to price adjustment, was shipped from the producing mill (Categories 1 - 3), received on the project (Categories 4 - 6), or casting date (Category 7).

### Step 2 (Monthly Calculator Spreadsheet)

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



- 1) Completed NCDOT Steel Price Adjustment Calculator Spreadsheet, summarizing all the steel submittal packages (Form SPA-2) actually incorporated into the completed work in the given month.
  - a. Contract Number
  - b. Bidding Index Reference Month
  - c. Contract Completion Date or Revised Contract Completion Date
  - d. County, Route and Project TIP information
  - e. Work Item Number from Table of Quantities
  - f. Line-Item Description (corresponding Trns\*port pay item)
  - g. Submittal Number from Form SPA-2
  - h. Adjustment Date
  - i. Pounds of Steel
- 2) An affidavit signed by the Design-Build Team stating the documentation provided in the NCDOT Steel Price Adjustment Calculator Spreadsheet is true and accurate.

### **Price Adjustment Conditions**

Download the Monthly Steel Adjustment Spreadsheet with the most current reference data from the Department's website each month. The Steel Price Adjustment Calculator Spreadsheet can be found on the following website:

**<https://connect.ncdot.gov/projects/construction/Pages/Construction-Resources.aspx>**

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

### **Price Adjustment Calculations**

The price adjustment shall be determined by comparing the percentage of change in index value listed in the Final Request for Proposals, including all Addenda, (BI) to the monthly index value (MI) (Reference the examples below). Weights and date of shipment shall be documented as required herein. The final price adjustment dollar value will be determined by multiplying this percentage increase or decrease in the index by the represented quantity of steel incorporated into the work, and the established bidding index (BI) subject to the limitations herein.

**Price increase / decrease shall be computed as follows:**

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where:

SPA = Steel price adjustment in dollars

- MI = Monthly Shipping Index - in Dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.
- BI = Bidding Index - in Dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the Final Request for Proposals, including all Addenda.
- Q = Quantity of steel, product, pounds actually incorporated into the work as documented by the Design-Build Team and verified by the Engineer.

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

Any apparent attempt to unbalance bids in favor of items subject to price adjustment, in the Department's sole discretion, may result in rejection of the Price Proposal.

Adjustments shall only be paid or charged to the Design-Build Team. Any Design-Build Team receiving a price adjustment under this provision shall distribute the proper proportional part of such adjustments to the subcontractor who performed the applicable work.

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

Price adjustments of eligible work items shall be adjusted up or down to a maximum of 50% from the Bid Index (BI) when compared to the Monthly Index (MI) of the steel product adjustment date. If the decrease in the steel material exceeds 50% of the BI, the Design-Build Team may submit to the Department additional market index information specific to the work item in question to dispute the decrease. The Department will review this information and determine if the decrease is warranted.

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

If the price adjustment is based on estimated material quantities for that time, and a revision to the total material quantity is made in a subsequent or final estimate, an appropriate adjustment will shall be made to the price adjustment previously calculated. The adjustment shall be based on the same indices used to calculate the price adjustment which is being revised. If the adjustment date of the revised material quantity cannot be determined, the adjustment for the quantity in question, shall be based on the indices utilized to calculate the steel price adjustment for the last initial

documentation package submission, for the steel product subject to price adjustment, that was incorporated into the particular work item, for which quantities are being finalized.

Example: Structural steel for a particular bridge was provided for in three different shipments with each having a different mill shipping date. The quantity of structural steel actually used for the bridge was calculated and a steel price adjustment was made in a progress payment. At the conclusion of the work an error was found in the plans of the final quantity of structural steel used for the bridge. The quantity to be adjusted cannot be directly related to any one of the three mill shipping dates. The steel price adjustment for the quantity in question shall be calculated using the indices that were utilized to calculate the steel price adjustment for the quantity of structural steel represented by the last initial structural steel documentation package submission. The package used shall be the one with the greatest sequential number.

### **Extra Work / Force Account**

When steel products, as specified herein, are added to the contract as extra work, in accordance with the provisions of Article 104-7 or 104-8, the Engineer will determine and specify in the supplemental agreement, the application of steel price adjustments on a case-by-case basis. A steel price adjustment shall not be made for any products manufactured from steel having an adjustment date prior to the supplemental agreement execution date. Price adjustments shall be made as provided herein, except the Bidding Index shall be based on the month in which the supplemental agreement pricing was executed.

For work performed on force account basis, reimbursement of actual material costs, along with the specified overhead and profit markup, shall be considered to include full compensation for the current cost of steel and steel price adjustments shall not be made.

### **Example: Form SPA-2**

#### **Steel Price Adjustment Submission Form**

|  |                                       |                     |                     |
|--|---------------------------------------|---------------------|---------------------|
| Contract Number                        | <u>C203394</u>                        | Bid Reference Month | <u>January 2019</u> |
| Submittal Date                         | <u>8/31/2019</u>                      |                     |                     |
| Work Item from the Table of Quantities | <u>237</u>                            |                     |                     |
| Work Item Description                  | <u>APPROX....LBS Structural Steel</u> |                     |                     |
| Sequential Submittal Number            | <u>2</u>                              |                     |                     |

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

Note: Attach the following supporting documentation to this form:

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

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

Printed Name

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Signature

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**Example: Form SPA-2****Steel Price Adjustment Submission Form**Contract Number C203394 Bid Reference Month January 2019Submittal Date August 31, 2019Work Item from the Table of Quantities 158Work Item Description SUPPORT, OVRHD SIGN STR -DFEB- STA 36+00 -L-Sequential Submittal  
Number 2

| Supplier         | Description of material                      | Location information  | Quantity in lbs. | Adjustment Date   |
|------------------|--|-----------------------|------------------|-------------------|
| XYZ mill         | Tubular Steel (Vertical legs)                | -DFEB- STA 36+00 -L-  | 12,000           | December 11, 2021 |
| PDQ Mill         | 4" Tubular steel (Horizontal legs)           | -DFEB- STA 36+00 -L-  | 5,900            | December 11, 2021 |
| ABC distributing | Various channel and angle shapes (see quote) | -DFEB- STA 36+00 -L-  | 1,300            | December 11, 2021 |
|                  | Catwalk assembly                             | -DFEB- STA 36+00 -L-  | 2,000            | December 11, 2021 |
| Nucor            | Flat plate                                   | -DFEB- STA 36+00 -L-  | 650              | December 11, 2021 |
|                  |  |                       |                  |                   |
|                  |  | Total Pounds of Steel | 21,850           |                   |

Note: Attach the following supporting documentation to this form.

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

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

Printed Name

Signature

**Example: Price Adjustment Calculation - Increase**

Price Proposal opened on September 17, 2019

Work Item 635 “Structural Steel” has a Released for Construction plan quantity of 2,717,000 pounds

Bidding Index for Structural Steel (Category 2) in the Final Request for Proposals, including all Addenda, was \$36.12 / CWT = BI

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

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

The Steel Price Adjustment formula shall be as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where: SPA = Steel price adjustment in dollars

BI = Bidding Index - in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the Final Request for Proposals, including all Addenda.

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

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

$$\text{BI} = \$36.12 / \text{CWT}$$

$$\text{MI} = \$64.89 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$64.89 / \$36.12 - 1) = (1.79651 - 1) = 0.79651162791$$

$$\text{Q} = 450,000 \text{ pounds}$$

$$\text{SPA} = 0.79651162791 * \$36.12 \times (450,000 / 100)$$

$$\text{SPA} = 0.79651162791 * \$36.12 * 4,500$$

SPA = \$129,465 pay adjustment to the Design-Build Team for Structural Steel (Structure 2 at Station 44+08.60 -L-)

**Example: Price Adjustment Calculation - Decrease**

Price Proposal opened on December 18, 2018

Work Item 635 Structural Steel has a Released for Construction plan quantity of 2,717,000 pounds

Bidding Index for Structural Steel (Category 2) in the Final Request for Proposals, including all Addenda, was \$46.72 / CWT = BI

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

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

The Steel Price Adjustment formula shall be as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where: SPA = Steel price adjustment in dollars

BI = Bidding Index - in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the Final Request for Proposals, including all Addenda.

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

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

$$\text{BI} = \$46.72 / \text{CWT}$$

$$\text{MI} = \$27.03 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$27.03 / \$46.72 - 1) = (0.57855 - 1) = -0.421446917808$$

$$\text{Q} = 600,000 \text{ pounds}$$

$$\text{SPA} = -0.421446917808 * \$46.72 * (600,000 / 100)$$

$$\text{SPA} = -0.421446917808 * \$46.72 * 6,000$$

SPA = \$118,140.00 pay adjustment (credit) to the Department for Structural Steel (Structure 1 at Station 22+57.68 -Y-)

**Example - Price Adjustment Calculation - Increase**

Price Proposal opened on July 16, 2020

Work Item 614 Reinforced Concrete Deck Slab has a Released for Construction plan quantity of 24,1974 pounds.

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

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

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

The Steel Price Adjustment formula shall be as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where: SPA = Steel price adjustment in dollars

BI = Bidding Index - in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the Final Request for Proposals, including all Addenda.

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

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

$$\text{BI} = \$29.21 / \text{CWT}$$

$$\text{MI} = \$43.13 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$43.13 / \$29.21 - 1) = (1.47655 - 1) = 0.47654912701$$

$$\text{Q} = 103,932 \text{ pounds}$$

$$\text{SPA} = 0.47654912701 * \$29.21 * (103,932 / 100)$$

$$\text{SPA} = 0.47654912701 * \$29.21 * 1,039.32$$

SPA = \$14,467.33 pay adjustment to the Design-Build Team for Reinforced Concrete Deck Slab (Category 1) at Station 107+45.55 -L-



**INDIVIDUAL MEETINGS WITH PROPOSERS**

(9-1-11)

DB1 G048

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

After issuance of the First Industry Draft RFP, the Design-Build Team's Utility Coordinator shall coordinate with the affected utility owners at their discretion.

After issuance of the First Industry Draft RFP, the Department will attempt to arrange a meeting between each individual proposer and the NCDOT Rail Division (Piedmont & Northern Railway rail corridor (P&N) Owners / Maintainers), referred to as the "Railroad".

The Department will afford each proposer two additional meetings with the Department (maximum two-hour 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 Price Proposals 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. 1-16-24)

DB1 G55A

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 Disadvantaged Business Enterprises (DBE) goals are established for this contract, the Proposer shall complete the form Listing of DBE Subcontractors contained elsewhere in this RFP in accordance with the *Disadvantaged Business Enterprises* 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 *Standard Specifications*, or Article 102-10 of the *Standard Specifications* 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 ~~ten~~ 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 to be submitted as an 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 **six** 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 (altdelivery@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 [e.g., 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 (e.g., 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 Technical Proposal submitted. This letter will be included in the distribution of the Technical Proposal 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 Proposal 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.

### **PAYOUT SCHEDULE**

(02-9-23) (Revised 1-16-24)

DB1 G57

No later than 12:00 o'clock noon on the 14th 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.

**SCHEDULE OF ESTIMATED COMPLETION PROGRESS**

(7-15-08) (Rev. 7-16-24)

108-2

DB1 G58

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

| <b><u>Fiscal Year</u></b> |                     | <b><u>Progress (% of Dollar Value)</u></b> |
|---------------------------|---------------------|--|
| 2026                      | (7/01/25 - 6/30/26) | 24% of Total Amount Bid                    |
| 2027                      | (7/01/26 - 6/30/27) | 21% of Total Amount Bid                    |
| 2028                      | (7/01/27 - 6/30/28) | 22% of Total Amount Bid                    |
| 2029                      | (7/01/28 - 6/30/29) | 19% of Total Amount Bid                    |
| 2030                      | (7/01/29 - 6/30/30) | 12% of Total Amount Bid                    |
| 2031                      | (7/01/30 – 6/30/31) | 2% of Total Amount Bid                     |

**DISADVANTAGED BUSINESS ENTERPRISE**

(10-16-07) (Rev. 5-9-24)

102-15(J)

SP1 G61

DB1 G061

**Description**

The purpose of this special provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

**Definitions**

*Additional DBE Subcontractors* - Any DBE submitted throughout the life of the project that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

*Committed DBE Subcontractor* - Any DBE submitted throughout the life of the project that is being used to meet the DBE goal by submission of a Letter of Intent. Or any DBE used as a replacement for a previously committed DBE firm.

*Contract Goal Requirement* - The approved DBE participation at time of award, but not greater than the advertised contract goal.

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

*DBE Open-Ended Performance Plan (OEPP)* – Written documentation from the Proposer submitted with the Technical Proposal on how the DBE goal will be achieved. The OEPP must include a commitment to meet the goal and provide details of the types of subcontracting work or

services with projected dollar amount that the Proposer will solicit DBEs to perform in addition to the other requirements as outlined in this special provision found elsewhere in the Request for Proposal (RFP).

*Disadvantaged Business Enterprise (DBE)* - A firm certified as a Disadvantaged Business Enterprise through the North Carolina Unified Certification Program.

*Goal Confirmation Letter* - Written documentation from the Department to the Proposer confirming the Design-Build Team's approved DBE Open-Ended Performance Plan along with a listing of the types of subcontracting work or services with the projected dollar amount.

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

*Regular Dealer* - A firm that owns (or leases), and operates a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in sufficient quantities, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, concrete or concrete products, gravel, stone, asphalt and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Any supplement of regular dealers' own distribution equipment shall be by a long-term operating lease and not on an ad hoc or contract-by-contract basis.

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

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

*North Carolina Unified Certification Program (NCUCP)* - A program that provides comprehensive services and information to applicants for DBE certification, such that an applicant is required to apply only once for a DBE certification that will be honored by all recipients of USDOT funds in the state and not limited to the Department of Transportation only. The Certification Program is 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.

**Forms and Websites Referenced in this Provision**

*DBE Payment Tracking System* - On-line system in which the Design-Build Team enters the payments made to DBE 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 DBE firms working on the project.

**<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>**

*RF-1 DBE Replacement Request Form* - Form for replacing a committed DBE.

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

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

**<https://connect.ncdot.gov/projects/construction/Construction%20Forms/SAF%20Form%20-%20Subcontract%20Approval%20Form%20Revised%2004-19.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 DBE subcontractor, manufacturer, regular dealer or distributor that affirms that a portion of said contract is going to be performed by the signed DBE for the estimated amount (based on quantities and unit prices) during the life of the project.

**<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>**

*Subcontractor Quote Comparison Sheet* - Spreadsheet for showing all subcontractor quotes in the work areas where DBEs quoted on the project. This sheet is submitted with good faith effort packages during the life of the project.

**<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>**

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

**<https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20Regular%20Dealer-Distributor%20Affirmation%20Form%20-%20USDOT%202024.pdf>**

## **DBE Goal**

The following DBE goal for participation by Disadvantaged Business Enterprises is established for this contract:

Disadvantaged Business Enterprises **4.0%**

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

This goal is to be met through utilization of highway construction contractors and/or right of way acquisition firms. The utilization of DBE firms performing design, other preconstruction services, or Construction Engineering and Inspection are not included in this goal.

## **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 DBE certified shall be used to meet the DBE 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.

**DBE Open-Ended Performance Plan (OEPP)**

In design-build contracting, the Department shall set a DBE goal that a proposer must show how it plans to meet the goal when submitting a DBE Open-Ended Performance Plan (OEPP) with its technical proposal.

To be considered responsive, the OEPP must include a commitment to meet the goal and provide details of the types of subcontracting work or services (with projected dollar amount) that the proposer will solicit DBEs to perform. The OEPP must include an estimated time frame in which actual DBE subcontracts would be executed during the life of the project and annual participation target by contract year. The OEPP must also include proposed DBE Outreach efforts. A statement must be provided by the proposer agreeing to take all reasonable steps to follow the DBE Open-Ended Performance Plan and meet the DBE requirements as stated in the proposal.

After award of the contract, the Design-Build Team shall identify DBE firms throughout the life of the project to perform the scopes of work listed in its OEPP. Only those subcontractors identified to meet the DBE goal will be considered committed, even though the OEPP shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted during the life of the project will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time the Subcontract Approval Form (SAF) is submitted to the Department for approval will be acceptable for listing in the Contractor's OEPP.

*If the DBE goal is zero, a DBE Open-Ended Performance Plan (OEPP) is not required for the zero goal, however any DBE participation that is achieved during the life of the project shall be reported in accordance with requirements contained elsewhere in this special provision.*

The use of the OEPP for the Design-Build project shall be in accordance with the Department's DBE Open-Ended Performance Plan (OEPP) Guidelines. The OEPP Guidelines can be found at the following link.

**[NCDOT DBE Open-Ended Performance Plan \(OEPP\) Guidelines Link](#)**

**DBE Prime Contractor**

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

For example, if the DBE goal is 45.0% and the DBE proposer will only perform 40.0% of the contract work, the prime will list itself at 40.0%, and the additional 5.0% shall be obtained through additional DBE participation with DBE subcontractors or documented through a good faith effort.

DBE Prime Contractors shall also follow the DBE Open-Ended Performance Plan just as a non-DBE proposer would.

### **Written Documentation – Letters of Intent**

The Design-Build Team shall submit written documentation throughout the life of the project for each DBE that will be used to meet the DBE contract goal, indicating the Design-Build Team's commitment to use the DBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be sent to the Engineer for review and approval. If the Design-Build Team fails to submit the Letter of Intent (LOI) for a committed DBE firm for each specified scope of work (and dollar amount) as listed in the OEPP to be used toward the DBE goal, or if the form is incomplete (e.g., both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal as outlined in the Design-Build Team's OEPP, the Design-Build Team shall submit evidence of good faith efforts, completed in its entirety.

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

Once the design-build contract is awarded, the Department shall provide ongoing monitoring and oversight to evaluate whether the Design-Build Team is using good faith efforts to comply with the OEPP and schedule. The Department and the Design-Build Team may agree to make written revisions of the OEPP throughout the life of the project, e.g., replacing the type of work items the Design-Build Team will solicit DBEs to perform and/or adjusting the proposed schedule, as long as the Design-Build Team continues to use good faith efforts to meet the goal.

Solicitations shall be provided at least thirty (30) days prior to the availability of the work scope as defined in the DBE Open-Ended Performance Plan. Documentation of DBE 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. 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.

### **Consideration of Good Faith Effort for Projects with DBE Goals More Than Zero**

Adequate good faith efforts mean that the Design-Build Team took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient DBE participation. Adequate good faith efforts also mean that the

Design-Build Team actively and aggressively sought DBE 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 Design-Build Team has made. Listed below are examples of the types of actions a Design-Build Team will take in making a good faith effort to meet the goal 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 DBEs who have the capability to perform the work of the contract. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The Design-Build Team must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
- (B) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.
  - (1) Where appropriate, break out contract work items into economically feasible units to facilitate DBE participation, even when the Design-Build Team 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 DBE goal when the work to be sublet includes potential for DBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested DBEs 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 DBEs. It is the Design-Build Team's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, to facilitate DBE participation.
  - (2) A Design-Build Team using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a Design-Build Team's failure to meet the contract DBE 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 Design-Build Team of the responsibility to make good faith efforts. Design-Build Teams are not, however,



required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

- (E) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The firms standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Design-Build Team's efforts to meet the project goal.
- (F) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or Design-Build Team.
- (G) Making efforts to assist interested DBEs 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 DBEs. Contact the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov for assistance with soliciting DBE quotes for the various scopes of work.
- (I) Any other evidence that the Design-Build Team submits which shows that the Design-Build Team has made reasonable good faith efforts to meet the DBE goal.

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

- (1) Whether the Design-Build Team's documentation reflects a clear and realistic plan for achieving the DBE goal.
- (2) The Design-Build Team's past performance in meeting the DBE goals.

### **Counting DBE Participation Toward Meeting DBE Goal**

#### **(A) Participation**

The total dollar value of the participation by a committed DBE will be counted toward the contract goal requirement. The total dollar value of participation by a committed DBE will be based upon the value of work performed by the DBE and the actual payments to DBE firms by the Design-Build Team.

#### **(B) Joint Checks**

Prior notification of joint check use shall be required when counting DBE 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 DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does not count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

(D) Joint Venture

When a DBE 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 DBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the DBE performs with its forces.

(E) Manufacturer, Regular Dealer, Distributor

A Design-Build Team may count toward its DBE requirement 40 percent of its expenditures for materials or supplies (including transportation costs) from a DBE distributor, 60 percent of its expenditures for materials or supplies (including transportation costs) from a DBE regular dealer and 100 percent of such expenditures obtained from a DBE manufacturer.

A Design-Build Team may count toward its DBE requirement the following expenditures to DBE firms that are not manufacturers, regular dealers or distributors:

- (1) The fees or commissions charged by a DBE 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 DBE, which is neither a manufacturer, regular dealer, nor a distributor count the entire amount of fees or commissions charged that the Department deems to be reasonable, including transportation charges for the delivery of materials or supplies. Do not count any portion of the cost of the materials and supplies themselves.

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

### **Commercially Useful Function**

#### **(A) DBE Utilization**

The Design-Build Team may count toward its contract goal requirement only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE 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 DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is performing and the DBE credit claimed for its performance of the work, and any other relevant factors.

#### **(B) DBE Utilization in Trucking**

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

- (1) The DBE 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 DBE goals.
- (2) The DBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The DBE 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 DBE may subcontract the work to another DBE firm, including an owner-operator who is certified as a DBE. The DBE who subcontracts work to another DBE receives credit for the total value of the transportation services the subcontracted DBE provides on the contract.
- (5) The DBE may also subcontract the work to a non-DBE firm, including from an owner-operator. The DBE who subcontracts the work to a non-DBE is entitled

to credit for the total value of transportation services provided by the non-DBE subcontractor not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE 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 DBE and the Design-Build Team will not count towards the DBE contract requirement.

- (6) A DBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the DBE 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 DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. This type of lease may count toward the DBE's credit as long as the driver is under the DBE's payroll.
- (7) Subcontracted / leased trucks shall clearly display on the dashboard the name of the DBE 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.

### **DBE Replacement**

When a Design-Build Team has relied on a commitment to a DBE subcontractor (or an approved substitute DBE subcontractor) to meet all or part of a contract goal requirement, the Design-Build Team shall not terminate the DBE or any portion of its work 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 DBE subcontractor, a non-DBE subcontractor, or with the Contractor'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 DBE subcontractor, with a copy to the Engineer of its intent to request to terminate a DBE subcontractor or any portion of its work, and the reason for the request. The Design-Build Team must give the DBE subcontractor five (5) business days to respond to the Design-Build Team's notice of intent to request termination and / or substitution. If the DBE subcontractor objects to the intended termination / substitution, the DBE, within five (5) 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 DBE subcontractor.

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

- (a) The listed DBE subcontractor fails or refuses to execute a written contract;
- (b) The listed DBE 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 DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Prime Contractor;
- (c) The listed DBE subcontractor fails or refuses to meet the Prime Contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed DBE 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 DBE subcontractor is not a responsible contractor;
- (g) The listed DBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (i) A DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract; and
- (j) Other documented good cause that compels the termination of the DBE subcontractor.

The Design-Build Team shall comply with the following for replacement of a committed DBE:

(A) Performance Related Replacement

When a committed DBE is terminated for good cause as stated above, an additional DBE that was submitted at the time the Price Proposal was submitted may be used to fulfill the DBE commitment. A good faith effort will only be required for removing a committed DBE if there were no additional DBEs submitted at the time the Price Proposal was submitted to cover the same amount of work as the DBE that was terminated.

If a replacement DBE is not found that can perform at least the same amount of work as the terminated DBE, 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 DBEs that their interest is solicited in contracting the work defaulted by the previous DBE or in subcontracting other items of work in the contract.
  - (2) Efforts to negotiate with DBEs for specific subbids including, at a minimum:
    - (a) The names, addresses, and telephone numbers of DBEs who were contacted.
    - (b) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed.
  - (3) A list of reasons why DBE quotes were not accepted.
  - (4) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Design-Build Team.
- (B) Decertification Replacement
- (1) When a committed DBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement but not the overall goal.
    - (i) If the DBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract. The Department may continue to count participation equal to the remaining work performed by the decertified firm which will count toward the contract goal requirement and overall goal.
    - (ii) If the DBE's ineligibility is caused solely by its acquisition by or merger with a non-DBE during the performance of the contract. The Department may not continue to count the portion of the decertified firm's performance on the contract remaining toward either the contract goal or the overall goal, even if the Contractor has executed a subcontract with the firm or the Department has executed a prime contract with the DBE that was later decertified.
  - (2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Contractor shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the DBE goal requirement. If a DBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

All requests for replacement of a committed DBE 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 DBE, 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 DBE based upon the Design-Build Team's commitment, the DBE shall participate in additional work to the same extent as the DBE 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 DBEs 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 DBE, the Design-Build Team shall seek participation by DBEs 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 DBE, the Design-Build Team shall seek additional participation by DBEs equal to the reduced DBE 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 DBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving DBE 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 DBE 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 (40.0%, 60.0% or 100.0%) of expenditures claimed for DBE credit.

**Reporting Disadvantaged Business Enterprise Participation**

The Design-Build Team shall provide the Engineer with an accounting of payments made to all DBE 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 DBEs, 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 or any affiliate companies within the Design-Build Team from being approved for work on future NCDOT projects until the required information is submitted.

Design-Build Teams reporting transportation services provided by non-DBE 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 DBE Payment Tracking System.

**Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *Standard Specifications* may be cause to disqualify the Prime Contractor or any affiliated companies within the Design-Build Team from further bidding.



**SPECIAL NOTICE TO BIDDERS**

(2-19-13) (Rev. 1-16-24)

DB1 G71

This project involves constructing new railroad roadbed on existing Railroad right of ways. The North Carolina Department of Transportation will be administering the project and the work will be constructed in accordance with the *Standard Specification*. Portions of the work will be done in accordance with *Norfolk Southern, Standard Specifications for Materials and Construction*, latest edition.

The construction will be taking place in existing Railroad right of way owned by North Carolina Department of Transportation Rail Division (NCDOT Rail Division). Safety in the right of way will be top priority and Norfolk Southern'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 special provisions.

All work adjacent to the live tracks shall be coordinated with the NCDOT Rail Division Roadway Worker In Charge, as defined later in the *Protection of Railroad Interest* Project Special Provision found elsewhere in this RFP. As a result of safety requirements for passing trains, there will be intermittent delays requiring all equipment within 25' of the operating tracks to stop work until authorized to proceed by the 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 the Railroad or the Department for any delays or additional cost incurred for the delays or any changes to the information above.

**PROTECTION OF RAILROAD INTEREST**

(2-19-13) (Rev. 1-16-24)

DB1 G73

**KEY STAKEHOLDERS AND ROLES FOR THE JOB**

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

| <b>TERMS</b>   | <b>DEFINITIONS</b>  |
|--|---|
| Owner, Company   | North Carolina Department of Transportation Rail Division (NCDOT Rail Division). They own the right of way / easement, facilities, tracks, structures, etc..  |
| Owner's Engineer / Representative                      | North Carolina Department of Transportation Rail Division's engineer or their authorized representative for the project.  |
| Operating Railroad, Railroad, Railway, Railway Company | No current operator and NCDOT Rail Division maintains the track facilities and signals.   |
| Railroad Engineer                                      | Track is inactive/inaccessible with no current rail operations / operator and NCDOT Rail Division maintains the track facilities and signals as the Owner Engineer.   |
| RWIC / Flagman   | Roadway Worker In Charge. This is the Design-Build Team's onsite representative responsible for work activities adjacent to / on the tracks by on-track construction equipment 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                | <i>AREMA Manual for Railway Engineering</i> , latest edition, <i>Norfolk Southern Railway - Standard Specifications for Materials and Construction</i> , latest edition, and the 2024 <i>NCDOT Standard Specifications for Roads and Structures</i> .   |
| 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                             | <i>Norfolk Southern Railway Public Projects Manual</i> , Latest Edition.  |

**AUTHORITY OF RAILROAD ENGINEER AND DEPARTMENT ENGINEER**

The authorized representative of the Operating Railroad Company, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of Railroad facilities including the adequacy of the foundations and structures supporting the Railroad tracks.

The authorized representative of the North Carolina Department of Transportation, hereinafter referred to as the Engineer or Department Engineer, shall have authority over all other matters as prescribed herein including Project Specifications, Special Provisions and the plans developed by the Design-Build Team.

## **SAFETY GUIDELINES FOR PERSONNEL WORKING ON COMPANY CORRIDOR**

The P&N Belmont Spur track is inactive and inaccessible for train operations. On-track construction equipment and workers will be present and FRA or Roadway Worker Protection rules governing such need to be adhered to. All Design-Build Team personnel working on Railroad right of way / easement and on or adjacent to NCDOT Rail Division tracks shall attend and pass a Roadway Worker Training course for NSR prior to beginning work on the Railroad right of way / easement and shall attend the class annually. The Design-Build Team personnel shall adhere to the following safety guidelines:

- (A) The Design-Build Team shall follow all applicable Railroad and governmental rules, with particular attention paid to Railroad operating rules, Railroad rules for the conduct of contractors, Railroad rules for the operation of moving vehicles (particularly on-track work equipment), and Federal Railway Administration (FRA) roadway worker rules.
- (B) No one shall be allowed within 25 feet of the centerline of the nearest track without the specific authorization of the RWIC / flagman.
- (C) The Design-Build Team shall wear the following while on or about the Railroad right of way / easement:
  - (1) Appropriate head protection
  - (2) Appropriate eye protection
  - (3) Appropriate hearing protection
  - (4) Appropriate respiratory protection
  - (5) Appropriate high visibility reflective safety vests are required for work inside active intermodal facilities, public rights of way, or other locations as required by the Company and the MUTCD
  - (6) Suitable protective clothing and footwear. Working in shorts shall be prohibited. Shirts shall cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots shall be prohibited. Hard sole, lace up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Safety steel toe boots shall be required.
  - (7) All protective equipment shall be in good condition and properly fitted
- (D) The Design-Build Team shall observe the safety provisions of applicable laws and building and construction codes shall be observed. Machinery and equipment and other hazards shall be guarded in accordance with the safety provisions of the most recent edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are consistent with applicable

law or regulation.

- (E) The Design-Build Team shall permit only qualified personnel to perform welding. Proper clothing, gloves and shields shall be worn for body and eye protection. All welding equipment shall be properly tested and in good working order.
- (F) Anyone working on the Railroad right of way / easement found to be under the influence of alcohol or other intoxicant, narcotic or hallucinogenic drug, or in possession of such intoxicant or drug, shall be immediately dismissed from the property by the Design-Build Team and not allowed to return.
- (G) When anyone working on the Railroad right of way / easement is injured, the Design-Build Team shall arrange for emergency medical assistance, if needed, and the Design-Build Team shall notify Railroad Owner / Engineer and the Department's Engineer of such incident by the quickest method of communication available.
- (H) The Design-Build Team shall not use defective or improvised tools and / or equipment to perform the work.
- (I) At the direction of the Railroad Owner / Engineer and / or the Department's Engineer, the Design-Build Team shall work with local emergency response personnel to develop action plans to respond to emergency situations.
- (J) The Design-Build Team shall maintain emergency site access for local emergency response personnel at all times.
- (K) The Design-Build Team shall promptly notify the Railroad Owner / Engineer and the Department Engineer of all safety incidents and / or injuries involving any person(s) on the project site.
- (L) The Design-Build Team shall hold daily safety briefings involving all personnel working on site per Railroad safety rules. Personnel arriving onsite after the safety briefing shall be briefed before proceeding with their work. The Design- Build Team and all personnel shall hold additional safety briefings during the day as conditions or work changes.
- (M) The Design Build Team shall obtain eRailSafe certification for personnel working within the Railroad right of way / easement upon award of Contract. The Design-Build Team shall follow all eRailSafe requirements and escort all subcontractors or non-certified employees on site. Information about requirements and responsibilities to become eRailSafe can be found at: **<http://www.e-railsafe.com/>**
- (N) The Design-Build Team personnel working within the Railroad right of way / easement shall obtain FRA and approved Roadway Worker Certification through an approved trainer.

- (O) All persons working near Railroad tracks while on-track work equipment is passing shall lookout for dragging bands, chains and / or protruding or shifted cargo. If any of these are observed, they must notify the RWIC / flagman immediately.
- (P) No one shall cross tracks without specific authorization from the flagman.
- (Q) Steel tape and / or chain shall not cross or touch rails without permission from the flagman.

### **GUIDELINES FOR EQUIPMENT WORKING ON COMPANY'S CORRIDOR**

The following shall apply to all equipment being operated within the Railroad right of way / easement:

- (A) The Design-Build Team's actions shall not interfere with on-track equipment construction operations. The Design-Build Team shall provide a weekly schedule of activities that may affect on-track equipment operations or require flagging protection.
- (B) NCDOT Rail Division will provide service outages only when absolutely required for construction activities as determined by the Railroad Owner / Engineer. No claim by the Design-Build Team against NCDOT Rail Division and / or the Department will be allowed for delays caused by NCDOT Rail Division's operations.

#### **\* \* NOTE \* \* Deleted Paragraph**

- (D) At locations where a flagman is deemed necessary by the Railroad Owner / Engineer for the safety of NCDOT's property and operations (such as at highway/railroad crossings), the Design-Build Team shall observe the directions given by Railroad Owner / Engineer. The Design-Build Team shall assure that it's officers, agents, suppliers, subcontractors and employees observe the directives given by the Railroad Owner / operator. It shall be distinctly understood, however, that no direction or failure to give direction by the Railroad Owner / operator will relieve the Design-Build Team from any of its indemnification commitments.
- (E) No one shall be within 25 feet of the centerline of the nearest track without the specific authorization of the RWIC / flagman.
- (F) No one shall cross the tracks without specific authorization of the RWIC / flagman.
- (G) All persons working near the track while on-track equipment is passing shall look for dragging bands, chains and protruding or shifted cargo. If any of these are observed, they must notify the RWIC / flagman immediately.
- (H) No one shall pass between, over or under on-track equipment.

- (I) Steel chain, metallic chain and / or measuring tape shall not cross or touch rails without permission from the RWIC / flagman.
- (J) Construction materials shall not be placed on tracks without approval of the Railroad Engineer or RWIC / flagman.
- (K) When working on tracks, switches shall be lined away from the work area and switch points spiked down or clamped or rail ends mismatched to prevent rail cars or engines from entering the work area.
- (L) Crane and / or boom equipment shall not be set up to work or be parked within boom distance plus 15 feet of centerline of track without specific permission from the Company official and flagman.
- (M) Crane and / or boom equipment shall not foul track or lift a load over the track without flagman protection.
- (N) All employees shall stay with their machines when crane or boom equipment is pointed toward track.
- (O) All cranes and boom equipment under load shall stop work while on-track work equipment is passing (including pile driving).
- (P) All swinging loads shall be secured to prevent movement while on-track work equipment is passing. Loads shall not be suspended above a moving train.
- (Q) Equipment shall not be within 25 feet of centerline of track without specific authorization of the flagman.
- (R) Trucks, tractors and / or any equipment shall not touch ballast line without specific permission from the flagman.
- (S) Equipment and / or load movement shall not be within 25 feet or above an on-track railroad equipment without specific authorization from the flagman.
- (T) All operating equipment within 25 feet of track shall halt operations when on-track work equipment is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.
- (U) All equipment, loads and cables shall be prohibited from touching the rails.
- (V) While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.

- (W) The Design-Build Team shall be responsible for the ingress and egress of its plant, equipment, materials and labor to and from the construction site in accordance with the following:
- (1) No movement that may endanger the safe normal NCDOT operations (highway or rail) shall be made without the approval of the Railroad Owner / Engineer as to route and time of use.
  - (2) No movement of the Design-Build Team's equipment, materials and / or labor to and from the site shall be made without the approval of the RWIC / flagman.
- (X) NCDOT regulations concerning the movement of vehicles on NCDOT property shall be followed by the Design-Build Team, including, without limitation, weight restrictions for roadways.
- (Y) Use of access routes shall not cause the fouling of turnouts, flangeways, equipment, and drainage facilities with gravel, mud, waste materials, or timbers used for crossing tracks. Such routes shall be planned in such a way to minimize the risk of damage to NCDOT facilities and shall be approved by the Railroad Engineer.
- (Z) Equipment and / or materials shall not be parked or stored on NCDOT highway or rail Owner / corridor unless specific authorization is granted from the Railroad Owner / Engineer.
- (AA) All unattended equipment that is left parked on NCDOT's corridor shall be effectively immobilized so that it cannot be moved by unauthorized persons.
- (BB) All cranes and boom equipment shall be turned away from track after each work day or whenever unattended by an operator.

## FAILURE TO COMPLY WITH SAFETY REQUIREMENTS

Failure to comply with any safety requirements within the NCDOT right of way / easement may result in the removal of the individual or individuals responsible for violation of policies. Depending upon the severity of the violation as determined by the Railroad Owner / Engineer, the Department's Engineer, the individual or individuals implicated must leave the NCDOT right of way / easement within one hour of notification of the violation. Depending on the severity of the violation, the individual or individuals who were involved in the incident may be able to return to the job the following day. That determination will be made by the Railroad Owner/Engineer and the Department's representative on site. The individual or individuals will be notified if they are allowed to return the following day by the close of business the day of the occurrence. If they are not allowed to return the next day, the Design-Build Team may file an appeal to the Department's Engineer requesting the individual or individuals accused of the violation be allowed to return to the job. The Engineer will then notify the NCDOT of the appeal and a meeting will be held to determine if the individual or individuals will or will not be allowed to return to the job. The individual or individuals alleged to have committed the violation will not be allowed on the project until after the Railroad Owner / Engineer and Department Engineer have reviewed the appeal and

made a determination if the individual or individuals may return. If a person is allowed to return to the site after the appeal process and a second violation of policies occurs, that will be grounds for permanent removal of the individual from the worksite. This does not only apply to individuals, but may apply to entire crews as well depending on the circumstances and severity of the violation of policy. The Design-Build Team shall have no claims whatsoever against the Railroad Owner / Engineer or the Department for any delays or additional cost incurred as a result of safety violations and removal of the individual or individuals from the job.

## **FEDERAL RAILROAD ADMINISTRATION (FRA) SAFETY REQUIREMENTS**

In addition to safety guidelines above, the Design-Build Team shall adhere to the safety requirements of the Federal Railroad Administration and comply with Title 49, Volume 4, Chapter 2, Part 213 and 214 of the Code of Federal Regulations. This information can be found at the following website:

**<http://ecfr.gpoaccess.gov/cgi/t/text/text-dx?c=ecfr&sid=ef344d8e404793fcb6650641e75f7e43&rgn=div5&view=text&node=49:4.1.1.1.8&idno=49>**

The FRA may conduct inspections on this project and fines can be levied against both the individual cited and the Design-Build Team for violations of these policies. The Design-Build Team shall have no claims whatsoever against the NCDOT Owner / Engineer or the Department for any delays or additional cost incurred as a result of violations and fines for noncompliance with the above FRA guidelines.

## **RAILROAD INSURANCE - SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTEREST**

**State Project:** I-5719B

**County:** Gaston

- (A) In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Design-Build Team shall provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under 23 CFR 646A for all work to be performed on NCDOT's corridor by carrying insurance of the following kinds and amounts:

- (1) DESIGN-BUILD TEAM'S COMMERCIAL GENERAL LIABILITY INSURANCE:

The Design-Build Team shall furnish an original and one copy of the certificate of insurance and one certified copy of the policy to the Department as evidence that, with respect to the operations the Design-Build Team performs on Company right of way / easement, the Design-Build Team carries regular Commercial General Liability Insurance having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard



(XCU) coverage, shall be endorsed to name Company specified in Item A.2.c. below as an additional insured, and shall include a severability of interests provision.

(2) RAILROAD PROTECTIVE LIABILITY INSURANCE:

**\* \* NOTE \* \* Deleted Paragraphs**

Because the Belmont Spur track for I-5719B is inactive/inaccessible, and as practiced by the NCDOT Rail Division in performing work on other such preserved/inactive corridors that it maintains, Railroad Protective Liability Insurance will not be required.

- (c) The named insured on the policy as required to be issued to the NCDOT shall read:

NCDOT Rail Division  
1 South Wilmington Street Raleigh, NC 27601  
Attention: Operations & Facilities;

- (d) The description of operations shall appear on the Declarations, shall match the project description in the Railroad Agreement(s), and shall include the appropriate Department project and contract identification numbers.

The Description and Designation shall read:

Replacement of Grade Separations and NCDOT Rail Division tracks over Interstate 85 and S. Main Street in Belmont, NC, Gaston County, I-5719B.

- (e) The job location shall appear on the Declarations and shall include the city, state and appropriate highway name / number.
- (f) The name and address of the prime contractor shall appear on the Declarations.
- (g) The name and address of the Department shall be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."
- (h) Other endorsements / forms that will be accepted include the following:
- (1) Broad Form Nuclear Exclusion - Form IL 00 21
  - (2) 30-day Advance Notice of Non-renewal or cancellation
  - (3) 60-day written notice be given the Department prior to cancellation or change
  - (4) Quick Reference or Index Form CL/IL 240
- (i) Endorsements / forms that are NOT acceptable include the following:

- (1) Any Pollution Exclusion Endorsement except CG 28 31
  - (2) Any Punitive or Exemplary Damages Exclusion
  - (3) Known injury or Damage Exclusion form CG 00 59
  - (4) Any Common Policy Conditions form
  - (5) Any other endorsement / form not specifically authorized in item No. 2.h above.
- (B) If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on the NCDOT right of way / easement. As an alternative, the Design-Build Team may provide insurance for the subcontractor by means of separate and individual policies.
- (C) Prior to entry on NCDOT's corridor, the original and one duplicate copy of the Commercial certificates of insurance evidencing the Design-Build Team's and any subcontractors' Commercial General Liability Insurance shall be submitted by the Design-Build Team to the Department and Company at the addresses below, and one certified copy of the Design-Build Team and any Subcontractor's policy is to be forwarded to the Department for its review and transmittal to the Company. All policies and certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to the Department and Company. The Company will not permit any work on Company's corridor until the Company has reviewed and approved the evidence of insurance required herein.

**DEPARTMENT**

NCDOT Rail Division  
Engineering & Safety Branch  
c/o State Railroad Agent  
1556 Mail Service Center  
Raleigh, NC 27699-1556

**COMPANY**

NCDOT Rail Division 1556 Mail Service Center  
Raleigh, NC 27699-1556

- (D) The insurance required herein shall not limit the obligations of Department or its Design-Build Team under the Railroad Agreement(s) terms.
- (E) The insurance amounts specified are minimum amounts and the Design-Build Team may carry insurance in larger amounts if the Design-Build Team so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, the Design-Build Team shall immediately notify the Department and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one-half of the aggregate limit, the Design-Build Team shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the

Department and Company as to form and amount prior to beginning work on NCDOT's corridor.

- (F) All insurance herein before specified shall be carried until the final inspection and acceptance of the project by the Department and Company, or acceptance of that portion of the project within NCDOT's corridor. At this point, no work or any other activities by the Design-Build Team shall take place in NCDOT's corridor without written permission from the Department and Company.

## FAILURE TO COMPLY

In the event the Design-Build Team violates or fails to comply with any of the requirements of this Request for Proposals:

- (1) The Railroad Owner / Engineer may require that the Design-Build Team vacate Company's corridor.
- (2) The Railroad Owner / Engineer may withhold monies due the Design-Build Team on monthly statements.

Any such orders shall remain in effect until the Design-Build Team has remedied the situation to the satisfaction of the Railroad Owner / Engineer.

## PAYMENT FOR COST OF COMPLIANCE

No separate payment shall be made for any extra costs incurred on account of compliance with the Request for Proposal requirements. All such costs shall be included in the lump sum bid for the entire project.

## RAILROAD SITE DATA

The following information is provided as a convenience to the Design-Build Team. Since this information is subject to change without notice, the Design-Build Team shall contact the Company to verify the accuracy. Additionally, since this information is shown as a convenience to the Design-Build Team and is subject to change, the Design-Build Team shall have no claims whatsoever against either the Company or the Department for any delays or additional costs incurred based on changes in this information.

|                          |   |
|--------------------------|---|
| Number of tracks         | 1 Main Tracks and 0 Siding Track        |
| Number of trains per day | Track is inactive / inaccessible        |
| Type of trains per day   | 0 Passenger Trains and 0 Freight Trains |
| Maximum train speed      | N/A                                     |

**NOTICE OF STARTING WORK**

The Design-Build Team shall not commence any work on NCDOT's corridor until the Design-Build Team has complied with the following conditions:

- (A) Give the Company written notice, with copy to the Engineer who has been designated to be in charge of the work, at least ten days in advance of the date the Design-Build Team proposes to begin work on NCDOT's corridor / right of way / easement. Notice to be given to:

Mr. Jeff Cole, PE  
NCDOT Rail Division  
1556 Mail Service Center  
Raleigh, NC 27699-1553

- (B) Obtained written authorization from NCDOT Rail Division to begin work on Railroad right of way / easement, such authorization to include an outline of specific conditions with which the Design-Build Team must comply.
- (C) Obtained written approval from the Company of Commercial General Liability coverage as required by the Railroad Insurance - Special Provisions for Protection of Railway Interest section above. The Company shall not accept notation of Railroad protective insurance on a certificate of liability insurance form or Binders, as the Company must have the full original countersigned policy. The policy will be reviewed for compliance prior to written approval. Due to the number of projects system-wide, it typically takes a minimum of 30 - 45 days for Company to review.
- (D) Furnish a schedule for all work within the Company right of way / easement, as required. Obtain written authorization from the Company to begin work on Company right of way / easement, such authorization to include an outline of specific conditions with which the Design-Build Team must comply.
- (E) Obtain Railroad's Flagging Services, as required.
- (F) The Design-Build Team must execute and deliver to NCDOT Rail Division a standard construction right of entry agreement approved by NCDOT Rail Division.

The Company's written authorization to proceed with the work shall include the names, addresses and telephone numbers of the Company's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

**INTERFERENCE/IMPACT WITH RAILROAD PROPERTY**

The Design-Build Team shall so arrange and conduct work such that there will be no damage to the property of the Company or to poles, wires, and other facilities of tenants on the Company right of way / easement. Whenever work is liable to affect the property the method of doing such work shall first be submitted to the Railroad Owner / Engineer for approval, but such approval shall not relieve the Design-Build Team from liability. Any work to be performed by the Design-Build Team which requires flagging or construction observation service shall be deferred by the Design-Build Team until the service required by the Company is available at the job site.

**\* \* NOTE \* \* Deleted Paragraph**

Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect property of the Company, the Design-Build Team shall make such provisions. If in the judgment of the Railroad Owner / Engineer, or in his absence, the Department Engineer, such provision is insufficient, either may require or provide such provisions as deemed necessary. In any event, such unusual provisions shall be at the Design-Build Team's expense and without cost to the Department or Company.

**TRACK CLEARANCES**

(A) Before undertaking any work within Company right of way / easement, or before placing any obstruction over any track, the Design-Build Team shall:

- (1) Notify the NCDOT Owner / Engineer at least 72 hours in advance of the work.
- (2) Receive assurance from the Railroad Owner / Engineer that arrangements have been made for flagging service as may be necessary.
- (3) Receive permission from the NCDOT Owner / Engineer to proceed with the work.
- (4) Ascertain that the Engineer has received copies of notice to the Company and of the Company's response thereto.

(B) The minimum track clearances to be maintained by the Design-Build Team during construction are as follows:

**\*\*NOTE\*\* Deleted Sections (1) and (2)**

As determined by the Design-Build Team to be in compliance with any FRA or Roadway Worker Protection rules for inactive / inaccessible track.

**CONSTRUCTION PROCEDURES****(A) General**

Construction work and operations by the Design-Build Team on NCDOT's property shall be:

- (1) Subject to the inspection and approval of the NCDOT Rail Division and NCDOT.
- (2) In accordance with all of the NCDOT's written specific conditions.
- (3) In accordance with the NCDOT's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.
- (4) In accordance with this Request for Proposals.

**(B) Excavation**

The subgrade of a track with on-track construction equipment shall be maintained with edge of berm at least 7'-0" from centerline of track and not more than 45" below top of rail. The Design-Build Team will not be required to make an existing section meet this specification if substandard, in which case existing section will be maintained.

**(C) Excavation for Structures**

The Design-Build Team shall take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting, for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. All plans and calculations for shoring shall be prepared and signed by a North Carolina Registered Professional Engineer. The Professional Engineer shall be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values which will accurately reflect the actual field conditions. The procedure for doing such work, including need of and plans for shoring, shall first be reviewed by the Department Engineer then reviewed and approved by the Railroad Engineer, but such approval shall not relieve the Design-Build Team from liability.

Additionally, a walkway with handrail protection may be required as noted in the section for Trainman's walkways herein.

**(D) Demolition, Erection, Hoisting**

- (1) Company tracks and other Company corridor or railroad property must be protected from damage during all operations.
- (2) The Design-Build Team shall submit a plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.

- (3) A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted.
- (4) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the existing and / or proposed structure showing complete and sufficient details with supporting data for the demolition or erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements shall be made under the supervision of the North Carolina Registered Professional Engineer submitting the procedure and calculations.
- (5) A data sheet must be submitted listing the types, size and arrangements of all rigging and connection equipment.
- (6) A complete procedure shall be submitted, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
- (7) All erection or demolition plans, procedures, data sheets, etc. submitted shall be prepared, signed and sealed by a North Carolina Registered Professional Engineer.
- (8) The Railroad's Owner / Engineer must be present at the site during the entire demolition and erection procedure period.
- (9) All procedures, plans and calculations shall first be approved by the Department Engineer and the Railroad Owner / Engineer, but such approval shall not relieve the Design-Build Team from liability.

(E) Blasting

The Design-Build Team shall obtain advance approval of the Railroad Owner / Engineer and the Department Engineer for use of explosives on or adjacent to Company corridor. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Design-Build Team shall comply with the following:

- (1) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Design-Build Team and a licensed blaster.
- (2) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.
- (3) No blasting shall be done without the presence of an authorized representative of the Company. A minimum 72 hours advance notice to the person designated in the Company's notice of authorization to proceed shall be required to arrange for the presence of an authorized Railroad Owner / representative and such flagging as the Company may require.
- (4) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting.

The Company representative / Engineer will:

**\*\* NOTE \*\* Deleted Sections (1)**

- (2) Have the authority to order discontinuance of blasting if, in the Company representative / Engineer's opinion, blasting is too hazardous or is not in accordance with this Request for Proposal.

(F) Maintenance of Railroad Facilities

The Design-Build Team shall maintain all ditches and drainage structures free of silt or other obstructions that may result from construction operations and provide and maintain any erosion control measures, as required. The Design-Build Team shall promptly repair eroded areas within NCDOT's corridor and repair any other damage to the property of the Company or its tenants.

All such maintenance and repair of damages due to the Design-Build Team's operations shall be done at the Design-Build Team's expense.

(G) Storage of Materials and Equipment

Materials and equipment shall not be stored where they will interfere with Company operations, nor on the corridor of the Company without first having obtained permission from the Railroad Owner / Engineer. Such permission shall be with the understanding that the Company will not be liable for damage to such material and equipment from any cause and that the Railroad Owner / Engineer may move or require the Design-Build Team to move, at the Design-Build Team's expense, such material and equipment.

All grading or construction machinery that is left idle or parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Design-Build Team shall protect, defend, indemnify and save Company, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Design-Build Team's failure to immobilize grading or construction machinery.

(H) Cleanup

During construction of the project, the Design-Build Team shall furnish garbage disposal containers and dispose of all trash appropriately. The Design-Build Team shall clean the construction site periodically as requested by the Department Engineer or the Railroad Owner / Engineer of all waste, rubbish and unused construction material. The removal of waste and debris shall be the responsibility of the Design-Build Team. Unused construction materials shall be stockpiled in an orderly fashion at a location that will not interfere with train operations and the construction progress. If the Design-Build Team does not clean the construction site after receiving notification, other forces may be used to clean the site of waste and rubbish. If other forces are used, the cleanup cost shall be deducted from monies due to the Design-Build Team.

Upon completion of the work, the Design-Build Team shall remove from within the limits of the Company right of way / easement, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Design-Build Team, and leave said Company right of way / easement in a neat condition satisfactory to the Chief Engineer



of the Company or his authorized representative and satisfactory to the Company's authorized representative. Cleanup shall also include removal, replacement or cleaning of soiled or contaminated ballast in the construction area.

## **DAMAGES**

The Design-Build Team shall assume all liability for any, and all, damages to the Design-Build Team's work, employees, servants, equipment and / or materials caused by Company traffic.

Any cost incurred by the Company for repairing damages to its corridor or to property of its tenants, caused by or resulting from the operations of the Design-Build Team, shall be paid directly to the Company by the Design-Build Team.

## **DESIGN-BUILD TEAM FURNISHED TWO WAY RADIOS**

The Design-Build Team shall furnish a minimum of three push to talk, two-way radios that operate on a frequency unique to the project and separate from NCDOT Rail Division frequencies. The operational frequency shall not be the same as the frequency on adjacent jobs unless directed by the Railroad Owner / Engineer. The radios shall be used for communication between the RWIC / flagman or the Company's designated contact and the Design-Build Team's Superintendent or designated contact on the job for safety. The Design-Build Team shall maintain at least three working radios at all time during the project. Project conditions and the Design-Build Team's work may require the need for more than three radios on the project. It shall be the Design-Build Team's responsibility to furnish the number of radios required by NCDOT Rail Division and NCDOT to maintain safety on the project. Failure on the part of the Design-Build Team to have working radios on site can result in suspension of the work until the radio requirements are met. There shall be no direct payment for the cost of furnishing the radios. The cost shall be included in the lump sum bid for the entire project.

The Design-Build Team shall provide radios capable of transmitting and receiving clearly, from any location within the project limits. Relaying messages from one radio operation to another shall not be an acceptable method. Any upgrades or additional equipment necessary to provide clear transmissions between two single radios, including signal repeaters shall be considered incidental to the radio requirements and shall not be subject to additional compensation.

The Design-Build Team shall submit information about the radios prior to use for approval by the Company.

The Design-Build Team shall have no claims whatsoever against the Company or the Department for any delays or additional cost incurred as a result of failure to have the required number of working radios on site each day or as a result of insufficient radio communication.

**FLAGGING SERVICES**

The track work required for I-5719B is on inactive/inaccessible track with no active train service. There will be, however, on-track work equipment and workers and any FRA or Roadway Worker Protection rules pertaining to such must be adhered to by the Design-Build Team. The Design-Build Team will be responsible for providing flagman services to protect on-track equipment, workers, and public vehicular traffic at any at-grade road crossings. All work to be performed by the Design-Build Team within the Company right of way / easement shall require a flagman be present. Any work to be performed by the Design-Build Team requiring flagging service shall be deferred by the Design-Build Team until the flagging protection required by the Company is available at the job site.

**\*\* NOTE \*\* Deleted Sections (A) and (B)****(C) Payment**

The Design-Build Team will be responsible for paying for any, and all, flagging costs required to accomplish the construction.

**\*\* NOTE \*\* Deleted Sections (1), (2) and (3)****\*\* NOTE \*\* Deleted Section (D)****HAULING ACROSS RAILROAD**

Where the plans developed by the Design-Build Team show or imply that materials of any nature must be hauled across the railroad, unless the aforementioned plans clearly show that the Design-Build Team has included arrangements for such haul in its agreement with the Company, the Design-Build Team shall make all necessary arrangements with the Company regarding means of transporting such materials across the railroad. The Design-Build Team shall bear all costs incidental to such crossings whether services are performed by the Design-Build Team's own forces or by Company personnel.

If the Design-Build Team desires to haul across the railroad for convenience, the Design-Build Team shall make all the necessary arrangements with the Company for a temporary crossing and shall bear all cost associated with construction and removal of the temporary crossing. The crossing shall only be used at times approved by the Engineer. The project shall not be considered complete until all temporary crossing have been removed by the Design-Build Team, unless directed by the Company to leave the crossing installed. A private grade crossing agreement shall be required for each crossing installed. The Design-Build Team shall have no claims whatsoever against the Company or the Department for denying any temporary crossing for the convenience of the Design-Build Team.

No crossing may be established for use of the Design-Build Team for transporting materials or equipment across the tracks of the Company unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, all at the expense of the Design-Build Team, is first obtained from the Railroad Engineer. The approval process for a temporary private crossing agreement normally takes 90 days.

## **WORK FOR THE BENEFIT OF THE DESIGN-BUILD TEAM**

All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project shall be shown on the plans developed by the Design-Build Team; shall be included in the force account agreement between the Department and Company or shall be covered by appropriate revisions to same which will be initiated and approved by the Department and / or Company.

Once approved, should the Design-Build Team desire to make changes to the above, then the Design-Build Team shall make separate arrangements with the Company for same to be accomplished at the Design-Build Team's expense. The Design-Build Team shall notify the Department of agreements between the Company the and the Design-Build Team for any work for the benefit of the Design-Build Team.

## **COOPERATION AND DELAYS**

It shall be the Design-Build Team's responsibility to arrange a schedule with the Company for accomplishing stage construction of work to be done by Company crews. In arranging the schedule, the Design-Build Team shall ascertain, from the Company, the lead time required for assembling crews and materials and shall make due allowance therefore. The Design-Build Team shall cooperate with others in the construction of the project to the end that all work may be accomplished to the best advantage.

The Design-Build Team shall insure that all work required to be completed by the Design-Build Team forces prior to Company's crews schedule move in date is completed. Delays by the Design-Build Team in meeting the schedule can result in delays in rescheduling Company crews and result in delays to the project. The Design-Build Team shall have no claims whatsoever against the Company or the Department for delays as a result of rescheduling Company crews due the Design-Build Team failing to meet the Design-Build Team's schedule.

No charge or claim of the Design-Build Team against the Department or the Company shall be allowed for hindrance or delay on account of railway traffic; any work done by the Company or other delays incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with this Request for Proposals.

The Design-Build Team's attention is called to the fact that neither the Department nor Company assumes any responsibility for any work performed by others in connection with the construction of the project, and the Design-Build Team shall have no claim whatsoever against the Department or Company for any inconvenience, delay, or additional cost incurred by the design-Build Team on account of such operations by others.

## **TRAINMAN'S WALKWAYS**

The track included in I-5719B is inactive/inaccessible for trains. Trainmen walkway as such are not required but walkways for construction workers' safety will be required. In areas along any

existing tracks, on the side opposite of the track from where the work will be done; existing walkways shall be maintained at a distance not less than ten feet from the centerline of the existing track. If the walkway does not exist, it will not be built or maintained unless shown on the plans developed by the Design-Build Team. In areas of new construction along turnouts / switches, signals and derails, walkways shall be constructed and maintained not less than ten feet from the centerline of the track. The walkway shall extend from the point of switch through the derail. The walkway shall be an unobstructed continuous space suitable for the workers to walk along the side of on-track or other equipment. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with ten-foot minimum clearance from centerline of track, shall be installed.

### **CERTIFICATION FOR FEDERAL-AID CONTRACTS**

(3-21-90)

DB1 G85

The Proposer certifies, by signing and submitting a Design-Build Proposal, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, *Disclosure Form to Report Lobbying*, in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by *Section 1352, Title 31, U.S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Proposer also agrees by submitting a Design-Build Proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such sub-recipients shall certify and disclose accordingly.

**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)**

(1-16-24)

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, payment will be in accordance with Article 104-7 Extra Work of the *Standard Specifications*.

**CONSTRUCTION EQUIPMENT EMISSIONS**

(1-1-20) (Rev. 1-18-22)

DB1 G94

**Reporting Requirements**

During construction, within 60 days after the end of each calendar year, the Design-Build Team shall submit to the Department a list of nonroad diesel-powered construction equipment that was used for construction work for more than 40 hours during that calendar year. Such list shall be submitted each year through the final acceptance of the project. The list shall be submitted on a form supplied by the Department and shall include the following information for each applicable piece of non-road construction equipment:

- equipment type and manufacturer;
- engine manufacturer and model;

- engine model number;
- engine family name and model year;
- engine horsepower or kilowatts;
- engine serial number; and
- engine EPA Tier number.

The submittal shall include the Tier (0, 1, 2, 3 or 4) Nonroad Exhaust Emission Standard that the equipment's engine currently satisfies in accordance with EPA current standards. This list shall be updated and submitted annually.

Failure to provide the equipment list by the timeframe provided above may result in the Department withholding money from the Design-Build Team due for work performed by that entity in the next partial payment until the necessary assurances are made consistent with this provision.

### **Minimum Tier Requirements**

A minimum of fifty percent (50%) of the reported construction equipment used on the project must meet Tier 4 or Tier 4i requirements.

### **Incentive**

The Department will pay a Fifty Thousand and 0/100 Dollars (\$50,000.00) incentive to the Design-Build Team if, at the conclusion of the project, each calendar year's report reflects that both items below were accomplished:

- (1) More than seventy-five percent (75.0%) of the total number of pieces of applicable construction equipment used on the project meets Tier 4 Final requirements, and
- (2) Less than twenty-five percent (25.0%) of the total number of pieces of applicable construction equipment used on the project is categorized as Tier 0 or 1.

### **Exclusions**

A piece of applicable construction equipment operated by DBE firms (federally funded projects) or MBE/WBE firms (state funded projects) may be excluded from the Reporting Requirements and Minimum Tier Requirements sections above, provided the applicable piece of equipment meets at least the Tier 1 requirements. However, to be eligible for the incentive, the Design-Build Team must include all of these firms' applicable construction equipment in the percentage calculations provided in the Incentive section above.

Regardless of Tier level, cranes are subject to the Reporting Requirements section above. However, any crane may be excluded from the calculations provided under the Minimum Tier Requirements and Incentive sections above, provided that crane meets Tier 1 or higher requirements.

**U.S. DEPARTMENT OF TRANSPORTATION HOTLINE**

(8-18-22)

108-5

DB1 G100

To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free hotline Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the hotline to report such activities.

The hotline is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse, and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

**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**

(7-1-95) (Rev. 1-16-24)

DB1 G133

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

- Project I-5719E is located within the project area, Project I-5719E has an anticipated February 2025 Let Date.
- Project I-5719FB is located within the project area, Project I-5719FB has an anticipated February 2025 Let Date.
- Project I-5719FD is located within the project area, Project I-5719FD has an anticipated February 2025 Let Date.
- Project I-5719FC is located within the project area, Project I-5719FC has an anticipated April 2025 Let Date.
- Project B-5857 is located approximately one mile south of I-85, Project B-5857 has an anticipated December 2025 Let date.
- Project U-6146 is located approximately one mile south of I-85, Project U-6146 has an anticipated December 2025 Let date.
- Project B-6051 is located approximately one mile south of I-85, Project B-6051 has an anticipated July 2025 Let date.
- Project I-6016 is located approximately 2.5 miles east on I-85, Project I-6016 has an anticipated July 2025 Let date.
- Project U-6143 is located approximately 3/4 mile south on I-85, Project U-6143 has an anticipated July 2025 Let date.
- Project 15BPR.118 is located east of, and adjacent to Project I-5719B on I-85, Project 15BPR.118 has an anticipated February 2026 Let date.

- Project I-5719C is located to the west of I-5719B on I-85, Project has an Notice to Proceed of January 2025.
- Project I-5719D extends the length of I-85 from the South Carolina / North Carolina State Line to east of NC 273, Project I-5719D pending anticipated Let date.
- Project I-5719A and U-6044 located west of and adjacent to Project I-5719B on I-85. Project I-5719A and U-6044 has an anticipated September 2028 Let date.
- Project I-5719FA is located west of and adjacent to Project I-5719B on I-85, Project I-5719FA has an anticipated December 2028 Let 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**

(1-1-02) (Rev. 8-20-24)

103

DB1 G142

### **General**

The successful Bidder (Design-Build Team) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 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 Bidder in the preparation of the bid. 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 Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. 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 Bidder 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 Design-Build Team's company; if not an officer, the Design-Build Team shall supply a letter signed and notarized by an officer of the Design-Build Team, granting permission for the representative to sign the escrow agreement on behalf of the Design-Build Team.

*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 Bidder after the notice of award for informational purposes. The Bidder 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 Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 14 days after the notice of award is received may be just cause for rescinding the award of the contract and may result in the removal of the Bidder from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder 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](mailto: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 10 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 Bidder includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Bidder 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 Bidder 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 State Contract Officer acting directly or through a duly authorized representative and the Bidder's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Bidder's representative shall immediately furnish the State Contract Officer acting directly or through a duly authorized representative with any other needed bid documentation. The State Contract Officer acting directly or through a duly authorized representative upon determining that the bid documentation is complete will, in the presence of the Bidder'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 Bidder. 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 Bidder as a *trade secret* at the time the bid documentation is delivered to the State Contract Officer acting directly or through a duly authorized representative 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 Design-Build Team 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 Bidder certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid 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 Design-Build Team**

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 Design-Build Team.

The Design-Build Team will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Design-Build Team. The Design-Build Team or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Design-Build Team does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Design-Build Team to determine final disposition 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 (e.g., 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.

## **PERMANENT VEGETATION ESTABLISHMENT**

(6-11-15) (Rev. 1-16-24)

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 *Standard Specifications*.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the 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 AND SEDIMENT CONTROL/STORMWATER CERTIFICATION**

(1-16-07) (Rev. 10-15-24)

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 Pollution discharge Elimination System (NPDES) permit for the work is required.

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

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

**Roles and Responsibilities**

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
  - (1) *Manage Operations* - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
    - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.

- (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
  - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
  - (d) Implement the erosion and sediment control/stormwater site plans requested.
  - (e) Provide any needed erosion and sediment control/stormwater practices for the 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 or any location where sediment leaves the Right-of-Way.
  - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
- (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.
  - (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24

- hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.
- (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
  - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
  - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
  - (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
  - (g) Provide secondary containment for bulk storage of liquid materials.
  - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
  - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Design-Build Team and subcontractors' construction activities.
  - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
  - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
  - (d) Conduct the inspections required by the NPDES permit.
  - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
  - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
  - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
  - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
  - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.

- (j) The 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 Designer* and notify the Engineer 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 Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA)*, *Notice of Violation (NOV)*, or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

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

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

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

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

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

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

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

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

### **Measurement and Payment**

All work described within this provision and the role of Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and Certified Designer will be incidental to the project for which no direct compensation will be made.

### **TACK FOR MULCH FOR EROSION CONTROL**

(1-16-24)

DB

### **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 *Standard Specifications*. 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 *Standard Specifications*.

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

(2-20-07) (Rev. 1-16-24)

105-16, 230, 801

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 *Standard Specifications*, 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. Conventional clearing methods shall be used except where permit drawings or conditions have been included elsewhere in this RFP which require certain areas to be cleared by hand methods. In areas with Permanent Utility Easements, clearing shall extend to the right of way limits.

**BURNING RESTRICTIONS**

(7-1-95)

DB2 R05

Open burning shall not be permitted on any portion of the right of way limits established for this project. The Design-Build Team shall not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in Gaston County. The Design-Build Team shall dispose of the clearing, grubbing and demolition debris by means other than burning and in accordance with state and local rules and regulations.

**BUILDING AND APPURTENANCE REMOVAL / DEMOLITION**

(9-1-11) (Rev. 1-16-24)

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 *Standard Specifications*.

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**

(01-17-17)(Rev. 4-16-24)

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 subgrade stabilization in accordance with the *Geotextile for Subgrade Stabilization* Project Special Provision found elsewhere in this RFP and the detail developed by the Design-Build Team. Geotextile for subgrade stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

**Materials**

Manufactured Quarry Fines.

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

The following MQFs are unacceptable:

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

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

### **Preconstruction Requirements**

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

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

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

### **Construction Methods**

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

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

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

**DRAINAGE PIPE**

(1-16-24)

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, Aluminized Corrugated Steel Pipe, Welded Steel Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe) in accordance with the following requirements:

- The appropriate Reinforced Concrete Pipe class and the appropriate gage thickness for Corrugated Aluminum Alloy Pipe Aluminized Corrugated Steel Pipe and Welded Steel Pipe shall be selected based on fill height. All pipe types shall be subject to the maximum and minimum fill height requirements as found on-line at the below:

**[https://connect.ncdot.gov/resources/hydro/Pages/  
NCDOT-Pipe-Material-Selection-Guide.aspx](https://connect.ncdot.gov/resources/hydro/Pages/NCDOT-Pipe-Material-Selection-Guide.aspx)**

- 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, Aluminized Corrugated Steel 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 1) the pipe slope is greater than 10%, in which case the pipe shall be either Corrugated Aluminum Alloy Pipe or Aluminized Corrugated Steel Pipe, 2) the pipe is within a walled roadway section in which case the pipe shall meet the requirements of the Hydraulics Scope of Work found elsewhere in this RFP or 3) the pipe will be constructed using trenchless methods in which case the pipe shall be Welded Steel Pipe.

**FLOWABLE FILL**

(9-17-02)(Rev. 1-16-24)

300, 340, 1000, 1530, 1540, 1550

DB3 R30

**Description**

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

## Materials

Refer to Division 10 of the *Standard Specifications*.

### Item

Flowable Fill

### Section

1000-7

## Construction Methods

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

## **BRIDGE APPROACH FILLS**

(1-16-18)(Rev. 1-16-24)

423

DB4 R02

### Description

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

Define bridge approach fill types as follows:

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

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

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

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

At the Design-Build Team's option, use Type 1A or 2A approach fills instead of Type 1 or 2 approach fills, respectively, for integral bridge abutments. Type 1A and 2A approach fills consists of constructing an approach fill with a temporary geotextile wall before placing all or a portion of the concrete for the backwall and wing walls of the integral end bent cap. The temporary geotextile



wall is designed for a construction surcharge, remains in place and is aligned so the wall face functions as a form for the integral end bent cap backwall and wing walls.

## Materials

Refer to Division 10 of the *Standard Specifications*.

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

Provide Type 1 geotextile for separation geotextiles, Type 4a geotextile for under bridge approach slabs and Class B concrete for outlet pads. Use Class V or Class VI select material for Type 1 and 1A approach fills and the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal for Type 2 and 2A approach fills. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide outlet pipes and fittings for subsurface drainage materials. Provide 1/4" hardware cloth with 1/4 inch openings constructed from 24 gauge wire.

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

## Construction Methods

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

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

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

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

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent geotextiles of the same type at least 18 inches. Cover select material or aggregate with Type 4a geotextile at an elevation 6 inches below the bridge approach slab. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geotextiles or MSE wall reinforcement.

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

Place select material or aggregate in 6 inch to 8 inch thick lifts. Compact fine aggregate for Type 2 and 2A approach fills in accordance with Subarticle 235-3(C) of the *Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for Type 1 and 1A approach fills and coarse aggregate for Type 2 and 2A approach fills with at least 4 passes of a trench

roller in a direction parallel to the end bent cap backwall. Do not displace or damage geosynthetics or MSE wall reinforcement when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics until they are covered with at least 8 inches of select material or aggregate. Replace any damaged geosynthetics to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap Type 4a geotextiles over select material or aggregate and back under approach slabs as shown in *Roadway Standard Drawing* No. 423.03 or 423.04.

### **GEOTEXTILE FOR SUBGRADE STABILIZATION**

(5-15-18)(Rev. 4-16-24)

505, 1056

DB5 R9

#### **Description**

Provide geotextile for subgrade stabilization in accordance with the Geotechnical Engineering Scope of Work found elsewhere in this RFP. Geotextile for subgrade stabilization is required for subgrades to prevent pavement cracking at locations shown in the plans developed by the Design-Build Team and as directed by the Engineer.

#### **Materials**

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

#### **Construction Methods**

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

### **CEMENT AND LIME STABILIZATION OF SUBGRADE SOILS**

(5-20-13) (Rev. 3-21-23)

DB5 R21

#### **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 Sub-grade soils
3. Conducting Laboratory tests to determine:
  - a. Soil classifications
  - b. Moisture-density relationships
  - c. Quantity of lime or cement required to achieve specified strengths
4. Designating areas to be stabilized by either lime or cement and the required rates of application
5. Conducting field tests to determine unconfined compressive strength

**Sampling**

The Design-Build Team shall take soil samples, after the project has been graded to within two inches of final sub-grade elevation. The Design-Build Team shall sample the top eight inches at a minimum frequency of one sample per 1,000 feet, per each lane, for classification tests; and one sample per 3,000 feet, per each lane, for moisture density tests and lime or cement mix design tests. For the aforementioned tests, a lane shall be considered 28 feet wide in one direction for sampling purposes. Additional samples shall be taken to ensure that all the predominant soil types, limits of distribution of these soils and different site conditions have been represented.

**Classification Tests**

The Design-Build Team shall perform the following tests to determine AASHTO classifications of different soils in accordance with AASHTO specifications as modified by NCDOT. Copies of these modified procedures can be obtained from Materials and Test Unit's Soils Laboratory.

**TABLE 1**

| <b><u>TEST</u></b>  | <b><u>AASHTO DESIGNATION</u></b> |
|---|----------------------------------|
| Dry Preparation of Disturbed Soils                          | T-87                             |
| Particle Size Analysis of Soils                             | T-88                             |
| Determining the Liquid Limit of Soils                       | T-89                             |
| Determining the Plastic Limit and Plasticity Index of Soils | T-90                             |

**Moisture Density Test**

Based on the criteria set in Table 2, below, the Design-Build Team shall perform the Moisture Density Tests, using either lime or cement. The Design-Build Team shall use 10% cement by weight in soil cement and 4% lime by weight, in soil-lime mixtures. The Design-Build Team shall conduct the tests in accordance with AASHTO T-99, and T-134 for soil-lime and soil-cement mixtures, respectively. In each case, The Design-Build Team shall determine the maximum dry density and optimum moisture content.

**TABLE 2**

| <b><u>CRITERIA FOR SELECTING LIME OR CEMENT</u></b> |          |          |
|---|----------|----------|
| <b>PROPERTY</b>                                     | <b>A</b> | <b>B</b> |
| Percent passing #200 Sieve                          | 35 Max   | 36 Min   |
| Liquid Limit  | 40 Max   | 41 Min   |
| Plasticity Index                                    | 10 Max   | 25 Min   |

The Design-Build Team shall use cement for all soils meeting criteria in Column A and lime for all soils meeting criteria in Column B. The Design-Build Team may choose either lime or cement for all soils not meeting all criteria in either Column A or B.

## **DETERMINING THE APPLICATION RATES FOR SOIL-CEMENT AND SOIL-LIME MIXTURES**

### **Soil-Cement Mixtures**

For soil-cement mixtures, the Design-Build Team shall be required to do the following:

- Make specimens at optimum moisture content using a quantity of cement in the range of five to 12 percent by weight.
- Compact the specimens to a minimum density of 95% of maximum dry density obtained using AASHTO T 134.
- Make a minimum of two specimens for each selected cement rate.
- Cure the specimens for seven days in a moist room maintained at a temperature of 73° F  $\pm$  2.7° and a humidity of 100%. At the end of the curing period, immerse the specimens in water for four hours.
- After immersion, test the specimens in unconfined compression in accordance with ASTM D 1633.
- Report the maximum strength obtained and the corresponding percent strain.
- Select the rate of cement that provides a minimum unconfined compressive strength of 200 psi and a maximum of 400 psi.

### **Soil-Lime Mixtures**

For soil-lime mixtures, the Design-Build Team shall be required to do the following:

- Allow the soil-water-lime mixture to mellow in an airtight, moisture proof container that does not contain aluminum or zinc for a minimum of 24 hours before compacting specimens.
- Make specimens at optimum moisture content using a quantity of lime in the range of 3.5 to 6.5 percent by weight.
- Compact specimens to a minimum density of 95% of maximum dry density obtained by AASHTO T99.
- Make a minimum of two specimens for each selected lime rate.
- Cure the specimens in airtight, moisture proof containers at a temperature of  $73^{\circ}\text{F} \pm 4^{\circ}$  for 7 days. The container for curing the specimen shall not contain aluminum or zinc. Do not immerse the specimens in water at the end of the curing period.
- Test the specimens in unconfined compression in accordance with AASHTO T 208. Report the maximum strength obtained and the corresponding percent strain.
- Select the rate of lime that provides a minimum unconfined compressive strength of 60 psi.

#### **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.
- Submit a sketch in plan view showing areas of the project to be stabilized by either lime or cement and application rates for each stabilizer.
- Submit any other documentation that supports the Design-Build Team's recommendations.

#### **Construction of Lime Treated Subgrade**

The Design-Build Team shall construct the lime treated sub-grade as specified in Section 501 of the *Standard Specifications* with the following exceptions:

##### **Subsection 501-4 Equipment**

Contractor's equipment will not require engineer's approval.

##### **Subsection 501-8 (A) General**

Paragraph #1 is not applicable to this project.

##### **Subsection 501-9 (B) Preliminary Curing**

Amend as follows: Allow a minimum of two days and a maximum of four days for preliminary curing.

#### **Subsection 501-10 Compacting, Shaping, and Finishing**

Last paragraph is not applicable.

#### **Subsection 501-11 Thickness**

Last two paragraphs are not applicable.

#### **Construction of Cement Treated Subgrade**

The Design-Build Team shall construct the soil cement sub-grade as specified in Section 542 of the *Standard Specifications*, with the following exceptions:

#### **Subsection 542-4 Equipment**

Contractor's equipment will not require Engineer's approval.

#### **Subsection 542-7 Application of Cement**

First paragraph is not applicable.

#### **Subsection 542-11 Thickness**

Paragraphs 2 and 3 are not applicable.

#### **Unconfined Compressive Strength**

The lime-stabilized subgrades shall be tested using Dynamic Cone Penetrometer (DCP) and / or by making field specimens. DCP testing shall be in accordance with *Quality Assurance Testing of Lime-Treated Soils Utilizing the Dynamic Cone Penetrometer*, Test Method #1-2005. The Design-Build Team shall adhere to the testing equipment requirements and procedures as outlined in *Dynamic Cone Penetrometer Testing for Subgrade Stability* except that the minimum penetration depth shall be eight inches. Upon request, a copy of the aforementioned documents can be obtained from the NCDOT Geotechnical Engineering Unit. The required unconfined compressive strength for lime shall be 60 psi, which corresponds to a penetration per blow of approximately 0.5 inches of the Dynamic Cone Penetrometer. If field specimens are made, cure them for seven days and test them in the laboratory. The minimum required unconfined compressive strength for lime-stabilized subgrade shall be 60 psi.

For cement-stabilized subgrades, the Design-Build Team shall make field specimens, cure them for seven days and test them in the laboratory. The minimum and maximum required unconfined compressive strength for soil cement shall be 200 psi and 400 psi, respectively.

For both lime and cement stabilized subgrades, 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 and dynamic cone penetrometer test results for review and acceptance.

## **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 *Standard Specifications*.



**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 *Standard Specifications* 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. 1-16-24)

DB6 R25

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

The CEI firm is responsible for maintaining records in accordance with the procedures outlined in the Construction Manual for “Weight Tickets As A Basis Of Payment.” And summarizing and submitting these records monthly for review and approval by the Resident Engineer.

The base price index for asphalt binder for plant mix is **\$565.63** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **April 1, 2025**.

**PRICE ADJUSTMENTS - ASPHALT CONCRETE PLANT MIX**

(9-1-11) (Rev. 1-16-24)

DB6 R26

Revise the *Standard Specifications* as follows:

**Page 6-15, Article 609-11 and Page 6-30, 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.

**\*\* NOTE \*\* Deleted Field Office Project Special Provision**

**DYNAMIC MESSAGE SIGN (DMS)****DESCRIPTION**

To ensure compatibility with the existing DMS Control Software deployed in the State, furnish NTCIP compliant DMS that are fully compatible with the current control software in use by the Department. (also referred to hereinafter as the “Control Software”). Contact the engineer to inquire about the current version being used.

Furnish and install DMS compliant with UL standards 48, 50 and 879.

Furnish, install, test, integrate and make fully operational the new DMS at locations shown in the plans developed by the Design-Build Team.

Furnish operating Dynamic Message Signs, not limited to, the following types. Dimensions represent DMS sizes commonly used by the Department, other size DMS may be specified in the plans developed by the Design-Build Team.

| DMS Naming Convention |                       |
|-----------------------|-----------------------|
| Type                  | Color                 |
| Type 1 – Front Access | A – Amber – 66mm      |
| Type 2 – Walk-in      | C – Full Color – 20mm |
| Type 3 – Embedded     |                       |
| Type 4 – Lane Control |                       |

- **DMS Type 1A** – Front Access Amber 66mm – 27 pixels high by 60 pixels wide
  - 3 lines, 10 characters per line, using 18” high characters.
- **DMS Type 1C** – Front Access Full Color 20mm – 96 pixels high by 208 pixels wide
  - 3 lines, 11 characters per line, using 18” high characters.
  - **DMS Type 2A** – Walk-in Amber 66mm – 27 pixels high by 90 pixels wide 3 lines, 15 characters per line, using 18” high characters.
- **DMS Type 2C** – Walk-in Full Color 20mm – 96 pixels high by 288 pixels wide
  - 3 lines, 15 characters per line, using 18” high characters.
- **DMS Type 3A** – Embedded Front Access Tri-color 66mm – 7 pixels high by 35 pixels wide
  - 1 line, 7 characters per line, using 18” high characters.
- **DMS Type 3C** – Embedded Front Access Full Color 20mm – 24 pixels high by 160 pixels wide
  - 1 line, 8 characters per line, using 18” high characters.
- **DMS Type 4C** – Lane Control Sign Full Color 20mm – 48- or 64-pixels square 48 pixels high by 48 pixels wide
  - 1 line, 2 characters per line using 18” high characters
  - 64 pixels high x 64 pixel wide
  - 2 lines, 3 characters per line using 18” high characters

Use only UL listed and approved electronic and electrical components in the DMS system.

**Use only approved DMS models listed on the NCDOT Qualified Products List (QPL) at the time of construction. NCDOT Qualified Products List can be accessed via official website at**

**<https://apps.ncdot.gov/products/qpl/>**

## **MATERIALS**

### **Environmental and Operating Requirements**

Construct the DMS and DMS controller cabinet so the equipment within is protected against moisture, dust, corrosion, and vandalism. Design and construct the DMS unit for continuous usage of at least 20 years. Design the DMS system to comply with the requirements of Section 2.1 (Environmental and Operating Standards) of NEMA TS 4-2016.

### **Viewing Requirements for all DMS**

Each line of text should be clearly visible and legible to a person with 20/20 corrected vision from a distance of 900 feet in advance of the DMS at an eye height of 3.5 feet along the axis.

Any line must display equally spaced and equally sized alphanumeric individual characters. Each character must be at least 18 inches in height (unless otherwise noted in the plans) and composed from a luminous dot matrix.

### **Housing Requirements for all DMS**

Construct the external skin of the sign housing out of aluminum alloy 5052 H32 that is a minimum of 1/8 inches thick for all walk-in DMS and 0.090-inch-thick for all front access or embedded DMS. Ensure the interior structure is constructed of aluminum. Ensure that exterior seams and joints, except the finish coated face pieces, are continuously welded using an inert gas welding method. Ensure that no internal frame connections or external skin attachments rely upon adhesive bonding. Ensure the sign housing meets the requirements of Section 3 of NEMA TS 4-2016.

Ensure that all drain holes and other openings in the sign housing are screened to prevent the entrance of insects. Ensure that the top of the housing includes multiple steel lifting eyebolts or equivalent hoisting points. Ensure hoist points are positioned such that the sign remains level when lifted. Ensure that the hoist points and sign frame allow the sign to be shipped, handled, and installed without damage. Ensure all external assembly and mounting hardware, including but not limited to; nuts, bolts, screws, and locking washers are corrosion resistant galvanized steel and are sealed against water intrusion. 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. Do not place a manufacturer name, logo, or other information on the front face of the DMS or shield. Do not paint the stainless-steel bolts on the Z-bar assemblies used for mounting the enclosure.

### **Housing Requirements for Walk-in type DMS**

Ensure the sign housing meets the requirements of Section 3.2.8 of NEMA TS 4-2016. Stitch weld the exterior housing panel material to the internal structural members to form a unitized structure. Ensure that exterior mounting assemblies are fabricated from aluminum alloy 6061-T6 extrusions

a minimum of 3/16 inches thick. Ensure housing access is provided through an access door at each end of the sign enclosure that meets the requirements of NEMA TS 4-2016, Section 3.2.8.1. Ensure the access doors include a keyed tumbler lock and a door handle with a hasp for a padlock. Ensure the doors include a closed-cell neoprene gasket and stainless-steel hinges. Install one appropriately sized fire extinguisher within 12 inches of each maintenance door. Ensure the sign housing meets the requirements of NEMA TS 4-2016, Section 3.2.8.3 for service lighting. All service lighting should be LED, incandescent and fluorescent lamps are not permitted. Ensure that the sign housing includes LED emergency lighting that automatically illuminates the interior when the door is open in the event of a power outage. Emergency lighting must be capable of operation without power for at least 90 minutes. Ensure the sign housing meets the requirements of NEMA TS 4-2016, Section 3.2.9 for convenience outlets.

### **Housing Requirements for Front Access DMS**

Comply with the requirements of Section 3.2.5 and 3.2.6 of NEMA TS 4-2016 as it applies to front access enclosures. The following requirements complement TS 4-2016. Ensure access door does not require specialized tools or excessive force to open. Provide multiple access doors that allow maintenance personnel access to 2 or 3 sign modules at a time. Vertically hinge the doors and design to swing out from the face to provide access to the enclosure interior. Extend each door the full height of the display matrix. Provide a retaining latch mechanism for each door to hold the door open at a 90-degree angle. Each door will form the face panel for a section of the sign. Mount the LED modules to the door such that they can be removed from the door when in the open position. Other sign components can be located inside the sign enclosure and be accessible through the door opening. Provide for each door a minimum of two (2) screw-type captive latches to lock them in the closed position and pull the door tight and compress a gasket located around the perimeter of each door. Install the gasket around the doors to prevent water from entering the cabinet.

### **Housing Face Requirements for all DMS**

Ensure the sign face meets the requirements of NEMA TS 4-2016, Section 3.1.3. Protect the DMS face with contiguous, weather-tight, removable panels. The DMS front face shall be constructed with multiple rigid panels, each of which supports and protects a full-height section of the LED display matrix. The panels shall be fabricated using aluminum sheeting on the exterior and polycarbonate sheeting on the interior of the panel. These panels must be a polycarbonate material that is ultraviolet protected and have an antireflection coating. Prime and coat the front side of the aluminum mask, which faces the viewing motorists, with automotive-grade semi-gloss black acrylic enamel paint or an approved equivalent. Guarantee all painted surfaces provide a minimum outdoor service life of 20 years. Design the panels so they will not warp nor reduce the legibility of the characters. Differential expansion of the DMS housing and the front panel must not cause damage to any DMS component or allow openings for moisture or dust. Glare from sunlight, roadway lighting, commercial lighting, or vehicle headlights must not reduce the legibility or visibility of the DMS. Install the panels so that a maintenance person can easily remove or open them for cleaning.

### **Housing Face Requirements for Walk-in type DMS**

No exposed fasteners are allowed on the housing face. Ensure that display modules can be easily and rapidly removed from within the sign without disturbing adjacent display modules.

### **Housing Face Requirements for Front Access type DMS**

The DMS front face shall be constructed with multiple vertically hinged rigid door panels, each of which contains a full-height section of the LED display matrix.

Any exposed fasteners on the housing face must be the same color and finish as the housing face. Only captive fasteners may be used on the housing face.

### **Housing Face Requirements for Embedded Front Access type DMS**

The DMS front face shall be constructed with a single, horizontally hinged rigid face panel which contains a full-height section of the LED display matrix.

Any exposed fasteners on the housing face must be the same color and finish as the housing face. Only captive fasteners may be used on the housing face.

### **Sign Housing Ventilation System for all DMS**

Install a minimum of one (1) temperature sensor that is mounted near the top of the DMS interior. The sensor(s) will measure the temperature of the air in the enclosure over a minimum range of -40°F to +176°F. Ensure the DMS controller will continuously monitor the internal temperature sensor output and report to the DMS control software upon request.

Design the DMS with systems for enclosure ventilation, face panel fog and frost prevention, and safe over-temperature shutdown.

Design the DMS ventilation system to be thermostatically controlled and to keep the internal DMS air temperature lower than +140°F, when the outdoor ambient temperature is +115°F or less.

The ventilation system will consist of two or more air intake ports located near the bottom of the DMS rear wall. Cover each intake port with a filter that removes airborne particles measuring 500 microns in diameter and larger. Mount one or more ventilation fans at each intake port. These fans will positively pressure the DMS enclosure.

Design the ventilation fans and air filters to be removable and replaceable from inside the DMS housing. To ease serviceability, mount the ventilation fans no more than four (4) feet from the floor of the DMS enclosure. Position ventilation fans so they do not prevent removal of an LED pixel board or driver board.

Provide each ventilation fan with a sensor to monitor its rotational speed, measured in revolutions per minute and report this speed to the sign controller upon request.

The ventilation system will move air across the rear of the LED modules in a manner such that heat is dissipated from the LED's. Design the airflow system to move air from the bottom of the enclosure towards the top to work with natural convection to move heat away from the modules.

Install each exhaust port near the top of the rear DMS wall. Provide one exhaust port for each air intake port. Screen all exhaust port openings to prevent the entrance of insects and small animals.

Cover each air intake and exhaust port with an aluminum hood attached to the rear wall of the DMS. Thoroughly seal all intakes and exhaust hoods to prevent water from entering the DMS. Provide a thermostat near the top of the DMS interior to control the activation of the ventilation system.

The DMS shall automatically shut down the LED modules to prevent damaging the LEDs if the measured internal enclosure air temperature exceeds a maximum threshold temperature. The threshold temperature shall be configurable and shall have a default factory setting of 140°F. The DMS provide an output to the controller to notify the Control Software when the DMS shuts down due to high temperature.

### **Sign Housing Ventilation System for Walk-in DMS**

Ensure the sign includes a fail-safe ventilation subsystem that includes a snap disk thermostat that is independent of the sign controller. Preset the thermostat at 140°F. If the sign housing's interior reaches 140°F, the thermostat must override the normal ventilation system, bypassing the sign controller and turning on all fans. The fans must remain on until the internal sign housing temperature falls below 115°F.

### **Sign Housing Photoelectric sensors**

Install three photoelectric sensors with ½ inch minimum diameter photosensitive lens inside the DMS enclosure. Use sensors that will operate normally despite continual exposure to direct sunlight. Place the sensors so they are accessible and field adjustable. Point one sensor north or bottom of the sign. Place the other two, one on the back wall and one on the front wall of the sign enclosure. Alternate designs maybe accepted, provided the sensor assemblies that are accessible and serviceable from inside the sign enclosure.

Provide controls so that the Engineer can field adjust the following:

- The light level emitted by the pixels in each Light Level Mode
- The ambient light level at which each Light Level Mode is activated

### **Display Modules**

Manufacture each display module with a standard number of pixels which can be easily removed. Assemble the modules onto the DMS assemblies contiguously to form a continuous matrix to display the required number of lines, characters, and character height.

Design display modules that are interchangeable, self-addressable, and replaceable without using special tools. Provide plug-in type power and communication cables to connect to a display module. Ensure that the sign has a full matrix display area as defined in NEMA TS 4-2016, Section 1.6.

Design each module to display

- All upper- and lower-case letters
- All punctuation marks
- All numerals 0 to 9
- Special user-created characters or images

Display upper-case letters and numerals over the complete height of the module. Optimize the LED grouping and mounting angle within a pixel for maximum readability.

**Furnish two (2) spare display modules per each DMS installed for emergency restoration.**

#### **Discrete LEDs**

Provide discrete LEDs with a nominal viewing cone of 30 degrees with a half-power angle of 15 degrees measured from the longitudinal axis of the LED. Make certain, the viewing cone tolerances are as specified in the LED manufacturer's product specifications and do not exceed +/- 3 degrees half-power viewing angle of 30 degrees.

Provide LEDs that are untinted, non-diffused, high output solid state lamps utilizing AlInGaP technology for Red and InGaN technology for Green and Blue. No substitutions will be allowed. Provide LEDs that emit a full color.

Provide LEDs 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. Discrete LED failure is defined as the point at which the LED's luminous intensity has degraded to 50% or less of its original level.

Obtain the LEDs used in the display from a single LED manufacturer. Obtain them from batches sorted for luminous output, where the highest luminosity LED is not more than fifty percent more luminous than the lowest luminosity LED when the LEDs are driven at the same forward current. Do not use more than two successive and overlapping batches in the LED display.

Individually mount the LEDs on circuit boards that are at least 1/16" thick FR-4 fiberglass, flat black printed circuit board in a manner that promotes cooling. Protect all exposed metal on both sides of the LED pixel board (except the power connector) from water and humidity exposure by a thorough application of acrylic conformal coating. Design the boards so bench level repairs to individual pixels, including discrete LED replacement and conformal coating repair is possible.



Operate the LED display at a low internal DC voltage not to exceed 24 Volts.

Design the LED display operating range to be  $-20^{\circ}\text{ F}$  to  $+140^{\circ}\text{ F}$  at 95% relative humidity, non-condensing.

Supply the LED manufacturer's technical specification sheet with the material submittals.

### **LED Power Supplies**

Power the LED Display by means of multiple regulated switching DC power supplies that operate from 120 volts AC input power and have an output of 24 volts DC or less. Wire the power supplies in a redundant parallel configuration that uses multiple power supplies per display. Provide the power supplies with current sharing capability that allows equal amounts of current to their portion of the LED display. Provide power supplies rated such that if one supply fails the remaining supplies will be able to operate their portion of the display under full load conditions (i.e. all pixels on at maximum brightness) and at a temperature of  $140^{\circ}\text{ F}$ .

Provide power supplies to operate within a minimum input voltage range of  $+90$  to  $+135$  volts AC and within a temperature range of  $-22^{\circ}\text{ F}$  to  $140^{\circ}\text{ F}$ . Power supply output at  $140^{\circ}\text{ F}$  must not deteriorate to less than 65% of its specified output at  $70^{\circ}\text{ F}$ . Provide power supplies that are overload protected by means of circuit breakers, that have an efficiency rating of at least 75%, a power factor rating of at least .95, and are UL listed. Provide all power supplies from the same manufacturer and with the same model number for each Type of DMS. Design the power driver circuitry to minimize power consumption.

Design the field controller to monitor the operational status (normal or failed) of each individual power supply and be able to display this information on the Client Computer screen graphically. Color code power supply status, red for failed and green for normal. Provide power supply monitoring circuitry to detect power failure in the DMS and to automatically report this fault to the Control Software. This requirement is in addition to reporting power failure at the controller cabinet.

### **LED Pixels**

A pixel is defined as the smallest programmable portion of a display module that consists of a cluster of closely spaced discrete LEDs. Design each pixel with either 66mm or 20mm spacing depending on the type of DMS called for in the plans developed by the Design-Build Team.

Construct the pixels with strings of LEDs. It is the manufacturer's responsibility to determine the number of LEDs in each string to produce the candela requirement as stated herein.

Use continuous current to drive the LEDs at the maximum brightness level. Design the light levels to be adjustable for each DMS / controller so the Engineer may set levels to match the luminance requirements at each installation site.

Ensure each pixel produces a luminous intensity of 40 Cd when driven with an LED drive current of 20 mA per string.

Power the LEDs in each pixel in strings. Use a redundant design so that the failure of an LED in one string does not affect the operation of any other string within the pixel and does not lower the luminous intensity of the pixel more than 25% of the 40Cd requirement. Provide the sign controller with the ability to detect the failure of any LED string and identify which LED string has failed.

### **DMS Mini Controller**

For Walk-In and Front Access DMS Types only, furnish and install a mini controller inside the DMS that is interconnected with the main controller using a fiber-optic cable. The mini controller will enable a technician to perform all functions available from the main controller. Provide the mini controller with a Display and keypad interface. Size the display screen to allow preview of an entire one-page message on one screen. Provide a 4 X 4 keypad.

### **DMS Enclosure Structure Mounting**

Mount the DMS enclosure and interconnect system securely to the supporting structures. Design the DMS enclosure supports and structure to allow full access to the DMS enclosure inspection door. Mount the DMS enclosure according to the manufacturer's recommendations.

Furnish and install U-bolt connections of hanger beams to truss chords with a double nut at each end of the U-bolt. Bring the double nuts tight against each other by the use of two wrenches.

Submit plans for the DMS enclosure, structure, mounting description and calculations to the Engineer for approval. Have such calculations and drawings approved by a Professional Engineer registered in the state of North Carolina, and bear his signature, seal, and date of acceptance.

Provide removable lifting eyes or the equivalent on the DMS enclosure rated for its total weight to facilitate handling and mounting the DMS enclosure.

Design the DMS structure to conform to the applicable requirements of Section 906 of the *Standard Specifications* and the section titled "DMS Pedestal Structure" of these Project Special Provisions.

### **DMS / DMS Controller Interconnect**

Furnish and install all necessary cabling, conduit, and terminal blocks to connect the DMS and the DMS controller located in the equipment cabinet. Use approved manufacturer's specifications and the plans developed by the Design-Build Team for cable and conduit types and sizes. Use fiber-optic cable to interconnect sign and controller. Install fiber-optic interconnect centers in the sign enclosure and cabinet to securely install and terminate the fiber-optic cable. Submit material submittal cut sheets for the interconnect center.

### **DMS Controller and DMS Cabinet**

Furnish and install one DMS controller with accessories per DMS in a protective cabinet. Controlling multiple DMS with one controller is allowed when multiple DMS are mounted on the

same structure. Mount the controller cabinet on the Sign support structure. Install cabinet so that the height from the ground to the middle of the cabinet is 4 feet. Ensure a minimum of 24" x 36" level concrete working surface under each cabinet that provides maintenance technicians with a safe working environment.

Provide the DMS controller as a software-oriented microprocessor and with resident software stored in non-volatile memory. The Control Software, controller and communications must comply with the NTCIP Standards identified in these Project Special Provisions. Provide sufficient non-volatile memory to allow storage of at least 500 multi-page messages and a test pattern program.

For DMS Type 4C installations provide a single controller that can control up to eight (8) signs simultaneously.

Furnish the controller cabinet with, but not limited to, the following:

- Power supply and distribution assemblies
- Power line filtering hybrid surge protectors
- Radio Interference Suppressor
- Communications surge protection devices
- Industrial-Grade UPS system and local disconnect
- Microprocessor based controller
- Display driver and control system (unless integral to the DMS)
- RJ45 Ethernet interface port
- Local user interface
- Interior lighting and duplex receptacle
- Adjustable shelves as required for components
- Temperature control system
- All interconnect harnesses, connectors, and terminal blocks
- All necessary installation and mounting hardware

Furnish the DMS controller and associated equipment completely housed in a Caltrans 336S cabinet made from 5052 H32 sheet aluminum at least 1/8" thick. Use natural aluminum cabinets. Perform all welding of aluminum and aluminum alloys in accordance with the latest edition of

AWS D1.2, Structural Welding Code – Aluminum. Continuously weld the seams using Gas Metal Arc Welding (GMAW).

Slant the cabinet roof away from the front of the cabinet to prevent water from collecting on it.

Do not place a manufacturer name, logo, or other information on the faces of the controller cabinet

Provide cabinets capable of housing the components and sized to fit space requirement. Design the cabinet layout for ease of maintenance and operation, with all components easily accessible. Submit a cabinet layout plan for approval by the Engineer.

Locate louvered vents with filters in the cabinet to direct airflow over the controller and auxiliary equipment, and in a manner that prevents rain from entering the cabinet. Fit the inside of the cabinet, directly behind the vents, with a replaceable, standard size, commercially available air filter of sufficient size to cover the entire vented area.

Provide a torsionally rigid door with a continuous stainless-steel hinge on the side that permits complete access to the cabinet interior. Provide a gasket as a permanent and weather resistant seal at the cabinet door and at the edges of the fan / exhaust openings. Use a non-absorbent gasket material that will maintain its resiliency after long term exposure to the outdoor environment. Construct the doors so that they fit firmly and evenly against the gasket material when closed. Provide the cabinet door with louvered vents and air filters near the bottom as described in the paragraph above.

The cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.

The rack shall contain a minimum of one (1) pullout drawer. The drawer shall be suitable for storing manuals and small tools. The drawer shall be able to latch in the out position to function as a laptop / utility shelf.

Provide a convenient location on the inside of the door to store the cabinet wiring diagrams and other related cabinet drawings. Provide a Corbin #2 main door lock made of non-ferrous or stainless-steel material. Key all locks on the project alike and provide 1 key per lock to the Engineer. In addition, design the handle to permit padlocking.

Provide the interior of the cabinet with ample space for housing the controller and all associated equipment and wiring. Provide ample space in the bottom of the cabinet for the entrance and exit of all power, communications, and grounding conductors and conduit.

Arrange the equipment to permit easy installation of the cabling through the conduit so that they will not interfere with the operation, inspection, or maintenance of the unit. Provide adjustable metal shelves, brackets, or other support for the controller unit and auxiliary equipment. Leave a three inch minimum clearance from the bottom of the cabinet to all equipment, terminals, and bus bars.

Provide power supply monitoring circuitry to detect power failure and to automatically report the occurrence to the Control Software.

Install two LED light strips with shields, one in the top of the cabinet and the other under the bottom shelf. Design both lights to automatically turn on when the cabinet door is opened and turn off when the door closes.

Mount and wire a 120V (+10%) GFCI duplex receptacle of the three-wire grounding type in the cabinet in a location that presents no electrical hazard when used by service personnel for the operation of power tools and work lights.

**No cabinet resident equipment may utilize the GFCI receptacle. Furnish one spare non-GFCI duplex receptacle for future equipment.**

Mount a bug-proof and weatherproof thermostatically controlled fan and safety shield in the top of the cabinet. Size the fan to provide at least for two air exchanges per minute. Fuse the fan at 125% of the capacity of the motor. The magnetic field of the fan motor must not affect the performance of the control equipment. Use a fan thermostat that is manually adjustable to turn on between 80° F and 160° F with a differential of not more than 10° F between automatic turn on and turn off. Mount it in an easily accessible location, but not within six inches of the fan.

Install additional fans and / or heaters as needed to maintain the temperature inside the cabinet within the operating temperature range of the equipment within the cabinet as recommended by equipment manufacturer(s).

### **Wiring**

The requirements stated herein apply wherever electrical wiring is needed for any DMS system assemblies and subassemblies such as controller cabinet, DMS enclosure, electrical panel boards etc.

Neatly arrange and secure the wiring inside the cabinet. Where cable wires are clamped to the walls of the control cabinet, provide clamps made of nylon, metal, plastic with rubber or neoprene protectors, or similar. Lace and jacket all harnesses or tie them with nylon tie wraps spaced at six inches maximum to prevent separation of the individual conductors.

Individually and uniquely label all conductors. Ensure all conductor labels are clearly visible without moving the conductor. Connect all terminal conductors to the terminal strip in right angles. Remove excess conductor before termination of the conductor. Mold the conductor in such a fashion as to retain its relative position to the terminal strip if removed from the strip. Do not run a conductor across a work surface with the exception of connecting to that work surface. No conductor bundles can be support by fasteners that support work surfaces. Install all connectors, devices and conductors in accordance to manufactures guidelines. Comply with the latest NEC guideline in effect during installation. No conductor or conductor bundle may hang loose or create a snag hazard. Protect all conductors from damage. Ensure all solder joints are completed using industry accepted practices and will not fail due to vibration or movement. Protect lamps and control boards from damage.

No splicing will be allowed for feeder conductors and communication cables from the equipment cabinet to the DMS enclosure.

Insulate all conductors and live terminals so they are not hazardous to maintenance personnel.

Route and bundle all wiring containing line voltage AC and / or shield it from all low voltage control circuits. Install safety covers to prevent accidental contact with all live AC terminals located inside the cabinet.

Use industry standard, keyed type connectors with a retaining feature for connections to the controller.

Label all equipment and equipment controls clearly.

Supply each cabinet with one complete set of wiring diagrams that identify the color-coding or wire tagging used in all connections. Furnish a water-resistant packet adequate for storing wiring diagrams, operating instructions, and maintenance manuals with each cabinet.

### **Power Supply and Circuit Protection**

Design the DMS and controller for use on a system with a line voltage of  $120V + 10\%$  at a frequency of  $60\text{ Hz} \pm 3\text{ Hz}$ . Under normal operation, do not allow the voltage drop between no load and full load of the DMS and its controller to exceed 3% of the nominal voltage.

Blackout, brownout, line noise, chronic over-voltage, sag, spike, surge, and transient effects are considered typical AC voltage defects. Protect the DMS system equipment so that these defects do not damage the DMS equipment or interrupt their operation. Equip all cabinets with devices to protect the equipment in the cabinet from damage due to lightning and external circuit power and current surges.

### **Circuit Breakers**

Protect the DMS controller, accessories, and cabinet utilities with thermal magnetic circuit breakers. Provide the controller cabinet with a main circuit breaker sized according to the NEC. Use appropriately sized branch circuit breakers to protect the controller, sign display and accessories and for servicing DMS equipment and cabinet utilities.

Provide a subpanel in the sign enclosure with a main and branch circuit breakers sized appropriately per NEC.

Provide a detailed plan for power distribution within the cabinet and the sign. Label all breaker and conductor with size and loads. Have the plans signed and sealed by a NC registered PE and submit the plans for review and approval.

### **Surge Suppressor**

Install and clearly label filtering hybrid power line surge protectors on the load side of the branch circuit breakers in a manner that permits easy servicing. Ground and electrically bond the surge protector to the cabinet within two inches.

Provide power line surge protector that meets the following requirements:

|  |                        |
|--|------------------------|
| Peak surge current occurrences                         | 20 minimum             |
| Peak surge current for an 8 x 20 microsecond waveshape | 50,000 Amperes         |
| Energy Absorption                                      | > 500 Joules           |
| Clamp voltage  | 240 Volts              |
| Response time  | <1 nanosecond          |
| Minimum current for filtered output                    | 15 Amperes for 120VAC* |
| Temperature range                                      | -40°F to +158°F        |

\*Capable of handling the continuous current to the equipment

### **Transients and Emissions**

DMS and DMS controller will be designed in such a way to meet the latest NEMA TS-4 for Transients and Emissions.

### **Transient Protection**

The RS232 and Ethernet communication ports in the DMS sign controller shall be protected with surge protection between each signal line and ground. This surge protection shall be integrated internally within the controller.

### **Lightning Arrester**

Protect the system with an UL approved lightning arrester installed at the main service disconnect that meets the following requirements:

|  |                               |
|--|-------------------------------|
| Type of design                           | Silicon Oxide Varistor        |
| Voltage                                  | 120/240 Single phase, 3 wires |
| Maximum current                          | 100,000 Amps                  |
| Maximum energy                           | 3000 Joules per pole          |
| Maximum number of surges                 | Unlimited                     |
| Response time one milliamp test          | 5 nanoseconds                 |
| Response time to clamp 10,000 amps       | 10 nanoseconds                |
| Response time to clamp 50,000 amps       | 25 nanoseconds                |
| Leak current at double the rated voltage | None                          |
| Ground Wire                              | Separate                      |

### **Uninterruptible Power Supply (UPS)**

Furnish UPS with external temperature monitoring that will shut off when running on battery power and the maximum operating temperature for the ethernet switch is reached.

Install UPS with RJ-45 ethernet network monitoring ports that can be disabled via the UPS software / firmware.

The Design-Build Team is responsible for supplying a UPS and batteries that can adequately power the cabinet load plus an additional 20% for a **minimum** of 4 hours. The Design-Build Team shall request the power requirements for any department supplied equipment prior to submitting UPS for approval. Allow eight (8) weeks for the department to supply equipment power requirements. Provide to the Engineer for Approval, a submittal package with Engineering Calculations consisting of, as a minimum, schematic drawing, technical data sheets, and supporting documentation. Ensure the documentation demonstrates, in theory, that the battery(ies) will provide for continuous operation for a minimum of four (4) consecutive hours with no additional charging.

Furnish and install one rack mounted UPS in each new cabinet that meet the following **minimum** specifications:

### **Output**

|                                  |                              |
|----------------------------------|------------------------------|
| Nominal Output Voltage           | 120V                         |
| Output Voltage Distortion        | Less than 5% at full load    |
| Output Frequency (sync to mains) | 57 - 63 Hz for 60 Hz nominal |
| Crest Factor                     | up to 5:1                    |
| Waveform Type                    | Sine wave                    |
| Output Connections               | (4) NEMA 5-15R               |

### **Input**

|  |                                  |
|--|----------------------------------|
| Nominal Input Voltage                              | 120V                             |
| Input Frequency                                    | 50/60 Hz +/- 3 Hz (auto sensing) |
| Input Connections                                  | NEMA 5-15P                       |
| Input voltage range for main operations            | 82 - 144V                        |
| Input voltage adjustable range for mains operation | 75 -154 V                        |

### **Battery Type**



Maintenance-free sealed Lead-Acid battery with suspended electrolyte, leak-proof.

Typical recharge time 2 hours

### **Communications & Management**

Interface Port(s) DB-9 RS-232, USB, RJ-45 Ethernet

Control panel LED status display with load and  
battery bar-graphs

### **Surge Protection and Filtering**

Surge energy rating 480 Joules

### **Environmental**

Operating Environment -32 - 165 °F

Operating Relative Humidity 0 - 95%

### **Conformance**

Regulatory Approvals FCC Part 15 Class A, UL 1778

### **Controller Communications Interface**

- An EIA/TIA-232E port for remote communication using NTCIP
- An 10/100 Ethernet port for remote communication using NTCIP
- An EIA/TIA-232E port for onsite access using a laptop
- An EIA/TIA-232E auxiliary port for communication with a field device such as a UPS
- Fiber-optic ports for communication with the sign

### **Controller Local User Interface**

Provide the controller with a Local User Interface (LUI) for at least the following functions:

- On / Off Switch: controls power to the controller
- Control Mode Switch: for setting the controller operation mode to either remote or local mode
- Display and Keypad: Allow user to navigate through the controller menu for configuration (display, communications parameter, etc.) running diagnostics,

viewing peripherals status, message creation, message preview, message activation, etc. Furnish a display with a minimum size of 240x64 dots with LED back light

Protected access to the LUI with an alphanumeric and PIN passwords. Allow the user to select a preferred method of password protection. Default and hardcoded passwords are not allowed.

### **Controller Address**

Assign each DMS controller a unique address. Preface all commands from the Control Software with a particular DMS controller address. The DMS controller compares its address with the address transmitted; if the addresses match, then the controller processes the accompanying data.

### **Controller Functions**

Design the DMS controller to continuously control and monitor the DMS independent of the Control Software. Design the controller to display a message on the sign sent by the Control Software, a message stored in the sign controller memory, or a message created on site by an operator using the controller keypad.

Provide the DMS controller with a watchdog timer to detect controller failures and to reset the microprocessor, and with a battery backed up clock to maintain an accurate time and date reference. Set the clock through an external command from the Control Software or the Local User Interface.

### **DMS Controller Memory**

Furnish each DMS controller with non-volatile memory. Use the non-volatile memory to store and reprogram at least one test pattern sequence and 500 messages containing a minimum of two pages of 45 characters per page. The Control Software can upload messages into and download messages from each controller's non-volatile memory remotely.

Messages uploaded and stored in the controller's non-volatile memory may be erased and edited using the Control Software and the controller. New messages may be uploaded to and stored in the controller's non-volatile memory using the Control Software and the controller.

### **Equipment List**

Provide a general description of all equipment and all information necessary to describe the basic use or function of the major system components. Include a general "block diagram" presentation. Include tabular charts listing auxiliary equipment, if any is required. Include the nomenclature, physical and electrical characteristics, and functions of the auxiliary equipment unless such information is contained in an associated manual; in this case include a reference to the location of the information.

Include a table itemizing the estimated average and maximum power consumption for each major piece of equipment.

### **Physical Description**

Provide a detailed physical description of size, weight, center of gravity, special mounting requirements, electrical connections, and all other pertinent information necessary for proper installation and operation of the equipment.

### **Parts List**

Submit a parts list that contains all information needed to describe the characteristics of the individual parts, as required for identification to the Engineer. Include a list of all equipment within a group and a list of all assemblies, sub-assemblies, and replacement parts of all units. Arrange this data in a table, in alpha numerical order of the schematic reference symbols, which gives the associated description, manufacture's name, and part number, as well as alternate manufacturers and part numbers. Provide a table of contents or other appropriate grouping to identify major components, assemblies, etc.

### **Character Set Submittal**

Submit an engineering drawing of the DMS character set including at a minimum, 26 upper case and lower case letters, 10 numerals, 9 punctuation marks (. , ! ? - ' " ; : ) 12 special characters (# & \* + / ( ) [ ] < > @ ) and arrows at 0, 45, 90, 135, 180, 225, 270, and 315 degrees.

### **Wiring Diagrams**

Submit a wiring diagram for each DMS and each controller cabinet, as well as interconnection wiring diagrams for the system as a whole to the Engineer.

### **Routine of 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.

### **Maintenance Procedures**

Specify and submit the recommended preventative maintenance procedures and checks at pre-operation, monthly, quarterly, semiannual, annual, and "as required" periods to assure equipment operates reliably to the Engineer. List specifications (including tolerances) for all electrical, mechanical, and other applicable measurements and / or adjustments.

### **Repair Procedures**

Include in this section all data and step by step procedures necessary to isolate and repair failures or malfunctions, assuming the maintenance technicians are capable of analytical reasoning using the information provided in the sections titled "Wiring Diagrams", "Routine of Operation" and "Maintenance Procedures"

Describe accuracy, limits, and tolerances for all electrical, physical, or other applicable measurements. Include instructions for disassembly, overhaul, and reassembly, with shop specifications and performance requirements.

Give detailed instructions only where failure to follow special procedures would result in damage to equipment, improper operation, danger to operating or maintenance personnel, etc. Include such instructions and specifications only for maintenance that specialized technicians and engineers in a modern electromechanical shop would perform. Describe special test set up, component fabrication, and the use of special tools, jigs, and test equipment.

### **Warranty**

Ensure that the DMS system and equipment has a manufacturer's warranty covering all defects and failures for a minimum of five (5) years from the date of final acceptance by the Engineer. This warranty will cover all parts, labor, shipping, and any other costs associated with the repair of the DMS.

## **CONSTRUCTION METHODS**

### **Description**

This article establishes practices and procedures and gives minimum standards and requirements for the installation of DMS systems, auxiliary equipment and the construction of related structures.

Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable. Provide connections between DMS equipment and DMS sign housing and electric utilities that conform to NEC standards.

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.

### **Layout**

The Regional ITS engineer or Division Traffic Engineer will establish the actual location of each DMS assembly. It is the Design-Build Team's responsibility to ensure proper elevation, offset, and orientation of all DMS assemblies. The location of service poles as well as conduit lengths shown in the plans developed by the Design-Build Team, are approximate based on available project data. Make actual field measurements to place conduit and equipment at the required location.

### **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 construction and installation and any modifications made during installation.

The As-Built Plans will show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; Wiring Diagrams, Parts list; coordinates of the DMS and devices; and wire and conduit routing. Show horizontal and vertical locations of all underground conduits and cables dimensioned from fixed objects.

Include detailed drawings that identify the routing of all conductors in the system by cable type, color code, and function. Clearly label all equipment in the DMS system, controller cabinet, and DMS enclosure.

### **Conduit**

Install the conduit system in accordance with Section 1715 of the *Standard Specifications* and NEC requirements for an approved watertight raceway.

Make bends in the conduit so as not to damage it or change its internal diameter. Install watertight and continuous conduit with as few couplings as standard lengths permit.

Clean conduit before, during, and after installation. Install conduit in such a manner that temperature changes will not cause elongation or contraction that might damage the system.

Attach the conduit system to and install along the structural components of the Sign structure assemblies with beam clamps or stainless-steel strapping or inside the structure if there is available space. Install strapping according to the strapping manufacturer's recommendations and according to NEC requirements. Do not use welding or drilling to fasten conduit to structural components. Space the fasteners at no more than four feet for conduit 1.5 inches and larger or six feet for conduit smaller than 1.25 inches. Place fasteners no more than three feet from the center of bends, fittings, boxes, switches, and devices.

Flexible conduit will only be allowed when the conduits transition from the horizontal structure segment to the horizontal truss segment and from the horizontal truss segment to the rear entrance of the DMS when installing the DMS communications and feeder cables. The maximum length of flexible conduit allowed at each transition will be five feet.

Do not exceed the appropriate fill ratio on all cable installed in conduit as specified in the NEC.

### **Wiring Methods (Power)**

Do not pull permanent wire through a conduit system until the system is complete and has been cleaned.

Color-code all conductors per the NEC. Use approved marking tape, paint, sleeves or continuous colored conductors for No.8 AWG and larger. Do not mark a white conductor in a cable assembly any other color.

Do not splice underground circuits unless specifically noted in the plans developed by the Design-Build Team.

### **Equipment and Cabinet Mounting**

Mount equipment securely at the locations shown in the plans developed by the Design-Build Team, in conformance with the dimensions shown. Install fasteners as recommended by the manufacturer and space them evenly. Use all mounting holes and attachment points for attaching DMS enclosures and controller cabinets to the structures.

Drill holes for expansion anchors of the size recommended by the manufacturer of the anchors and thoroughly clean them of all debris.

Provide cabinets with all strapping hardware and any other necessary mounting hardware in accordance with these Project Special Provisions and the plans developed by the Design-Build Team.

Seal all unused conduit installed in cabinets at both ends to prevent water and dirt from entering the conduit and cabinet with approved sealing material.

Install a ground bushing attached inside the cabinet on all metal conduits entering the cabinet. Connect these ground bushings to the cabinet ground bus.

Install a level concrete technician pad measuring a minimum four inches thick, 36 inches wide and 36 inches long at the front door of the DMS equipment cabinet as shown on the Typical Details sheet within the plans developed by the Design-Build Team.

### **Work Site Clean-Up**

Clean the site of all debris, excess excavation, waste packing material, wire, etc. Clean and clear the work site at the end of each workday. Do not throw waste material in storm drains or sewers.

### **General Test Procedure**

Test the DMS and its components in a series of functional tests and ensure the results of each test meet the specified requirements in the presence of the Engineer. These tests should not damage the equipment. The Engineer will reject equipment that fails to fulfill the requirements of any test. Resubmit rejected equipment after correcting non-conformities and re-testing; completely document all diagnoses and corrective actions. Modify all equipment furnished under this contract, without additional cost to the Department, to incorporate all design changes necessary to pass the required tests.

Provide electronic copies of all test procedures and requirements to the Engineer for review and approval at least 30 days prior to the testing start date.

Only use approved procedures for the tests. Include the following in the test procedures:

- A step-by-step outline of the test sequence that demonstrates the testing of every function of the equipment or system tested
- A description of the expected nominal operation, output, and test results, and the pass / fail criteria
- An estimate of the test duration and a proposed test schedule
- A data form to record all data and quantitative results obtained during the test
- A description of any special equipment, setup, manpower, or conditions required by the test

Provide all necessary test equipment and technical support. Use test equipment calibrated to National Institute of Standards and Technology (NIST) standards. Provide calibration documentation upon request.

Conform to these testing requirements and the requirements of these specifications. It is the Design-Build Team's responsibility to ensure the system functions properly even after the Engineer accepts the CCTV test results.

Provide electronic copies of the quantitative test results and data forms containing all data taken, highlighting any non-conforming results and remedies taken, to the Engineer for approval. An authorized representative of the manufacturer must sign the test results and data forms.

## **Compatibility Tests**

### **DMS System**

Compatibility Tests are applicable to DMS that the Design-Build Team wishes to furnish but are of a different manufacturer or model series than the existing units installed in the Region. If required, the Compatibility Test shall be completed and accepted by the Engineer prior to approval of the material submittal.

The Compatibility Test shall be performed in a laboratory environment at a facility chosen by the Engineer based on the type of unit being tested. Provide notice to the Engineer with the material submitted that a Compatibility Test is requested. The notice shall include a detailed test plan that will show compatibility with existing equipment. The notice shall be given a minimum of 15 calendar days prior to the beginning of the Compatibility Test.

The Design-Build Team shall provide, install, and integrate a full-functioning unit to be tested. The Department will provide access to existing equipment to facilitate these testing procedures. The Engineer will determine if the Compatibility Test was acceptable for each proposed device. To prove compatibility the Design-Build Team is responsible for configuring the proposed equipment at the applicable Traffic Operations Center (TOC) with the accompaniment of an approved TOC employee.

***Operational Field Test (On-Site Commissioning)*****DMS System**

Final DMS locations must be field verified and approved by the Engineer. Perform the following local operational field tests at the DMS assembly field site in accordance with the test plans in the presence of the ITS Design Unit and a representative of the DMS manufacturer. The Design-Build Team is responsible for providing a laptop for camera control and positioning during the test. After completing the installation of the camera assemblies, including the camera hardware, power supply, and connecting cables, the Design-Build Team shall:

**Local Field Testing**

Furnish all equipment and labor necessary to test the installed camera and perform the following tests before any connections are made.

- Verify that physical construction has been completed
- Inspect the quality and tightness of ground and surge protector connections
- Check the power supply voltages and outputs, check connection of devices to power source
- Verify installation of specified cables and connection between the DMS and control cabinet
- Make sure cabinet wiring is neat and labeled properly; check wiring for any wear and tear; check for exposed or loose wires
- Perform the DMS assembly manufacturer's initial power-on test in accordance with the manufacturer's recommendation
- Set the DMS control address

**Central Operations Testing**

- Interconnect the DMS's communication interface device with one of the following methods as depicted on the plans developed by the Design-Build Team:
  - communication network's assigned Ethernet switch and assigned fiber-optic trunk cable and verify a transmit / receive LED is functioning and that the DMS is fully operational at the TOC.

AND / OR

- to the DOT furnished cellular modem and verify a transmit / receive LED is functioning and that the DMS is fully operational at the TOC.



- Review DMS date and time and DMS controller information
- Run DMS diagnostics and review results
- Run DMS pixel test and review results
- Run test message
- Run test schedule
- Program burn-in scenario

Approval of Operational Field Test results does not relieve the Design-Build Team to conform to the requirements in these Project Special Provisions. If the DMS system does not pass these tests, document a correction or substitute a new unit as approved by the Engineer. Re-test the system until it passes all requirements.

## NTCIP REQUIREMENTS

This section defines the NTCIP requirements for the DMSs covered by these Project Special Provisions and plans developed by the Design-Build Team.

### References

#### A. Standards

This specification references several standards through their NTCIP designated names.

The following list provides the full reference to the current version of each of these standards

Implement the most recent version of the standard including any and all Approved or Recommended Amendments to these standards for each NTCIP Component covered by these project specifications. Refer to the NTCIP library at [www.ntcip.org](http://www.ntcip.org) for information on the current status of NTCIP standards.

| Abbreviated Number | Title  |
|--------------------|--|
| NTCIP 1201         | <i>Global Object (GO) Definitions</i>                    |
| NTCIP 1203         | <i>Object Definitions for Dynamic Message Signs</i>      |
| NTCIP 2101         | <i>SP-PMPP/232 Subnet Profile for PMPP over RS-232</i>   |
| NTCIP 2104         | <i>SP-Ethernet Subnet Profile for Ethernet</i>           |
| NTCIP 2201         | <i>TP-Null Transport Profile</i>                         |
| NTCIP 2202         | <i>Internet Transport Profile (TCP/IP and UDP/IP)</i>    |
| NTCIP 2301         | <i>AP for Simple Transportation Management Framework</i> |

## B. Features

Each DMS shall be required to support the following optional features, conformance groups and all functional requirements and objects that apply herein.

| Feature  | Reference      |
|--|----------------|
| Time Management                                    | NTCIP 1201 v3  |
| Timebase Event Schedule                            | NTCIP 1201 v3  |
| PMPP   | NTCIP 1201 v3  |
| Determine Sign Display Capabilities                | NTCIP 1203 v03 |
| Manage Fonts                                       | NTCIP 1203 v03 |
| Manage Graphics                                    | NTCIP 1203 v03 |
| Schedule Messages for Display                      | NTCIP 1203 v03 |
| Change Message Display Based on and Internal Event | NTCIP 1203 v03 |
| Control External Devices                           | NTCIP 1203 v03 |
| Monitor Sign Environment                           | NTCIP 1203 v03 |
| Monitor Door Status                                | NTCIP 1203 v03 |
| Monitor Controller Software Operations             | NTCIP 1203 v03 |
| Monitor Automatic Blanking of Sign                 | NTCIP 1203 v03 |
| Report   | NTCIP 1103 v03 |

## C. Objects

The following table represents objects that are considered optional in the NTCIP standards but are required by this specification. It also indicated modified objects value ranges for certain objects. Each DMS shall provide the full, standard object range support (FSORS) of all the objects required by these specifications unless otherwise stated below.

| Object                     | Reference             | Requirement   |
|----------------------------|-----------------------|---|
| moduleTable                | NTCIP 1201 – 2.2.3    | Shall contain at least one row with moduleType equal to 3 (software) The moduleMake specifies the name of the manufacturer, the moduleModel specifies the manufacturer's name of the component and the moduleVersion indicates the model version number of the component. |
| maxTimeBaseScheduleEntries | NTCIP 1201 – 2.4.3.1. | Shall be at least 28  |
| maxDayPlans                | NTCIP 1201 – 2.4.4.1  | Shall be at least 20  |
| maxDayPlanEvents           | NTCIP 1201 – 2.4.4.2  | Shall be at least 12  |
| maxGroupAddresses          | NTCIP 1201 – 2.7.1    | Shall be at least 1   |
| maxEventLogConfigs         | NTCIP 1103 – A.7.4    | Shall be at least 50  |

|                          |                      |  |
|--------------------------|----------------------|--|
| eventConfigMode          | NTCIP 1103 – A.7.5.3 | The DMS shall support the following Event Configurations: onChange, greaterThanValue, smallerThanValue |
| eventConfigLogOID        | NTCIP 1103 – A.7.5.7 | FSORS  |
| eventConfigAction        | NTCIP 1103 – A.7.5.8 | FSORS  |
| maxEventLogSize          | NTCIP 1103 – A.7.6   | Shall be at least 20   |
| maxEventClasses          | NCTIP 1103 – A.7.2   | Shall be at least 16   |
| eventClassDescription    | NTCIP 1103 – A.7.3.4 | FSORS  |
| communityNamesMax        | NTCIP 1103 – A.7.8   | Shall be at least 3  |
| numFonts                 | NTCIP 1203 – 5.4.1   | Shall be at least 12   |
| maxFontCharacters        | NTCIP 1203 – 5.4.3   | Shall be at least 255  |
| defaultFlashOn           | NTCIP 1203 – 5.5.3   | The DMS shall support flash “on” times ranging from 0.1 to 9.9 seconds in 0.1 second increments        |
| defaultFlashOnActive     | NTCIP 1203 – 5.5.4   | The DMS shall support flash “on” times ranging from 0.1 to 9.9 seconds in 0.1 second increments        |
| defaultFlashOff          | NTCIP 1203 - 5.5.5   | The DMS shall support flash “off” times ranging from 0.1 to 9.9 seconds in 0.1 second increments       |
| defaultFlassOffActive    | NTCIP 1203 – 5.5.6   | The DMS shall support flash “off” times ranging from 0.1 to 9.9 seconds in 0.1 second increments       |
| defaultBackgroundColor   | NTCIP 1203 – 5.5.2   | The DMS shall support the black background color   |
| defaultForegroundColor   | NTCIP 1203 - 5.5.2   | The DMS shall support the amber foreground color   |
| defaultJustificationLine | NTCIP 1203 - 5.5.9   | The DMS shall support the following forms of line justification: left, center, and right               |
| defaultJustificationPage | NTCIP 1203 - 5.5.11  | The DMS shall support the following forms of page justification: top, middle, and bottom               |
| defaultPageOnTime        | NTCIP 1203 - 5.5.13  | The DMS shall support page “on” times ranging from 0.1 to 25.5 seconds in 0.1 second increments        |
| defaultPageOffTime       | NTCIP 1203 - 5.5.15  | The DMS shall support page “off” times ranging from 0.0 to 25.5 seconds in 0.1 second increments       |

|                               |                         |   |
|-------------------------------|-------------------------|---|
| defaultCharacterSet           | NTCIP 1203 - 5.5.21     | The DMS shall support the eight bit character set   |
| dmsMaxChangeableMsg           | NTCIP 1203 - 5.6.3      | Shall be at least 100.  |
| dmsMessageMultiString         | NTCIP 1203 - 5.6.8.3    | The DMS shall support any valid MULTI string containing any subset of those MULTI tags listed in Table 3 (below)  |
| dmsControlMode                | NTCIP 1203 - 5.7.1      | Shall support at least the following modes: local, central, and centralOverride   |
| dmsSWReset                    | NTCIP 1203 - 5.7.2      | FSORS   |
| dmsMessageTimeRemaining       | NTCIP 1203 - 5.7.4      | FSORS   |
| dmsShortPowerRecoveryMessage  | NTCIP 1203 - 5.7.8      | FSORS   |
| dmsLongPowerRecoveryMessage   | NTCIP 1203 - 5.7.9      | FSORS   |
| dmsShortPowerLossTime         | NTCIP 1203 - 5.7.14     | FSORS   |
| dmsResetMessage               | NTCIP 1203 - 5.7.11     | FSORS   |
| dmsCommunicationsLossMessage  | NTCIP 1203 - 5.7.12     | FSORS   |
| dmsTimeCommLoss               | NTCIP 1203 - 5.7.13     | FSORS   |
| dmsEndDurationMessage         | NTCIP 1203 - 5.7.15     | FSORS   |
| dmsMultiOtherErrorDescription | NTCIP 1203 - 5.7.20     | If the vendor implements any vendor-specific MULTI tags, the DMS shall provide meaningful error messages within this object whenever one of these tags generates an error |
| dmsIllumControl               | NTCIP 1203 - 5.8.1      | The DMS shall support the following illumination control modes: Photocell, and Manual   |
| dmsIllumNumBrightLevels       | NTCIP 1203 - 5.8.4      | Shall be at least 100   |
| dmsIllumLightOutputStatus     | NTCIP 1203 - 5.8.9      | FSORS   |
| numActionTableEntries         | NTCIP 1203 - 5.9.1      | Shall be at least 200   |
| watcdogFailureCount           | NTCIP 1203 - 5.11.1.5   | FSORS   |
| dmsStatDoorOpen               | NTCIP 1203 - 5.11.1.6   | FSORS   |
| fanFailures                   | NTCIP 1203 - 5.11.2.3.1 | FSORS   |
| fanTestActivation             | NTCIP 1203 - 5.11.2.3.2 | FSORS   |
| tempMinCtrlCabinet            | NTCIP 1203 - 5.11.4.1   | FSORS   |
| tempMaxCtrlCabinet            | NTCIP 1203 - 5.11.4.2   | FSORS   |
| tempMinSignHousing            | NTCIP 1203 - 5.11.4.5   | FSORS   |
| tempMaxSignHousing            | NTCIP 1203 - 5.11.4.6   | FSORS   |

#### D. MULTI Tags

Each DMS shall support the following message formatting MULTI tags. The manufacturer may choose to support additional standard or manufacturer specific MULTI tags.

| <b>Code</b>   | <b>Feature</b>   |
|---------------|--|
| f1            | field 1 - time (12hr)  |
| f2            | field 2 - time (24hr)  |
| f8            | field 8 – day of month   |
| f9            | field 9 – month  |
| f10           | field 10 - 2 digit year  |
| f11           | field 11 - 4 digit year  |
| fl (and / fl) | flashing text on a line by line basis with flash rates controllable in 0.5 second increments.            |
| fo            | Font   |
| jl2           | Justification – line – left  |
| jl3           | Justification – line – center  |
| jl4           | Justification – line – right   |
| jl5           | Justification – line – full  |
| jp2           | Justification – page – top   |
| jp3           | Justification – page – middle  |
| jp4           | Justification – page – bottom  |
| mv            | moving text  |
| nl            | new line   |
| np            | new page, up to 2 instances in a message (i.e., up to 3 pages / frames in a message counting first page) |
| pt            | page times controllable in 0.5 second increments.  |

## **E. Documentation**

Supply software with full documentation, including a USB flash drive containing ASCII versions of the following MIB files in Abstract Syntax Notation 1 (ASN.1) format:

- The relevant version of each official standard MIB Module referenced by the device functionality.
- If the device does not support the full range of any given object within a Standard MIB Module, a manufacturer specific version of the official Standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and / or DESCRIPTION fields of the associated OBJECT TYPE macro. Name this file identical to the standard MIB Module, except that it will have the extension ".man".

- A MIB Module in ASN.1 format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
- A MIB containing any other objects supported by the device.

Allow the use of any and all of this documentation by any party authorized by the Department for systems integration purposes at any time initially or in the future, regardless of what parties are involved in the systems integration effort.

## **F. NTCIP Acceptance Testing**

Test the NTCIP requirements outlined above by a third party testing firm. Submit to the Engineer for approval a portfolio of the selected firm. Include the name, address, and a history of the selected firm in performing NTCIP testing along with references. Also provide a contact person's name and phone number. Submit detailed NTCIP testing plans and procedures, including a list of hardware and software, to the Engineer for review and approval ten days in advance of a scheduled testing date. Develop test documents based on the NTCIP requirements of these Project Special Provisions. The acceptance test will use the NTCIP Exerciser, and / or other authorized testing tools and will follow the guidelines established in the ENTERPRISE Test Procedures. Conduct the test in North Carolina on the installed system in the presence of the Engineer. Document and certify the results of the test by the firm conducting the test and submit the Engineer for review and approval. In case of failures, remedy the problem and have the firm retest in North Carolina. Continue process until all failures are resolved. The Department reserves the right to enhance these tests as deemed appropriate to ensure device compliance.

## **DMS PEDESTAL STRUCTURE**

### **DESCRIPTION**

This section includes all design, fabrication, furnishing, and erection of the DMS pedestal structure, platforms, walkways, ladders for access to the DMS inspection doors, and attachment of the DMS enclosures to the structure in accordance with the requirements of these Project Special Provisions and the plans developed by the Design-Build Team. Fabricate the supporting DMS assemblies from tubular steel. Furnish pedestal type DMS assemblies as shown in the plans developed by the Design-Build Team.

Provide pedestal DMS structures with a minimum clearance from the high point of the road to the bottom of the DMS enclosure of 25 feet for Walk-In DMS and 20 feet for Front Access DMS. Design the new DMS assemblies (including footings), DMS mounting assemblies, maintenance platforms, and access ladders and submit shop drawings for approval. A Professional Engineer that is registered in the state of North Carolina will prepare such computations and drawings. These must bear his signature, seal, and date of acceptance.

The provisions of Section 900 of the *Standard Specifications* apply to all work covered by this section.

The Standard Provisions SP09R005 and SP09R007 found at the link below apply to all work covered by this section.

<https://connect.ncdot.gov/resources/Specifications/Pages/2024-Specifications-and-Special-Provisions.aspx>

It is the Design-Build Team's responsibility to verify DMS S-dimension elevation drawings for the DMS locations and provide them with the DMS shop drawings for the Engineer's approval.

## **MATERIALS**

Use materials that meet the requirements of:

- Section 906 of the *Standard Specifications*.
- Standard Provision SP09R005 *Foundations and Anchor Rod Assemblies for Metal Poles*.
- Standard Provision SP09R007 *Overhead and Dynamic Message Sign Foundations*.

## **CONSTRUCTION METHODS**

### **General**

Construct DMS structures and assemblies in accordance with the requirements of:

- Section 906 of the *Standard Specifications*.
- Standard Provision SP09R005 *Foundations and Anchor Rod Assemblies for Metal Poles*.
- Standard Provision SP09R007 *Overhead and Dynamic Message Sign Foundations*.

### **DMS Maintenance Platform (Walkway)**

Provide a maintenance platform (walkway), a minimum of three feet wide with open skid resistant surface and safety railing on the DMS assemblies for access to one of the DMS inspection doors as shown on the plans developed by the Design-Build Team. Provide platforms with fixed safety railings along both sides from the beginning of the platform to the inspection door. No gap is allowed between walkway and inspection door or along any part of the safety rails.

Ensure the design, fabrication and installation of the access platforms on new DMS structures complies with the following:

- A. The top of the platform grading surface is vertically aligned with the bottom of the DMS door
- B. The DMS door will open 90-degrees from its closed position without any obstruction from the platform or safety handrails

- C. The platform is rigidly and directly connected to the walkway brackets and there is no uneven surface between sections
- D. Install a four-inch x four-inch safety angle parallel to and along both sides of the platform and extend it the entire length of the platform. Design the safety angle to withstand loading equivalent to the platform
- E. Ensure the platform design allows full access to the DMS enclosure inspection door with no interference or obstructions

### **DMS Access Ladder**

Provide a fixed ladder, of the same material as the pedestal structures, leading to and ending at the access platform. Equip the ladder with a security cover (ladder guard) and lock to prohibit access by unauthorized persons. Furnish the lock to operate with a Corbin #2 key and furnish two keys per lock. Design the rungs on 12-inch center to center typical spacing. Start the first ladder rung no more than 18 inches above the landing pad. Attach the security cover approximately 6 feet above the finished ground. Design the ladder and security cover as a permanent part of the DMS assembly and include complete design details in the DMS assembly shop drawings. Fabricate the ladder and cover to meet all OSHA requirements and applicable state and local codes, including but not limited to providing a ladder cage.

### **CONDUIT FOR JETTING FIBER**

(10-14-24)

### **DESCRIPTION**

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

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. Furnish individual HDPE conduits (Traditional) with an embedded tracer wire. If there are more than one HDPE conduit in the same trench, provide tracer wire with only one of the conduits. See Section 1. 2.(C) "Traditional - HDPE Conduit" below. Furnish grouped microcell conduits with an internal tracer wire.

Furnish all HDPE conduit that is 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.

For traditional conduits designated as spare, furnish polyester pull tape with an embedded tracer wire.

### **MATERIALS**

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



**A. 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. 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)  |
| <b>Microduct Conduit Trade Sizes</b>     | <b>Fiber Count (Micro-Fiber)</b>      | <b>Furnish</b>     |
| 22 mm OD & 16 mm ID                      | 12 - 864                              | EPEC-7.3 (SDR 7.3) |

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 F <sub>10</sub> >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.

## **B. 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 minimum colors (Blue, Orange, Green, Brown, Slate or Grey, Black, Red, White).

Furnish grouped microcell conduit assemblies with an “Orange” outer sheath unless otherwise noted in the plans or these project special provisions. An alternate grouped microcell conduit outer sheath color may be submitted for approval by the Engineer.

## **C. Traditional - HDPE Conduit**

On traditional conduits, where multiple conduits are to be placed at the same time, furnish 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 (NTRL). Ensure all non-locatable standard wall HDPE conduits are marked at least with the following information at two feet or less intervals per the examples below in a-f. For locatable standard wall HDPE conduit ensure the conduit is marked at least with the following information on two feet or less intervals with items a-e below:

- (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

#### **D. 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 to ensure 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.

#### **E. 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 Kg/cm<sup>2</sup> (80,000 psi) and a minimum Pipe Stiffness of 49.2 Kg/cm<sup>2</sup> (699 psi).

Ensure the completed grouped microcell conduit assembly is furnished with a minimum of two (2) 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.

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.

#### **F. 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.

Couplers shall meet, at minimum, 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  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $73^{\circ}\text{F} \pm 9^{\circ}\text{F}$ ) for 5 minutes.

#### **G. 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

### A. General

Install traditional HDPE conduits and grouped microcell conduit assemblies utilizing the method identified in the plans (trench, micro-trench, plow, directional drill, etc.) Comply with the following Sections in Article 1715-3 “Construction Methods” of the *Standard Specifications*, 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                  | 42”/48”   |
| Minimum/Maximum Conduit Depth crossing the Interstate (Perpendicular) | 15 feet below   |
| Bridge Foundation   | 5 ft horizontal and 4 ft vertical (clearances greater than minimum horizontal should continue to use the 4V:5H ratio, i.e., 10 ft horizontal should be no deeper than 8 ft) |
| Drainage Pipes 60" or Less  | 14 to 15 feet below   |
| Drainage Pipes Greater than 60"                                       | 14 to 15 feet below   |
| Box Culverts  | 14 to 15 feet below   |
| Slope Protection (rip rap)  | 32” below   |
| Slope Protection Foundation Footing                                   | 5 ft below  |
| Crossing Beneath Ditches  | 32” below bottom of ditch   |

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 should 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 6-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 4-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” below in this 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 the 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 Section 1.4 (B) - “Jetting Operations” below.

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 when the “Conduit Integrity Testing”, see B below, is being done. Once the CIT testing has been completed the ends are to be sealed as outlined in Section 1.4 (C) “Duct Sealing” below.

## **B. Conduit Integrity Testing**

Immediately upon completing the conduit installation or prior to installation of the fiber cable it will be the responsibility of the Contractor to ensure usability of the conduit system. This will 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 identify 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 (3) 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 6 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 5 minutes to see if the pressure remains stable. If the pressure reading remains stable or does not drop significantly (Minimal reductions of 1 to 2 pounds is acceptable) after a 5 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 corrective actions shall be taken. 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 later)

### 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 installers obligation 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 later).

#### 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 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 has been discovered to have been damaged (failing to pass the Conduit Integrity Testing) notify the Engineer. The Engineer has the authority to require any of the following options regarding the damaged section of conduit:

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

#### **C. Conduit Sealing**

Immediately upon completing the Conduit Integrity Testing 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.

#### **D. 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. (See "Tracer Wire Bonding/Isolation Test Switch" in 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.

**B. 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 allowing 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. 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. Moldable Duct Seal will 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".

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.

**PORTABLE CCTV CAMERA and TRAILER**

(10-14-24)

**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 State Traffic Operations Center (STOC).

Furnish, deploy, install, test, integrate and make fully operational the new Portable CCTV Camera assembly at the location described or shown in the plans 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 will not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

The Department will provide a cellular modem to establish the communications link between the Portable CCTV Camera and the State Traffic Operations Center (STOC).

**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 will safely support the camera mount and CCTV Camera when they are not deployed, and the trailer is in travel mode and when the camera mount and CCTV Camera are deployed. Provide the trailer with heavy-duty fenders capable of supporting a minimum of 200 lbs. Ensure the fenders are designed to minimize road surface water and debris from being thrown up on to the trailer equipment when being transported.

The towing tongue or drawbar shall be removable and shall include a 2-inch ball hitch. The trailer shall tow level when attached to a 2-inch ball mounted 18" high. Ensure the trailer tongue

is removable and that no tools are required to remove or re-install the tongue. Provide an electrical connector for separation of the trailer safety lighting system where the trailer tongue connects to the trailer. Ensure the trailer tongue is rated for 6,000 lbs. Provide a tongue jack stand will be heavy-duty; swivel mount castor wheel type design with a 1,200 lb. capacity (minimum). Ensure the tongue jack stand can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

Safety chains shall be provided, of adequate length, meeting SAE J-697 Standard, latest edition. Chain shall be a minimum of 5/16", and meet the National Association of Chain Manufacturer's (NACM) welded chain standard rating of Grade 70 with a Working Load Limit of 4700 lbs.

The trailer, springs and axels shall be rated for 2,500 lbs. and supplied with 15" (minimum) radial tires. Total combined load rating of the tires and wheels shall exceed the GVWR of the unit. Load ratings shall be determined by reference to the current yearbook of the Tire and Rim Association, Inc., or the manufacturer's published load rating. Tire ratings shall be calculated at 65 mph.

Trailer GVWR shall not exceed 2,500 lbs. so a trailer braking system shall not be required. The trailer must not require any special towing package, electric brakes or specialized heavy-duty truck to tow.

The trailer shall include a leveling system to allow for the trailer to be in a stable and level position when the jack legs are deployed. The trailer shall be equipped with (4) four crank style leveling jacks, one at each corner of the trailer that extend straight down with adequate lifting capacity and a large steel footpad to level and stabilize the trailer. Ensure the leveling jacks can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

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

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

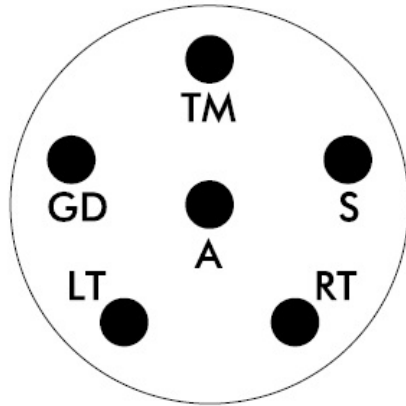
An illuminated license plate holder will be mounted so that a license plate is protected and does not extend past sides of fenders.

The trailer sides and rear shall be marked with continuous red/white striped retroreflective tape in a pattern meeting applicable NHTSA (DOT) regulations using certified retroreflective material meeting ASTM D4956. The tape must be 3 inches wide and installed in a repeating pattern of 11 inches long (red) followed by 7-inches long (white).

Provide a standard 6-way plug and receptacle connector, equal to and interchangeable with a Velvac 055049 assembly, and a heavy-duty jacketed multi-conductor cable shall be furnished for connecting the truck and trailer wiring system. All wiring shall be properly protected and secured. The receptacle shall be furnished loose, while the cable and plug shall be attached to the trailer in sufficient length to reach a truck-mounted receptacle, additionally provide an intermediate

electrical connector where the wiring harness leaves the removeable tongue and the trailer body. The plug shall be connected to the trailer wiring system in accordance with the following drawing:

### 6-Way Trailer Connection



| Letter Code             | Trailer Color Code |
|-------------------------|--------------------|
| GD – Brake Wire Ground  | WHITE              |
| TM – Tail & Marker Lamp | BLACK              |
| S – Stop Lamp           | RED                |
| RT – Right Turn Signal  | GREEN              |
| LT – Left Turn Signal   | YELLOW             |
| A – Live Brake Wire     | BROWN              |

### 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 must have tempered glass faces and be sealed.

**The vendor, upon request, must provide solar panel specifications including dimensions, voltage, wattage and the number of panels and cells to be used. Additionally, the vendor must provide load calculations for the photovoltaic power system to operate the CCTV Camera and its supporting components in accordance with these specifications.**

Loads for NCDOT furnished equipment are shown below. The solar and load calculations shall be performed and certified by a certified NABCEP Solar PV Installation Professional. The Manufacturer must specify the power requirements for each component of the system including the camera, digital cellular modem and any other electrical loads present during normal operation.

The trailer shall include a NEMA 4X hinged, lockable enclosure to contain the power system control components to operate the CCTV Camera system, unless these components are located in a separate compartment within the battery compartment. The battery enclosure shall be lockable to prevent unauthorized access to the battery(s) and control components. All locks shall be keyed to accept a Corbin #2 key.

Additionally, a separate 12 x 12 x 6 (minimum) NEMA 4X hinged, lockable enclosure shall be provided to install switches, cellular communications modules, and control equipment for the CCTV Camera assembly.

The power system including solar panels shall be mounted onto the trailer and shall exceed the dimensions of the trailer or cause the trailer GVWR (2,500 lb.) to be exceeded.

#### 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 must provide a drawing that shows camera mounting provisions provided.** Camera wiring shall spiral around the mast to allow the mast to raise and lower. A 2" diameter minimum (or acceptable equivalent) grommited 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 ANSI Z 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 must meet the following minimum requirements:

- Sensor size: 2 megapixels
- Video Resolution: 1920x1080 (HDTV 1080p)
- Aspect Ratio: 16:9
- Overexposure protection: The camera shall have built-in circuitry or a protection device to prevent any damage to the camera when pointed at strong light sources, including the sun
- Low light condition imaging
- Wide Dynamic Range (WDR) operation
- Electronic image stabilization
- Automatic focus with manual override
- Incoming session IP logging allows the monitoring of excess data usage.

**Lens**

Furnish each camera with a motorized zoom lens that is high performance integrated dome system or approved equivalent with automatic iris control with manual override and neutral density spot filter. Furnish lenses that meet the following optical specifications:

- 30X optical zoom, and 12X electronic zoom
- Preset positioning: 64 Presets

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical means must be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

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

**Pan and Tilt Unit**

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

- Pan: continuous 360 Degrees
- Tilt: up/down +2 to -90 degrees minimum
- Motors: Two-phase induction type, continuous duty, instantaneous reversing
- Preset Positioning: 64 PTZ presets per camera

**Video Ethernet Encoder**

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

Encoders must have the following minimum features:

- Network Interface: Ethernet 10/100 Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP
- Security: SSL, SSH, 802.1x, HTTPS encryption with password-controlled browser interface
- Video Streams: Minimum 2 simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9 aspect ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth 30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

**Central Receiver/Driver**

Provide each new camera unit with a control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit,

camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide the following functions:

- Zoom in/out
- Automatic focus with manual override
- Tilt up/down
- Automatic iris with manual override
- Pan right/left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver must accept status information from the pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver/driver must accept “goto” preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

### **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, standby-by generator/land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram references connections for CCTV Camera and controller and all other supporting devices and systems that comprise the whole system.

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

**Deployment**

The Engineer will establish the actual location of each Portable CCTV camera trailer assembly to be deployed. It is 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 will 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.

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

(10-14-24)

## **DESCRIPTION**

Furnish and install junction boxes with covers, graded stone, and all necessary hardware in accordance with the plans and specifications.

Provide Electronic Marking Balls to aid in locating the junction

## **MATERIALS**

### **H. General**

Refer to Division 8 and 10 of the *Standard Specifications*.

| <b>Item</b>             | <b>Section</b> |
|-------------------------|----------------|
| #57 or #67 Washed Stone | 1005           |

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

### **I. Junction Box**

Provide junction boxes with 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 6-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 inside dimensions of 16" (l) x 10" (w) x 10" (d). Provide a cover embossed with the following wording "NCDOT Electrical".

Provide oversized junction boxes and covers with minimum inside dimensions of 28" (l) x 15" (w) x 22" (d) for installing only fiber-optic communications cable.

Provide special oversized junction boxes and covers with minimum inside dimensions of 33" (l) x 22" (w) x 22" (d) where underground fiber-optic splice enclosures are to be installed or as directed by the plans.

Provide additional oversized junction boxes and covers as identified in the plans where underground fiber-optic splice enclosures and conduit requirements may 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 may 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 in this project special provision).

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. **All conduits shall enter the junction boxes through the mouse holes/knock-outs.**

#### **J. Electronic Marker Ball**

Furnish an electronic marking ball, with a minimum life expectancy of 15 years and that are 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

## CONSTRUCTION METHODS

### A. Junction Boxes

Install standard size junction boxes as shown in the plans. When lateral runs for electrical cables are greater than 150 feet, install additional junction boxes to ensure distances between junction boxes does not exceed 150 feet.

Install oversized junction boxes and any special oversized junction boxes at maximum intervals of 1500 feet unless otherwise stated in the plans.

Backfill beneath and around the boxes using #57 or #67 washed stone in conformance with Section 1005 of the *Standard Specifications*. Backfill beneath the box a minimum of 12-inches and around the exterior of the box a minimum of 3-inches.

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

### B. 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.

### C. 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 (TSMO) Unit.

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

### **CONNECTED CHANGEABLE MESSAGE SIGN**

(10-14-24)

#### **Description**

**Connected Changeable Message Signs (CCMS) are separate and in addition to any Changeable Message Signs (CMS) required by the project for temporary traffic control.**

Furnish, install, operate, maintain, relocate, and remove Connected Changeable Message Signs (CCMS) that operate off a photovoltaic power source, can be controlled via a NCDOT supplied cellular model, and can be deployed as part of an Incident Management System or as a temporary replacement for a permanent Dynamic Message Sign. Furnish CCMS 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.

CCMS 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 CCMS that are fully compatible with Daktronics, Inc. Vanguard V4 software (also referred to hereinafter as the “Vanguard V4 Software”).

Deploy and configure the new CCMS 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 CCMS 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 CCMS 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. **CCMS signs must be listed on the NCDOT ITS & Signals QPL.** Prototype equipment will not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

The Department will provide a cellular modem to establish the communications link between the CCMS and the Statewide Traffic Operations Center (STOC).

## **TRAILER**

The trailer shall be specifically designed to support and secure the CCMS 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 2-inch ball hitch. The trailer shall tow level when attached to a 2-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Furnish a hydraulic surge braking system built into the tongue with a manual lockout lever or pin that will 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 will 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 4 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 1-inch increments along the entire length of the support leg. Each support leg shall extend a minimum of 4 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 4-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.

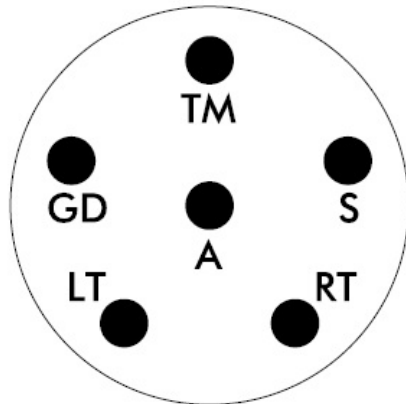
An illuminated license plate holder will be mounted so that a license plate is protected and does not extend past sides of fenders.

The trailer sides and rear shall be marked with continuous red/white striped retroreflective tape in a pattern meeting applicable NHTSA (DOT) regulations using certified retroreflective material meeting ASTM D4956. The tape must be 3 inches wide and installed in a repeating pattern of 11 inches long (red) followed by 7 inches long (white).

Provide a standard 6-way plug and receptacle connector, equal to and interchangeable with a Velvac 055049 assembly, and a heavy-duty jacketed multi-conductor cable shall be furnished for connecting the truck and trailer wiring system. All wiring shall be properly protected and secured. The receptacle shall be furnished loose, while the cable and plug shall be attached to the trailer in sufficient length to reach a truck-mounted receptacle, additionally provide an intermediate

electrical connector where the wiring harness leaves the removeable tongue and the trailer body. The plug shall be connected to the trailer wiring system in accordance with the following drawing:

### 6-Way Trailer Connection



| Letter Code             | Trailer Color Code |
|-------------------------|--------------------|
| GD – Brake Wire Ground  | WHITE              |
| TM – Tail & Marker Lamp | BLACK              |
| S – Stop Lamp           | RED                |
| RT – Right Turn Signal  | GREEN              |
| LT – Left Turn Signal   | YELLOW             |
| A – Live Brake Wire     | BROWN              |

### Solar Power System

The CCMS 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 CCMS 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 CCMS 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 must 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 CCMS 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 CCMS 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 7 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 and 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 ANSI Z 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 CCMS 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 CCMS to display messages that are visible from ½ miles 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 CCMS 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 CCMS 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:  $3.9 \times 10^{-5}$  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 are required to 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.

The controller and modem shall be stored in a locked, weather and vandal resistant box when not in use and after changes to the messages are made.

### **NTCIP Compliance/Compatibility**

The Connected 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 CCMS 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 CCMS 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 will 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 CCMS controller a unique address. Preface all commands from the Vanguard V4 Software with a particular CCMS controller address. The CCMS 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 CCMS detailing the power system, including but not limited to, Solar charge controller, photovoltaic panels, batteries, standby-by generator/land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram 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 CCMS assemblies and subassemblies such as driver boards, control boards, CCMS 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, contractor shall supply one complete set of video operator training materials (DVD format preferred). This material shall adequately cover the safe and correct operation of the equipment.

## **CONSTRUCTION METHODS**

### **Description**

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Connected Changeable Message Signs 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 Engineer, Regional ITS Engineer and STOC will establish the actual location of deployment for each CCMS assembly. It is the Design-Build Team's responsibility to ensure proper elevation, leveling, offset, and orientation of all CCMS assemblies.

The Design-Build Team **shall not** relocate deployed CCMS assemblies without prior approval from the Engineer, Regional ITS Engineer and the STOC. CCMS relocated without approval shall be consisted equivalent to a disruption in operation of an ITS device and/or DMS sign and the contractor shall be subject to all applicable ICTs and/or liquidated damages.

The Design-Build Team shall program each controller with password protection that will deter unauthorized programming of the controller. The password system is recommended to include at last two levels of security such that operators at one level may only change message sequences displayed using preprogrammed sequences and operators at a higher level may create and store messages or message sequences.

When each CCMS assembly is deployed for use on the project, the Design-Build Team shall change the controller password from the factory default and periodically change the controller password to deter unauthorized programming of the controller. The Design-Build Team shall remove the keyboard if possible and lock the controller cabinet to restrict unauthorized access. Passwords **shall not** be written or displayed anywhere on or in the CCMS. It is the Design-Build Team's responsibility to restrict user access to authorized representatives of the Design-Build Team.

### **Construction Submittal**

When the work is complete, submit "as built" plans, inventory sheets, and any other data required by the Engineer to show the details of actual location and any modifications made during installation.

The "as built" plans will show the CCMS 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 parts, service and warranty facilities.

Access Facilities)” found elsewhere in these Specifications).

## **HORIZONTAL DRAINS**

(12-17-19)(Rev. 1-16-24)

DB8 R17

### **Description**

Construct horizontal drains for slopes, rock cuts and retaining walls in accordance with the contract and Geotechnical 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 are 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 *Standard Specifications*.

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

Use solid and slotted PVC Schedule 40 or 80 pipes as shown in the plans for drain pipe. Provide slotted PVC pipes with 0.01" wide horizontal slots in the direction perpendicular to the pipe length and evenly spaced around and along pipe so that open area is at least 1 sq in per linear ft of pipe.

### **Construction Methods**

The Engineer will determine the number, locations, elevations, inclination and lengths of horizontal drains required. The approximate known drain locations, elevations, inclination and lengths are shown in the plans. Drain pipe requirements including those drains without pipes will also be determined by the Engineer and known pipe information is shown in the plans.

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 is not required unless drain pipe is omitted. Drill straight and clean holes with the dimensions and orientation shown in the plans or as directed. Drill holes within 6" 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. 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 redrill the hole.

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

### **PEDESTRIAN SAFETY RAIL**

(8-28-09)(Rev. 7-18-23)

DBI 8-51

The Design-Build Team shall furnish and install steel pipe handrail at locations as shown in the plans developed by the Design-Build Team, in accordance with the detail in the plans developed by the Design-Build Team and as directed by the Engineer.

### **FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES**

(1-17-12)(Rev. 1-16-24)

9, 14, 17

DB9 R05

#### **Description**

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

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

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

#### **Materials**

Refer to the *Standard Specifications*.

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

Provide Type 3 material certifications in accordance with Article 106-3 of the *Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12-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 foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

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

<https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx>

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

- (A) Straight anchor rods,
- (B) Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and
- (C) Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

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

### **Construction Methods**

Install the required size and number of conduits in foundations in accordance with the plans developed by the Design-Build Team and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within one inch of elevations shown in the plans developed by the Design-Build Team or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *Standard Specifications* for portions of

foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

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

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

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

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

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

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

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

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

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

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

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

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

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

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

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

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

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

(B) Footings, Pedestals, Grade Beams and Wings

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

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

(C) Anchor Rod Assemblies

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

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

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



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

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

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

| <b>NUT ROTATION REQUIREMENTS<br/>(Turn-of-Nut Pretensioning Method)</b> |                    |
|---|--------------------|
| <b>Anchor Rod Diameter, inch</b>  | <b>Requirement</b> |
| $\leq 1 \frac{1}{2}$  | 1/3 turn (2 flats) |
| $> 1 \frac{1}{2}$   | 1/6 turn (1 flat)  |

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

- (11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.
- (12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

| <b>TORQUE REQUIREMENTS</b>       |                           |
|----------------------------------|---------------------------|
| <b>Anchor Rod Diameter, inch</b> | <b>Requirement, ft-lb</b> |
| 7/8                              | 180                       |
| 1                                | 270                       |
| 1 1/8                            | 380                       |
| 1 1/4                            | 420                       |
| $\geq 1 \frac{1}{2}$             | 600                       |

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

- (13) Do not grout under base plate.

## **OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS**

(1-16-24)

DB9 R07

### **Description**

Sign foundations include foundations for overhead and dynamic message signs (DMS) supported by metal poles or upright trusses. Sign foundations consist of footings with pedestals or drilled piers with or without grade beams or wings, conduit and anchor rod assemblies. Construct sign

foundations in accordance with the contract and accepted submittals. Define “cantilever sign” as an overhead cantilever sign support in accordance with Figure 1-1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6<sup>th</sup> Edition, including the latest interim specifications and the latest interim revisions.

### **Materials**

Use sign foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

### **Subsurface Conditions**

Assume the following soil parameters and groundwater elevation for sign foundations unless these subsurface conditions are not applicable to sign locations:

- A. Unit weight ( $\gamma$ ) = 120 pcf,
- B. Friction angle ( $\phi$ ) = 30°,
- C. Cohesion ( $c$ ) = 0 psf and
- D. Groundwater seven feet below finished grade.

A subsurface investigation shall be required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. Subsurface conditions requiring a subsurface investigation shall include, but are not limited to, weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No additional compensation or extension of completion date or time will be allowed for subsurface investigations.

### **Subsurface Investigations**

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within two feet of finished grade before beginning drilling. Drill borings to two drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

### **Sign Foundation Designs**

Design sign foundations for the wind zone and clearances shown in the plans developed by the Design-Build Team and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation above for sign foundation designs unless a subsurface investigation is performed or required by the Engineer. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design

footings, pedestals, drilled piers, grade beams and wings in accordance with the 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6<sup>th</sup> Edition, including the latest interim specifications and the latest interim revisions. In some instances, conflicts with drainage structures may dictate sign foundation types.

Design footings in accordance with Section 4.4 of the AASHTO *Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 psf for footings.

Design drilled piers for side resistance only in accordance with Section 4.6 of the AASHTO *Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE Version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than one inch at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms' method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms' design method in accordance with C13.6.1.1 of the 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6<sup>th</sup> Edition, including the latest interim specifications and the latest interim revisions.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

## **Construction Methods**

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP. Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

**ROADWAY LIGHTING FOUNDATIONS**

(1-16-18)(Rev. 1-16-24)

DB14 R04

**Description**

Roadway lighting foundations include foundations for high mount and light standards. High mount foundations for high mount standards and standard foundations for light standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct roadway lighting foundations in accordance with the contract, *Roadway Standard Drawings* and accepted submittals. Define “high mount foundation” as a drilled pier including the conduit and anchor rod assembly that meets Roadway Standard Drawing No. 1402.01. Define “standard foundation” as a drilled pier or footing with pedestal including the conduit and anchor rod assembly that meets Roadway Standard Drawing No. 1405.01.

**Materials**

Use roadway lighting foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP. Provide metal shrouds for median mounted light standards in accordance with Subarticle 1400-4(I) of the *Standard Specifications*.

**Roadway Lighting Foundations****(A) High Mount Foundations**

Construct high mount foundations for the wind zone and high mount heights shown in the Final Lighting Plans provided by the Department, unless the following assumed site conditions are not applicable to high mount locations:

- 1) Soil with unit weight ( $\gamma$ )  $\geq 120$  pcf and friction angle ( $\phi$ )  $\geq 30^\circ$ ,
- 2) Groundwater at least seven feet below finished grade and
- 3) Slope of finished grade 6:1 (H:V) or flatter.

A subsurface investigation and high mount foundation design shall be required if the Engineer determines these assumed site conditions do not apply to a high mount location and the high mount cannot be moved. Subsurface conditions requiring a high mount foundation design, include but are not limited to, weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations or high mount foundation designs.

**(B) Standard Foundations**

Construct standard foundation types for the light standard types shown in the Final Lighting Plans provided by the Department and the site conditions at each light standard location. When weathered or hard rock, boulders or obstructions conflict with standard foundations,

submit an alternate standard foundation design for acceptance in accordance with Article 105-2 of the *Standard Specifications*. No extension of completion date or time will be allowed for alternate standard foundations.

### **Subsurface Investigations**

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each high mount location requiring a subsurface investigation. Rough grade high mount locations to within two feet of finished grade before beginning drilling. Drill borings to two drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT Version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

### **High Mount Foundation Designs**

Design high mount foundations for the wind zone and high mount heights shown in the Final Lighting Plans provided by the Department and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6<sup>th</sup> Edition, including the latest interim specifications and the latest interim revisions.

Design drilled piers for side resistance only in accordance with Section 4.6 of the AASHTO *Standard Specifications for Highway Bridges*. Use the computer software LPILE Version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 0.5-inch at top of piers.

Design footings in accordance with Section 4.4 of the AASHTO *Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 psf for footings.

Submit boring logs, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for high mount foundation design submittals. Have high mount foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

### **Construction Methods**

Grade around roadway lighting locations with cut and fill slopes as shown on Roadway Standard Drawing No. 1402.01 or No. 1405.01. Construct drilled piers, footings and pedestals and install anchor rod assemblies for roadway lighting foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

For median mounted light standards, place concrete for median barriers and underlying pedestals in the same pour. Construct concrete barriers in accordance with the contract and make concrete median barriers continuous through standard foundations. Coordinate construction of median mounted light standards with sign structures, concrete barriers, drainage structures, etc. to avoid conflicts.

## **LIGHTING**

### **DESCRIPTION**

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the Final Lighting Plans provided by the Department.

Perform all work in accordance with these Special Provisions, the Final Lighting Plans provided by the Department, the National Electrical Code, and the North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2024 Standard Specifications*).

Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the *2024 Standard Specifications* applicable to the work on this project are listed below.

|              |   |
|--------------|---|
| Section 1401 | High Mount Standard and Portable Drive Unit |
| Section 1404 | Light Standards                             |
| Section 1407 | Electric Service Pole and Lateral           |
| Section 1408 | Light Control System                        |
| Section 1409 | Electrical Duct                             |
| Section 1410 | Feeder Circuits                             |
| Section 1411 | Electrical Junction Boxes                   |

### **FINAL INSPECTION**

The electrical subcontractor foreman onsite during project construction shall also be onsite during the final inspection by NCDOT Lighting & Electrical personnel. In instances where the same foreman cannot be present, the final inspection shall be canceled and rescheduled. As-built plans are required to be submitted prior to the final inspection.

## **LIGHT EMITTING DIODE (LED) LUMINAIRES FOR LIGHT STANDARDS**

### **DESCRIPTION**

Furnish, install, and place into satisfactory operation a light standard luminaire, either on a bracket

arm or directly mounted to the standard, complete with all light sources, drivers, wiring inside standard from circuit conductors to luminaire, in-line breakaway fuseholders and fuses and ground wiring at the pole on light standards less than 55 ft. in height.

Any luminaire submitted for approval must meet the minimum requirements in the table and sections below.

| Type     | HPS Replacement Equivalent | Color Temp     | Min. % of initial output at 70k hours | Min. Maintained Delivered Lumens |
|----------|----------------------------|----------------|---------------------------------------|----------------------------------|
| 185W LED | 250W                       | 3500K<br>±500K | 83%                                   | 15,500                           |
| 285W LED | 400W                       | 3500K<br>±500K | 83%                                   | 19,150                           |

Third party certified photometric files in IES format are required to be submitted with the catalog cuts for the proposed LED roadway luminaire. Photometric files must show that proposed luminaire will meet or exceed the design shown in the Final Lighting Plans provided by the Department.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

LLF = Lamp Lumen Depreciation (LLD) x Luminaire Dirt Depreciation (LDD)

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

## MATERIALS

### LUMINAIRE REQUIREMENTS

#### A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
  - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
  - Report number
  - Date
  - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
  - Description of luminaire, LED light source(s), and LED driver(s)



- Goniophotometry
  - Colorimetry
- 
- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
  - Luminaire shall be constructed of a single piece die cast aluminum housing. Each luminaire shall be finished gray in color unless otherwise noted.
  - The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities.
  - Provide a summary of reliability testing performed for LED driver.
  - Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
  - Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 3-0-3 and an IESNA distribution of Type II or Type III as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.
  - Minimum Ingress Protection (IP) dust and moisture ratings for the luminaire electrical components (driver and surge protection) and luminaire optical components shall be IP65 and IP66, respectively, as specified in ANSI C136.25.
  - Luminaire shall have external and internal labels per ANSI C136.15 and ANSI C136.22, respectively. Internal label shall identify the manufacturer, year and month of manufacture and the manufacturer's part number.
  - Luminaire shall have an internal bubble level.
  - Luminaires shall start and operate in -20°C to +40°C ambient.
  - Luminaires shall be rated for continuous service at an ambient temperature of 40°C (104°F)
  - Electrically test fully assembled luminaires before shipment from factory.
  - Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.4 square feet and 46 lbs.
  - Luminaires shall be designed for ease of electrical component replacement.
  - Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31.
  - LED light sources and drivers shall be RoHS compliant.
  - The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
  - Luminaire shall have a 1.25" to 2.0" adjustable tenon mount for connection to luminaire bracket arm assembly.
  - Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.
  - Grommets shall be installed in cable entry holes. Cable entry holes shall be free from sharp edges which might cut conductors or an ungloved hand.

- All conductors inside the luminaire shall be neatly secured with tie-wraps as needed to prevent pinch points and assist in trouble shooting.

#### Driver

- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of  $\pm 10\%$ .
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
- Shall provide UL Class II output.

#### Surge Suppression

- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

#### Electromagnetic interference

- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

#### Electrical safety testing

- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

#### Finish

- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness and finished green in color.
- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.
- Exterior surfaces shall be smooth and free of burrs.

#### Thermal management

- Mechanical design of protruding external surfaces (heat sink fins) on roadway luminaries shall facilitate hose-down cleaning and discourage debris accumulation.
- Liquids or moving parts will not be allowed for thermal management.

#### Color Quality

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K.

#### Optics

- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.

The following shall be in accordance with corresponding sections of ANSI C136.37

- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines. Terminal blocks shall be easily accessible to installers or repair personnel. Wire nuts are prohibited inside the luminaire housing.

#### Latching and hinging

- Refractor and housing door holders and hinges shall be designed to maintain positive control of door to the luminaire body so as not to allow the accidental disengagement of either door.
- Drivers shall be mounted to a housing door designed to be opened from the bottom of the luminaire. Housing door shall allow easy removal for troubleshooting/repair on the ground.

Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

Include a shorting cap for each luminaire provided.

Provide wiring inside the light standard, breakaway fuseholders and fuses meeting Article 1400-2 of the *2024 Standard Specifications*, respectively.

#### WARRANTY

Provide a minimum ten-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages, color shifting, or flickering/strobing not related to incoming power issues all constitute luminaire failure.

Warranty period shall begin after project acceptance by the Department. Supplier shall furnish documentation of warranty procedures to the Design-Build Team stating that warranty is for NCDOT.

#### CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

When installing twin arm poles, the Design-Build Team shall install a separate SOOW cable along with a separate breakaway fuseholder and fuses for each luminaire.

All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Design-Build Team at no additional cost to the Department.

## HIGH MAST LIGHT EMITTING DIODE (LED) LUMINAIRES

### DESCRIPTION

Furnish, install and place into satisfactory operation, LED luminaires on high mount standards as detailed in these Special Provisions.

Any high mast luminaire submitted for approval must meet the minimum requirements in the table and sections below.

| Mounting Height | Max. LED Fixture Wattage | Number & HPS Replacement Equivalent | Color Temp       | Min. % of initial output at 70k hours | Min. Maintained Delivered Lumens (per fixture) |
|-----------------|--------------------------|-------------------------------------|------------------|---------------------------------------|--|
| 120'            | 560W                     | 8 x 750W                            | 3500K $\pm$ 500K | 87%                                   | 54,000   |
| 100'            | 560W                     | 6 x 750W                            | 3500K $\pm$ 500K | 87%                                   | 54,000   |
| 80'             | 335W                     | 8 x 400W                            | 3500K $\pm$ 500K | 87%                                   | 27,000   |
| 60'             | 335W                     | 4 x 400W                            | 3500K $\pm$ 500K | 87%                                   | 27,000   |

The Design-Build Team shall supply the Department with current catalog cuts and 3<sup>rd</sup> party certified photometric data files in Illuminating Engineering Society (IES) format for any high mount luminaire submitted for approval. The Department will thoroughly evaluate all high mount luminaires to determine if the submitted high mount luminaire meets or exceeds design criteria and pole spacing shown on the Final Lighting Plans provided by the Department. High mount luminaires which do not meet or exceed the design criteria, or which do not produce enough light to meet the pole spacings shown on the Final Lighting Plans provided by the Department, will not be approved for use.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

$$\text{LLF} = \text{Lamp Lumen Depreciation (LLD)} \times \text{Luminaire Dirt Depreciation (LDD)}$$

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

High mount luminaire retrofit LED kits are not an acceptable alternative.

### MATERIALS

## LUMINAIRE REQUIREMENTS

### General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
  - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
  - Report number
  - Date
  - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
  - Description of luminaire, LED light source(s), and LED driver(s)
  - Goniophotometry
  - Colorimetry
- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of aluminum. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities.
- Provide a summary of reliability testing performed for LED driver.
- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 5-0-5 and an IESNA distribution of Type V as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio requirements shown on the Final Lighting Plans provided by the Department. The same BUG rating and distribution type shall be used throughout the project.
- Luminaire LED modules shall meet dust and moisture rating of IP-66, minimum.
- Luminaire shall have an external label per ANSI C136.15.
- Luminaires shall have an internal label per ANSI C136.22.
- Luminaires shall start and operate in -20°C to +40°C ambient.
- Electrically test fully assembled luminaires before shipment from factory.
- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.3 square feet and 65 lbs.
- Luminaires shall be designed for ease of electrical component replacement.

- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31-2010
- LED light sources and drivers shall be RoHS compliant.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.

#### Driver

- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of  $\pm 10\%$ .
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

#### Surge Suppression

- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

#### Electromagnetic interference

- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

#### Electrical safety testing

- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

#### Finish

- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.
- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

#### Thermal management

- Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.

**Color Quality**

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K

**Optics**

- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.

The following shall be in accordance with corresponding sections of ANSI C136.37

- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines
- Latching and hinging

Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

Include a shorting cap for each luminaire provided.

**WARRANTY**

Provide a minimum ten-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages, color shifting, or flickering/strobing not related to incoming power issues all constitute luminaire failure.

Warranty period shall begin after project acceptance by the Department.

**CONSTRUCTION METHODS**

Level and secure each luminaire in all directions. Securely terminate the wiring for each high mount luminaire and include an equipment grounding conductor to bond the housing to the supply cord grounding conductor.

Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Design-Build Team at no additional cost to the Department.

**PEDESTRIAN BRIDGE FOOT LIGHTING SYSTEM****DESCRIPTION**

The Design-Build Team shall design, furnish, install, and place into satisfactory operation a pedestrian lighting system in the interior barrier of the Piedmont and Northern Railway bridge. The pedestrian lighting system shall be positioned toward the proposed greenway and will aid in illuminating the pedestrian way on the structure. The pedestrian lighting system shall be designed to provide an average illumination of 2 foot-candle on the pedestrian walkway at a 3:1 average to minimum uniformity ratio.

Pedestrian lighting for the Piedmont and Northern Railway Bridge shall be owned and operated by the City of Belmont and requires a separate electrical service from any nearby roadway lighting systems owned and operated by the Department.

## MATERIALS

### CONDUIT SYSTEM AND CONDUCTORS IN CONCRETE BARRIER RAIL

Provide in ground junction boxes meeting Section 1411 of the *2024 Standard Specifications*.

Provide rigid non-metallic PVC (Polyvinyl chloride) Schedule 40 heavy wall conduit approved for underground use and concrete encasement per UL 651 "Rigid Non-Metallic Conduit". Use terminations designed for PVC conduit, to seal and stub out each PVC conduit, and to provide watertight protection. Provide UL listed combination expansion/deflection couplings of the appropriate size at all construction joints and bent expansion joints. Expansion/deflection couplings shall be weatherproof, shall not require the use of an external bonding jumper and shall provide a 4" minimum of conduit movement and a deflection of up to 30 degrees. Use PVC to RGC transition adapters as required to connect conduit system to expansion/deflection couplings.

Use formed openings in lieu of cast-iron junction boxes in the barrier rail. Use plywood and foam board, or other similar materials, to construct formed openings in the barrier rail. Provide a 5/16" galvanized checkered steel plate to cover the formed opening. Attach a grounding lug to the inside of the plate via a blind tapped hole. Use concrete inserts and stainless steel or brass bolts to attach the checkered plate.

Provide Type THWN stranded conductor of appropriate size and quantity to meet the design requirements.

Use watertight set screw type connectors rated for submersible installations meeting the requirements of Subarticle 1400-4(F) of the *2024 Standard Specifications* for all conductor splicing.

Provide an antioxidant compound rated for use with copper conductors for all splices.

### STEP LIGHT LUMINAIRES

The Design-Build Team shall furnish and install LED step light luminaires, embedded in the vertical concrete interior barrier rail. The luminaire shall be an outdoor type rated for marine



environments with a minimum ingress protection rating of IP66. The luminaire shall have a color temperature range of 3000K to 4200K, and a minimum life of 50,000 hours.

Luminaires shall mount to a box embedded in the concrete rail sized appropriately to allow for splicing of conductors. The embedded box shall be stainless steel or composite material.

#### LIGHTING CONTROL PANEL

The lighting control panel shall be a NEMA 3R rated enclosure and must include a main circuit breaker, a feeder circuit breaker, solid neutral bar, contactor, photocontrol, selector switch, fused control circuitry and a surge protector. Factory install as many components as practical.

The lighting control panel shall be labeled as suitable for use as service entrance equipment. If the control panel is not made in a certified UL 508A Panel Shop, a third party, recognized by the Department of Insurance as having the authority, shall label the lighting control panel.

The lighting control panel enclosure shall be equipped with a flange mounted operator handle that is lockable in the OFF position and is interlocked with the door and main circuit breaker, so that the door cannot be opened when the breaker is in the ON position. The enclosure shall have an internal removable back panel for mounting components and shall have external mounting brackets.

The lighting control panel shall be rated as service entrance and the same voltage as the step lighting luminaires. The lighting control panel shall be equipped with a main beaker, control relays, mechanically held contactors, feeder circuit breakers and a heavy-duty HAND-OFF-AUTO selector switch. All breakers shall be rated as determined by the Design-Build Team.

Include a Type 1 surge protection device (SPD) meeting UL 1449 and UL96A, designed to contain and arrest an arc of 40,000 A. Install SPD on load side of service breaker.

Use ground rods meeting the requirements of Sub article 1400-4(G) of the *2024 Standard Specifications*. Install two ground rods spaced at 6' apart as shown in Standard Drawing 1408.01, sheet 2.

Provide a 100 A meter base.

The Design-Build Team shall design, provide and install an adequate mounting system for the lighting control panel and meter base. The mounting system shall consist of a 4" rigid galvanized steel pipe, embedded in a concrete foundation, similar to Standard Drawing 1408.01, sheet 3. Include a threaded cap on top of the 4" rigid galvanized steel pipe. Use galvanized slotted steel framing channel with straps and bolts, for the mounting brackets and hardware for attaching the lighting control panel and meter base to the pole.

#### CONSTRUCTION METHODS

**CONDUIT SYSTEM AND CONDUCTORS IN CONCRETE BARRIER RAIL**

Install conduit in the interior barrier rail to serve the pedestrian step lighting system. All conduit shall be securely fastened with ties prior to placing any concrete. Each conduit run between termination points shall be as straight as possible. The total angular deflection of all bends in a conduit run shall not exceed 270 degrees. After the conduit is encased in concrete, clean each conduit by snaking with a steel band with an approved tube cleaner equipped with a mandrel of a diameter not less than 85% of the nominal inside diameter of the conduit.

Provide a formed opening near the end of the bridge rail to transition the pedestrian lighting conduit from the ground to the structure. The formed opening shall be constructed with a frame built of plywood, or similar material, encased with rigid foam insulation board, or similar material, that can easily be chiseled away, and the frame removed once the concrete has hardened. The frame shall be constructed with an outer dimension of 10"W x 12"H x 6"D. Position the formed opening frame near the ends of the bridge barrier rail, but do not conflict with guardrail attachment points. Center the formed opening frame between the vertical "S" bars. Do not cut the "S" bars. Longitudinal "B" bars may be cut to allow the formed opening frame to fit in the barrier. The bottom of the formed opening frames shall be a minimum of 9" above the bridge deck.

All conduit and formed opening frame work must be inspected and approved by the Engineer before concealment.

The formed opening shall be constructed with a 2" recessed flange at depth of 5/16" so that the checkered galvanized steel plate recesses flush with the barrier when installed. Install 2" x 1/4" threaded inserts near the corners of the formed opening. Threaded inserts shall be placed with a minimum of 1-1/2" of concrete cover between the outer edge of the insert and the inside of the formed opening. Locate and field drill mounting holes in the checkered galvanized cover which align with the location of the concrete inserts. To ensure against corrosion in the areas where galvanizing of the cover has been damaged or drilled, cover all raw metal surfaces with a cold galvanized, zinc rich paint.

Extend conduits to an adequate length inside the formed opening frame and securely terminate. Provide a minimum of 2" concrete cover between the face of the barrier and the conduit. After the formed opening frame is removed, trim conduit as needed to fit inside the formed opening. Use bushings at all conduit termination points within the formed opening.

Provide and install a bonding jumper to connect the grounding lug on the inside of the galvanized steel plate to the feeder circuit ground. The bonding jumper shall be of sufficient length to allow the galvanized steel plate to be removed and placed on the bridge deck without disconnection.

Securely fasten all embedded luminaire boxes prior to pouring any concrete for the vertical barrier. Place concrete with care so as not to dent or disturb the proper alignment of the luminaire box.

Install feeder circuits and conduit from the barrier rail to the lighting control panel.

All conductor splicing shall be accomplished using watertight set screw connectors rated for submersible applications. Generously coat all conductor splices with an antioxidant compound.

Install each step light luminaire over the embedded boxes following the manufacturer's directions. Adjust each luminaire to aim light towards the walking path as directed by the Engineer.

Any luminaire displaying improper operating characteristics shall be replaced with new.

Coordinate pedestrian lighting system work with work by others as directed by the Engineer.

Where feeder circuit(s) for pedestrian lighting system cross under the roadway, the Design-Build Team shall install feeder circuits in conduit under the roadway in a protective sleeve. Refer to Standard Drawing 1409.01.

### LIGHTING CONTROL PANEL

Contact the local utility company and obtain the required electrical services in the name of the City of Belmont.

Locate the lighting control panel outside of the clear zone and in an area easily accessible for maintenance personnel. Install all non-factory installed components of the lighting control panel securely, with all conductors properly terminated and identified. Attach the lighting control panel and meter base to the galvanized slotted channel with galvanized or stainless steel hardware. Provide and install a padlock for the lighting control panel, with eight keys all keyed alike as per Article 1400-8 of the *2024 Standard Specifications*.

Upon installation of the pedestrian lighting system, the Engineer will inspect the installation and perform an insulation resistance test on all conductors installed by the Design-Build Team, as detailed in Article 1400-5 of the *2024 Standard Specifications*. Any deficiencies identified during the inspection shall be properly addressed by the Design-Build Team at no additional cost to the Department. After all deficiencies are corrected and accepted by the Engineer, the Design-Build Team shall perform a burn-in test as detailed in Article 1400-6 of the *2024 Standard Specifications*.

Repair any damage to the lighting control panel, mounting system or external mounting hardware using zinc rich paint.

### MEDIAN BARRIER FORMED OPENING

#### DESCRIPTION:

The work covered by this section consists of furnishing and installing formed openings embedded in the median barrier for connection and splicing of lighting conduit and conductors.

#### MATERIALS

Use plywood and foam board, or other similar materials to construct formed openings in the barrier rail at the locations shown in the plans. Provide a 5/16" galvanized checkered steel plate, sized as shown in the plans, to cover the formed opening. Attach a grounding lug to the inside of the plate via a blind tapped hole. Use stainless steel concrete inserts and stainless steel or brass bolts to attach the checkered plate.

Provide jute that is a burlap-like material used for filling voids and protecting components from waterproofing and adhesive compounds.

Use mastic that is a permanent, non-hardening, water sealing compound that adheres to metal, plastic, and concrete.

## CONSTRUCTION METHODS

Securely fasten all conduit and formed opening frames prior to placing any concrete. Each conduit run between termination points should be as straight as possible. The total angular deflection of all bends in a conduit run should not exceed 270 degrees.

Construct the formed opening with a frame built of plywood, or similar material, encased with rigid foam insulation board, or similar material, that can easily be chiseled away and the frame removed once the median barrier concrete has cured. The frame shall be constructed so that the outer frame matches the formed opening dimensions shown in the plans.

Position the formed opening frame as shown in the plans, and securely attach the formed opening frame to median barrier rebar cage. Slightly recess the formed opening frame to prevent snagging of the slipform machinery.

All conduit and formed opening frame work must be inspected and approved by the Engineer before concealment.

The formed opening shall be constructed with a 2" recessed flange at depth of 5/16" so that the checkered galvanized steel plate recesses flush with the barrier when installed. Install 2" x 1/4" threaded inserts during slipforming as shown in the plans. Threaded inserts shall be placed with a minimum of 1-1/2" of concrete cover between the outer edge of the insert and the inside of the formed opening. Locate and field drill mounting holes in the checkered galvanized cover which align with the location of the concrete inserts. To ensure against corrosion in the areas where galvanizing of the cover has been damaged or drilled, cover all raw metal surfaces with a cold galvanized, zinc rich paint.

Extend conduits to an adequate length inside the formed opening frame and securely terminate. Provide a minimum of 2" concrete cover between the face of the barrier and the conduit. After the formed opening frame is removed, trim conduit as needed to fit inside the formed opening. Use bushings at all conduit termination points within the formed opening.

Provide and install a bonding jumper to connect the grounding lug on the inside of the galvanized steel plate to the feeder circuit ground. The bonding jumper shall be of sufficient length to allow the galvanized steel plate to be removed and placed on the roadway surface without disconnection.

Coordinate formed opening and conduit work with others as directed by the Engineer.

## **HIGH VISIBILITY DEVICES**

(10/25/2019) (Rev. 11/15/2022)

### **Description**

In accordance with this RFP, the Design-Build Team shall furnish and install High visibility devices for projects on interstates and freeways. 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 *Standard Specifications* and shall have Grade B flexible, fluorescent orange sheeting that meets the retroreflective requirements of Section 1092-2 of the *Standard Specifications*.

All stationary work zone signs shall be new and meet the existing requirements of Section 1089-1 of the *Standard Specifications*. Legend overlays shall be prohibited and shall not be accepted on the interstate / freeway 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 two inches wide, a minimum of six inches in length on sign supports with one sign mounted and 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 *Standard Specifications*. 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 *Standard Specifications* 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 *Standard Specifications*.

### **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 *Standard Specifications* 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 interstates and freeways.

### **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.

### **TYPICAL MEDIAN ACCESS AREAS**

(12/18/18) (Rev. 10/13/2023)

#### **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 controlled access facilities.

Typical Median Access Areas are not required when construction vehicle ingress and egress is conducted using lane closures as shown on detail 1101.05, Sheet 2, of the *Roadway Standard Drawings*.

#### **Materials**

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

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

Provide Work Zone Performance Pavement Markings for Design-Build Projects (See Project Special Provision)

Provide High Visibility Devices (See Project Special Provision)

### **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 detail 1110.01, Sheet 1, of the *Roadway Standard Drawings* 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 *Standard Specifications*. 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 Details below.

#### **Temporary Acceleration Lane**

Construct a temporary acceleration lane with a minimum length of 1720 feet and a minimum clear width of 12 feet for the full length of the Temporary Acceleration Lane. At least 920 feet of parallel merge / diverge area is required adjacent to the active travel lanes. The detection zone will be located from the beginning of the paved area to within 100 feet of the end of the PCB. It shall have protection separating it from the active travel lanes for the first 500 feet.

The Temporary Acceleration Lane shall use either existing or proposed pavement, where available. If existing or proposed pavement is not available, construct temporary pavement as follows: 1.25" S9.5B, 2.5" I19.0C, and 8" ABC. Install and maintain pavement in accordance with Division 6.

Using Work Zone Performance Pavement Markings, install 12-inch yellow diagonals 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.

### **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 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**

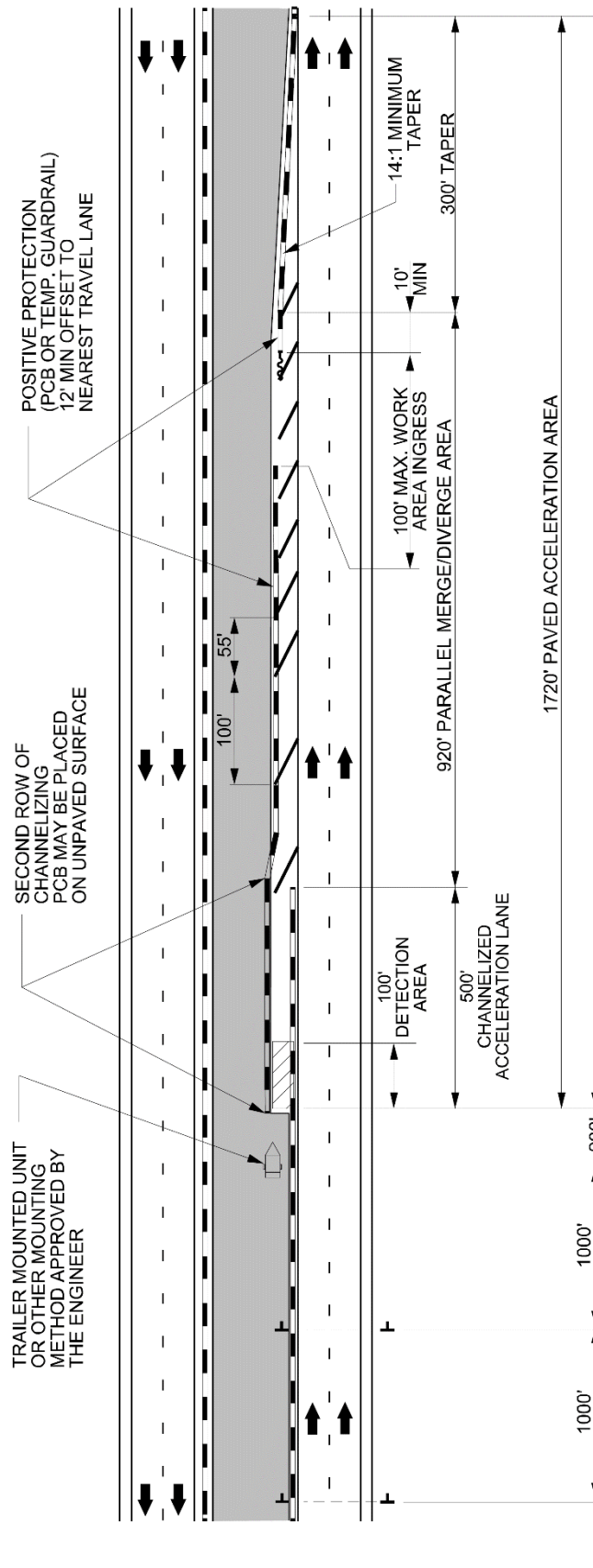
Typical Median Access Areas shall not be located within one-half (1/2) mile of any interchange acceleration or deceleration lanes, unless approved by the Department. All proposed locations for Typical Median Access Areas shall be reviewed and approved by the Department prior to installation.

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.

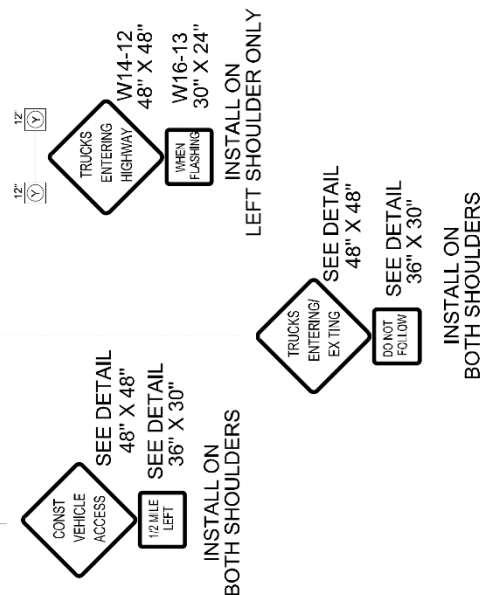
The Design-Build Team shall comply with multiple and single vehicle hauling restrictions as shown in the TMP when performing hauling of equipment or materials to or from the project while using Typical Median Access Areas.

## TYPICAL MEDIAN ACCESS DETAIL



## 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.



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**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**

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 Digital Speed Limit Sign shall be mounted such that the bottom of the sign is 7' above 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 allows for 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.

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 and accessed remotely from a secure cloud location.

The Work Zone Digital Speed Limit systems shall have flashing beacons. The beacons are to be a minimum of 8" diameter LED circular yellow. They shall be mounted above and below the sign assemblies and are to 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 FINE sign is not obscured when in operation.

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.

The batteries, when fully charged, 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.

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 are to 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 above the displayed speed limit, then the LED shall flash the speed limit until the speeds are within the 6 MPH tolerance.

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

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

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

### **Other Construction Methods**

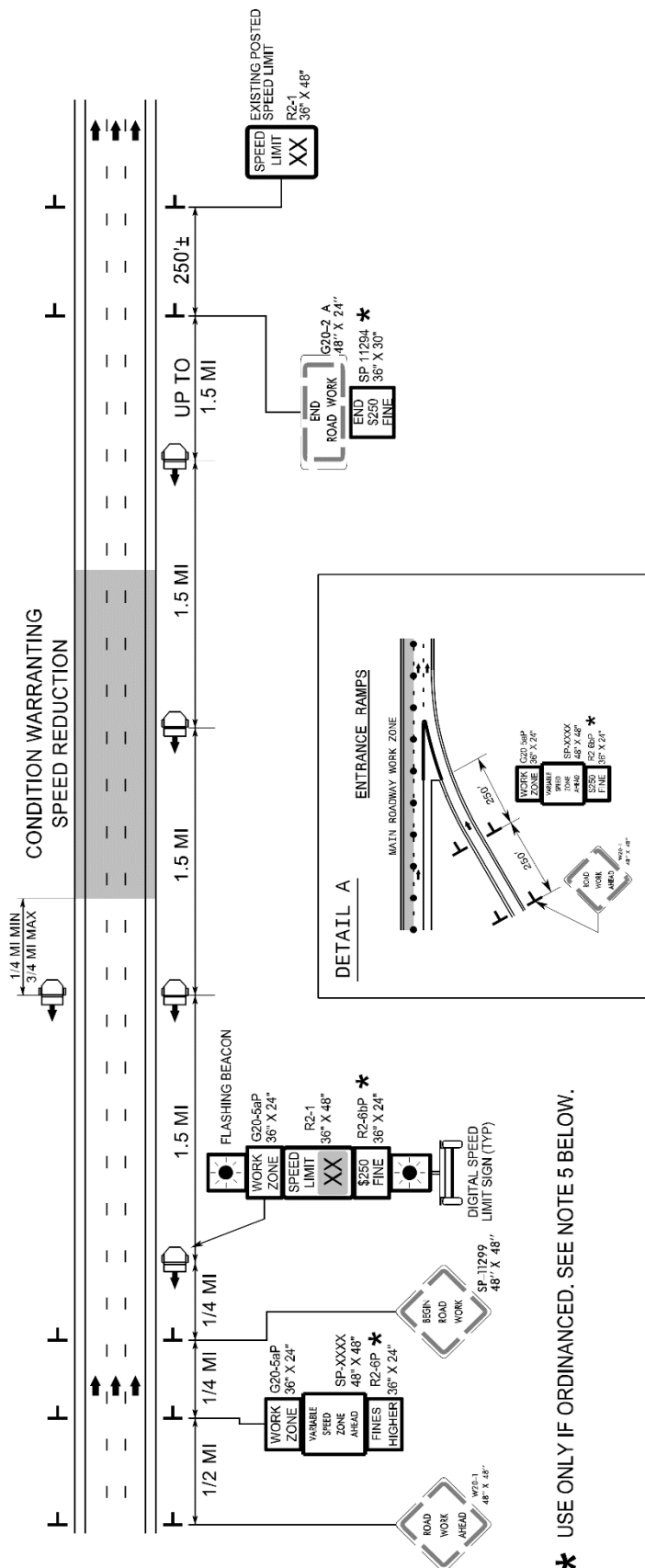
The speed limits are the sole authority of the NCDOT. An ordinance by the State Traffic Engineer is required for all speed limits in order to have a lawfully enforceable speed limit.



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 seek 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 and shall have the capability of being leveled.



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

## NOTES

1. THE DIGITAL SPEED LIMITS SIGNS WILL BE INSTALLED (TRAILER MOUNTED OR STATIONARY MOUNTED) IN ADVANCE OF AND SPACED APPROXIMATELY 1.5 MILES THROUGHOUT THE THE PROJECT LIMITS, UNLESS DIRECTED OTHERWISE.
  2. WITHIN  $\frac{1}{4}$  TO  $\frac{3}{4}$  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.
3. 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.
  4. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
  5. THE WORK ZONE VARIABLE SPEED LIMIT AND THE \$250 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.
  6. THE REDUCED SPEED SHALL BE DISPLAYED A MINIMUM OF  $\frac{1}{4}$  MILE AND A MAXIMUM OF  $\frac{3}{4}$  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.
  7. THE SPEED DISPLAYED SHALL BE THE LOWER OF THE EXISTING SPEED LIMIT OR THE SPEED IN THE WORK ZONE CONDITION CHART.
  8. THE BEACONS ON THE DIGITAL SPEED LIMIT SIGNS SHALL ONLY FLASH DURING TIMES THE SPEED IS REDUCED, AND REMAIN OFF AT ALL OTHER TIMES.

| WORK ZONE CONDITIONS   | SPEED TO DISPLAY<br>(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<br>ON BOTH SHOULDERS       | 55                                   |
| 1 OPEN LANE WITH CONTINUOUS BARRIER<br>ON 1 SHOULDER           | 60                                   |
| 3 OR 2 OPEN LANES WITH CONTINUOUS<br>BARRIER ON BOTH SHOULDERS | 60                                   |
| 3 OR 2 OPEN LANES WITH CONTINUOUS<br>BARRIER ON 1 SHOULDER     | 65                                   |
| 4 OPEN LANES WITH BARRIER CONTINUOUS<br>ON BOTH SHOULDERS      | 65                                   |
| 4 OPEN LANES WITH BARRIER CONTINUOUS<br>ON 1 SHOULDER          | EXISTING                             |
| UNEVEN LANES   | 60                                   |

[illegible]

**WORK ZONE PERFORMANCE PAVEMENT MARKINGS**

(06/04/2015) (Rev. 10/13/2023)

**Description**

Furnish and install Work Zone Performance pavement markings that delineate the travel way for work zone traffic patterns on high speed (greater than 55 MPH) 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 will last the full duration of a traffic pattern during any particular phase of construction without having to be replaced or reapplied for a period of up to 12 months. In addition, they are to provide a higher performance level for both initial and residual retroreflectivity than standard traffic paints to improve nighttime work zone visibility.

**Materials****A) General**

Use materials in accordance with the Manufacturer's recommendations that will retain both durability and a minimum retroreflectivity as described elsewhere in this specification for a period of up to 12 months.

In addition, it 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 marking applications.

- Polyurea
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type IV)

**B) Material Qualifications/Certifications**

Only use Work Zone Performance pavement marking materials as listed above that are on the NCDOT Approved Products List. In addition, provide a Type 3 Material Certification for all materials and a Type 3 and Type 4 certification for all reflective media in accordance with Article 106-3, and Section 1087-4 of the *Standard Specification*.

**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 and or removing from any project under contract.

## Construction Methods

Do 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 are to be installed in a single application.

### 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 of this specification are met.

### B) Application Equipment

See Section 1205 of the North Carolina 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 =             | 50 mils (Extruded or Sprayed) |
| Polymer =                   | 20 mils wet                   |
| Cold Applied Plastic (IV) = | Manufacturer's recommendation |

Unless otherwise stated in the plans, the line widths are as follows:

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

"No track" dry times for the liquid systems shall be 10 minutes or less. Traffic shall not be placed on any material until it's sufficiently dry/cured to eliminate wheel tracking. The minimum level of retroreflectivity for any Work Zone Performance pavement marking system selected is as follows:

### Reflectometer Requirements for Work Zone Performance Pavement Markings

| Color  | Initial        | 6 Months       |
|--------|----------------|----------------|
| White  | 375 mcd/lux/m2 | 275 mcd/lux/m2 |
| Yellow | 250 mcd/lux/m2 | 150 mcd/lux/m2 |

The above chart describes the retroreflectivity levels the work zone performance pavement markings are required to meet during initial placement and maintain for a minimum of 6 months. Initial retroreflective measurements will be taken with a mobile retroreflectometer within 30 days after initial placement. The Contractor shall notify the Engineer 7-10 days prior to the installation of new pavement marking lines. Accordingly, the Engineer will notify the Signing and Delineation Unit's Standards Engineer so the Mobile Retroreflective Contractors can be scheduled to measure the pavement markings for compliance.

In addition, work zone performance pavement markings are intended to maintain hardy retroreflective levels for the full 12 month duration. If the markings appear to be non-performing within the first 6 months, the Engineer may request additional retroreflectivity readings be taken. If and when this becomes necessary, the same notification procedure as described above will be used to have markings read by the Mobile Retroreflective Contractors.

If measured and found not to be in reasonable compliance, the markings are to be replaced at no cost to the Department.

If Work Zone Performance pavement markings are snowplowed within their 12 month expected life, the material shall be durable to withstand a single snow event without showing excessive fatigue in both bond and retroreflectivity. However, if excessive damage has occurred during a single event or multiple snow plow events, resulting in more than 25% of the pavement marking edgelines or skips being physically removed, then the Work Zone Performance pavement markings are to be replaced at the contract unit price unless the traffic pattern is to change within 30 days.

Unless the Work Zone Performance pavement marking is replaced due to excessive damage, it shall meet the following minimum retroreflectivity values within the single snow event.

**Reflectometer Requirements for Work Zone Performance Pavement Markings After  
Single Snow Event**

| <b>Color</b> | <b>MINIMUM</b> |
|--------------|----------------|
| White        | 150 mcd/lux/m2 |
| Yellow       | 100 mcd/lux/m2 |

If the work zone experiences more than more than 1 snow event requiring snowplowing, the retroreflectivity numbers in the chart no longer apply. The Engineer will determine if the pavement markings are still performing adequately or if replacement is necessary due to excessive damage caused by snowplow activities. If the markings are found to be deficient, they shall be replaced at the contract unit price unless the traffic pattern is to change within 30 days.

**D) Surface Preparation**

All pavement surfaces to receive Work Zone Performance pavement markings are to be swept clean and prepared in accordance with the Manufacturer's recommendation.

### E) Temperature and Weather Limitations

Do not apply Work Zone Performance pavement markings unless the ambient air temperature and the pavement temperature is 50°F or higher for thermoplastic and is 40°F or higher for all other materials. Do not install unless the pavement surface is completely dry and not within 4 hours of a heavy rain event such as a thunderstorm with rainfall intensities greater than 1 inch/per hour.

In the event a traffic shift has to take place when the air and pavement temperatures are below the required minimums or if a rain event occurs prior to or during a planned traffic shift, upon approval by the Engineer, an acceptable alternative is to install temporary pavement marking. Use 1 application of standard traffic paint to produce a 4" line with at 15 mils (wet). Beads shall also be applied to provide proper retroreflectivity until the "performance" material can be installed. The Work Zone Performance pavement markings shall be applied within 90 days of installation of the temporary pavement markings.

### Maintenance

Replace any Work Zone Performance pavement material that prematurely fails due to debonding or excessive wearing where it doesn't maintain its retroreflectivity for the required 12 month duration. Any traffic control and Work Zone Performance pavement marking costs due to replacement is at no cost to the Department unless it's due to excessive damage caused by snowplow damage.

### **WORK ZONE BLANK CANVAS**

(1/21/2025)

### Description

The Design-Build Team shall provide a uniform surface appearance in color and texture on asphalt and concrete pavements. The Design-Build Team shall perform the work covered in this provision including, but not limited to, removing pavement markings and/or pavement marking residue, removing pavement material, and disposing of any excess material resulting from the removal process during work zone operations.

### Equipment

The Design-Build Team shall use a self-propelled unit with sufficient power to accurately provide a uniform pavement surface suitable for handling traffic without damage to the underlying pavement structure. Equipment shall be capable of removing pavements to a depth of 1/8 inch or less in a single pass.

### Construction Methods

The Design-Build Team shall submit a construction sequence to the Engineer at least 14 days prior to blank canvas operations. The Design-Build Team shall maintain traffic in accordance with the traffic control plans. The construction sequence shall include the following:

- At the discretion of the Design-Build Team, the Design-Build Team may either:
  - Complete blank canvas operations as part of pavement marking removal. This is suitable for lower profile existing pavement markings that do not require traditional pavement marking removal methods first.
  - or
  - Complete blank canvas operations within 14 days after completing a traffic shift. This is better suited for higher profile markings that require traditional pavement marking removal methods first.
- The Design-Build Team shall complete blank canvas operations in a continuous manner with consecutive passes of 6 feet minimum width, parallel to the centerline and direction of travel. Do not remove pavement to a depth of more than 1/8 inch.
- The Design-Build Team shall complete operations such that the resulting surface is devoid of machine produced streaks, ruts, or overlap grooves that may interfere with the free flow of water. Ensure water does not puddle in areas where the existing pavement markings are removed. No visible overlaps between passes are allowed.
- The Design-Build Team shall remove all debris and/or wastewater immediately following each blank canvas operations and prior to opening closed lanes to traffic. Disposing or wasting of removed materials will not be permitted within the right of way. Sweep or vacuum any residue before it can (a) be blown by traffic or wind, (b) migrate across open travel lanes or shoulders, or (c) enter a drainage facility.

### **CONNECTED LANE CLOSURE SYSTEM**

(10/29/2018) (Rev. 2/7/2023)

#### **Description**

Furnish, install, operate, maintain, relocate, and remove connected lane closure devices for use on Interstate and Freeway lane closures. The purpose of a Connected Lane Closure System (CLCS) is to transmit real-time information of active lane closures on Interstate and Freeways for use by the State Transportation Operations Center (STOC), Regional Transportation Management Centers (TMCs), and 511 systems; and for third party vendors (Mapping, Navigation, Connected Vehicles, etc.) to identify and provide advanced notification of active lane closures to approaching motorists.

#### **Materials**

The CLCS shall be designed and built to transmit the location of the real-time lane closure from the START to the END such that the full length of the lane closure is known. The information transmitted shall be approved by each entity, conform to the current version of the USDOT's Work



Zone Data Exchange (WZDx) specification and be publicly available to NCDOT approved consumers of this data. More information about the WZDx specification can be found at:

**<https://www.transportation.gov/av/data/wzdx>**

The connected lane closure devices shall be capable of wireless communication.

The initial connected device representing the START location shall be designed and attached to the flashing arrow board in such a manner that it is only activated when either the left or right arrows are displayed, not when the flashing arrow board is operated in caution mode. When the lane closure is removed, and the flashing arrow board is turned off or changed to caution mode, the connected device shall automatically turn off simultaneously and its location shall no longer be transmitted. The device shall also have a visual indicator (e.g. an illuminated light either steady burn or flash) to allow clear, visual proof the device is powered on, has established communication and is transmitting. The visual indicator shall not be located such that it potentially creates confusion to the motorists.

A second connected device representing the END location shall be installed on a crashworthy (e.g. NCHRP 350 or MASH-16) traffic control device. It shall have an easily accessible power switch and a small status indicator light mounted such that it is visible when passing by in a vehicle at operating speed. When switched to the ON position, the light shall indicate the device has established communication and is transmitting. The light may be either steady burn or flashing and shall not exceed one (1) inch in diameter. This second connected device representing the END location may be created virtually by a connected flashing arrow board.

The devices shall have battery life sufficient to maintain operation for the duration of the lane closure or have the ability to be recharged without deactivating the device or impacting the location of the lane closure information transmitted to the external parties. All costs associated with charging are incidental and shall be included in the cost of the system.

### **Construction Methods**

Connected lane closure devices shall be used on all lane closures on freeways and interstates throughout the project.

A START and END location shall be established by the installed system per grouping of lane closures (single, double, or triple); one attached and wired into the flashing arrow board at the beginning of the first taper. The other at the last traffic control device at the end of the lane closure(s) if the END location cannot be created virtually. Supplemental flashing arrow boards in advance of the first lane closure taper or flashing arrow boards in subsequent lane closures (for double and triple lane closures) shall not be transmitting if equipped with connected devices. Subsequent lane closures occurring downstream of where all lanes have been reopened and lane closures in the opposite direction of travel will require additional connected devices.

The second connected lane closure device shall be manually turned ON and OFF by crews installing and removing the lane closure unless the device can be controlled or virtually created by

the initial connected device. The unit shall be turned on immediately upon installation of the lane closure and turned off immediately upon removal of the lane closure.

Once installed, the Contractor shall verify that the connected lane closure devices are transmitting information prior to leaving the device unattended and re-verify transmission every 72 hours for long-term installations.

### **Technical Requirements**

The connected devices shall run continuously during any active lane closures for the length of the contract.

The GPS within the connected devices shall have a horizontal accuracy of 10 feet, 95% of the time.

The system shall send real-time alerts to designated NCDOT personnel when the flashing arrow mode or direction is changed. The alert shall be within 5 minutes of the actual change.

The connected device information, including the location, transmission status, and battery status shall be transmitted within five (5) minutes of initiation and updated every thirty (30) minutes to the central server.

The contractor shall provide multiple logins to a secured server (e.g. vendor dashboard) that provides real-time and historic status. The status must be exportable, within 24 hours, in .csv or .xls format and include data for date, display direction, time on, time off, and GPS coordinates. The historic logged information shall be available to CLCS users 24/7/365 during the length of the entire construction phase. All logged information from the project shall be retained by the Contractor and be available to the NCDOT for at least one (1) year after the contract ends. Information shall include timestamps, device name, flashing arrow mode, communication status, battery voltage and GPS location.

The battery voltage shall be collected at least once an hour. The information shall be stored and available for troubleshooting. To prevent communication loss, the system shall transmit an alert via E-mail or SMS to designated personnel if the battery voltage of a device is under a specified threshold.

The CLCS shall provide an immediate electronic alert (e.g. via E-mail or SMS) to the Traffic Control Supervisor or other designated individual if a device is not transmitting its position for a period of 30 minutes or more.

The outputs from the connected device on the arrow board and the downstream connected (or virtual) device at the end of the lane closure shall be easily identifiable as a single system, either by sequential device IDs, identical project names, or other method as approved by the Engineer. Additional pairs on the project shall have unique identifiable information such that it is not confused with another project system.

**TEMPORARY GLARE SCREEN**

(02/06/2013) (Rev. 10/13/2023)

**Description**

Furnish, installing, maintain, and remove Temporary Glare Screen in accordance with the plans and specifications.

**Materials**

Provide Temporary Glare Screen which are modular units consisting of vertical blades and a horizontal base rail. Provide blades and base rails manufactured from durable high impact resistant, non-warping, and non-metallic material.

Provide blades that have nominal widths between 6 inches and 9 inches. Provide blades which are a minimum of 24 inches high and capable of being locked down at an angle and spacing to provide a continuous cut-off angle of not less than 22 degrees. Provide modular units with a maximum length of 10 feet.

Anchor the modular units to the barrier using either a mechanical or adhesive system with a minimum pullout and shear strength of 3000 lbs. Use galvanized mounting hardware in accordance with Section 1076 of the NCDOT Standard Specifications. An acceptable alternate may be used if approved by the Engineer. Do not place Modular units over barrier connector between adjoining barrier sections.

Install yellow or crystal encapsulated lens (high performance) retro-reflective sheeting or microprismatic retro-reflective sheeting on the surface of the leading blade of every section of concrete barrier. Provide sheeting that is a minimum of 2 inches x 12 inches and applied with a pressure sensitive adhesive. Have color of the retro-reflective sheeting match the color of the adjacent pavement marking edgeline. Provide reflective sheeting which meets the requirements of Section 1092 of the NCDOT Standard Specifications.

**Construction Methods**

Section 1105-3 of the NCDOT Standard Specifications applies to this special provision.

**Maintenance**

Maintain Temporary Glare Screen in accordance with Section 1105-4 of the NCDOT Standard Specifications.

**WORK ZONE PRESENCE LIGHTING**

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

**Description**

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 are required. Work Zone Presence Lighting shall be installed in accordance with the attached detail and the Manufacturer's recommendations.

Supply a power source for each light 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 such that the light mast is plumb.

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

## Construction Methods

Work Zone Presence Lighting shall be permitted to be prestaged (up to one hour prior for single lane closures and up to two hours prior for double or triple lane closures) along with other traffic control devices or installed within one hour after the necessary traffic control has 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 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 based on the amount of light output for each unit according to the chart below.

Work Zone Presence Lighting shall be permitted to supplement the Portable Construction Lighting inside the lane closure. Work Zone Presence Lighting shall not be used in lieu of Portable Construction Lighting.

If there is sufficient existing overhead lighting, Work Zone Presence Lighting may be eliminated as directed by the Engineer.

## Lighting Unit Installation Requirements

The lighting units shall be installed in advance of the lane closure as shown on the attached detail and spaced according to the chart below:

|                          |                        | AREA 1 *               |             | AREA 2 **              |             |
|--------------------------|------------------------|------------------------|-------------|------------------------|-------------|
| Light Output<br>(Lumens) | Illuminated<br>Fixture | Number<br>of<br>Lights | Spacing *** | Number<br>of<br>Lights | Spacing *** |

|                 | Area (Sq. Ft.) |   |                   |   |                 |
|-----------------|----------------|---|-------------------|---|-----------------|
| 14,000 - 35,000 | 4              | 6 | 640' (16 skips)   | 8 | 480' (12 skips) |
| 35,001 - 59,999 | 5              | 5 | 800' (20 skips)   | 6 | 640' (16 skips) |
| 60,000 +        | 6 +            | 4 | 1,000' (25 skips) | 5 | 800' (20 skips) |

\* Area 1: Begins 2,640' downstream from CMS; Extends to just past first Lane Closure Sign

\*\* Area 2: Begins just past the first Lane Closure Sign; Extends to just past the last Lane Closure Sign

\*\*\* Skips refer to traditional ten-foot pavement marking lines with 30' gaps.

### **SOUND BARRIER WALL**

(3-6-15) (Rev. 10-4-24)

DB30 Special

#### **(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 *Standard Specifications* 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 and in areas of steep topography. 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 developed by the Design-Build Team for review and acceptance. Include material specifications for all components. Once preliminary plans developed by the Design-Build Team 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 *Standard Specifications*.

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 1/2-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 *Standard Specifications* 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 1/4-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 *Standard Specifications*, 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 *Standard Specifications*, 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**DB  
Special**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 four 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 *Standard Specifications*



- 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 *Standard Specifications*.

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 *Standard Specifications*. 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 two 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. 1-16-24)

Special

#### **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 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 an unstained finish **on both sides** of pre-cast concrete panels used for sound barrier walls.

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 no appreciable contrast between the colors of the unstained concrete columns and the unstained panels. For information purposes only, sources of form liners in the stacked 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 *Standard Specifications*. 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.

**\*\*NOTE\*\* Deleted Concrete Color System / Stain**

**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 3,000 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 *Standard Specifications*, 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.

**\*\* NOTE \*\* Deleted Color / Stain Application**

**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.



**APPLICATION OF BASE AND ANTI-GRAFFITI COATING**

(10-4-23)

DB Special

**GENERAL**

This work consists of preparing and cleaning concrete and galvanized surfaces as well as furnishing and applying a colored base coating with a compatible anti-graffiti finish coating to the surfaces described herein. The base coating and anti-graffiti coating shall be applied to all surfaces indicated on the plans developed by the Design-Build Team and / or as directed by the Engineer and shall be applied only after the surface preparation specified herein has been completed, inspected and approved by the Engineer.

Alternate coating methods may be submitted for review and approval.

**MATERIALS**

The base coating shall be compatible with the anti-graffiti finish coating and must be designed specifically for coating galvanized surfaces or damp, uncured concrete. The coating material shall be delivered to the job site in sealed containers bearing the manufacturer's original labels. The brand, color, and type shall be clearly marked on each container. A copy of the manufacturer's Materials Safety Data Sheet and a copy of the manufacturer's printed instructions shall be presented to the Engineer at the time of delivery.

The coating material shall be stored in airtight, upright containers. The containers shall be stored in a dry location where the temperature remains above 40° F and below 100° F.

The coating material shall have a shelf life of not less than 12 months. After application, the base coating shall be dry to the touch within 48 hours and shall achieve a final cure within two to three weeks. 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 base coating and area of application shall be in accordance with the Federal Standard 595.

The color of the anti-graffiti coating shall be clear after full cure.

Prior to application, provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the NCDOT Materials and Tests Unit, Chemical Testing Engineer for review and acceptance.

**MATERIAL TESTING AND CERTIFICATION**

Prior to applying coating material, a Type 2 certification shall be provided to the Engineer attesting that the product furnished is in accordance with the same formula as that previously subjected to the tests specified below and approved. Copies of the current tests reports shall be attached to the certification. Reports for tests made more than four years prior to shipment to the project site will not be accepted.

All testing shall be performed by a qualified commercial testing laboratory that has been approved by the NCDOT Materials and Tests Unit.

Prior to application, the coating shall be subjected to, and shall satisfy, the requirements of the tests listed below:

### **Freeze-Thaw**

1. Three concrete specimens, not less than four inches by six inches by six inches, of the mix design for the structure shall be cast and cured. Fourteen days moist curing with a drying period at room temperature, 60° F to 80° F, for 24 hours shall be required before applying the coating material to the specimens. Caution shall be taken that there be no excessive oil on specimen forms. The coating shall be applied to the sides of specimens at a spreading rate of  $50 \pm 10$  square feet per gallon. Brush application will be permitted. Cementitious coatings shall be cured at room temperature and 30 percent relative humidity for 24 hours; at room temperature and 90 percent relative humidity for 48 hours; and at room temperature and 50 percent relative humidity for four days; for a total curing time of seven days.
2. The specimens shall be immersed in water at room temperature for three hours, then removed.
3. The specimens shall be placed in cold storage at -15° F for one hour and then removed.
4. The specimens shall be thawed at room temperature for one hour.
5. Steps 3 and 4 shall be repeated for a total of 250 cycles. At the end of 250 cycles, the specimens shall show no visible defects.

### **Accelerated Weathering**

Coating shall be subjected to a 7,500-hour exposure test in a Twin-Carbon-Arc-Weatherometer, ASTM G 23, Type D, at an opening temperature of 145° F. The test shall be made at 20-minute cycles consisting of 17 minutes of light; and three minutes of water spray plus light. At the end of the exposure test, the exposed samples shall show no chipping, flaking, or peeling. The panels for this test shall be prepared by applying the coating at a spreading rate of  $50 \pm 10$  square feet per gallon to both sides and edges of panels cut from asbestos cement shingles in accordance with Federal Specification S-S-346, Type I. Curing time shall be in accordance with Freeze-Thaw Test curing time.

### **Fungus Growth Resistance**

In accordance with Federal Specification TT-P-29g, coating shall pass a fungus resistance test. Fungus growth shall not be indicated after a minimum incubation period of 21 days.

### **Abrasion Resistance**

In accordance with Method 6191 Abrasion Resistance-Falling Sand, Federal Test Method Standard 141a, ASTM D968-81, coating shall pass the 2,000 litre sand abrasion test. The specimens for this test shall be prepared by applying the coating to a cleaned steel panel at a spreading rate of  $50 \pm 10$  square feet per gallon. The specimens shall be cured at room temperature for 21 days.

### **Impact Resistance**

Coating shall be applied to a concrete panel prepared in accordance with the Federal Test Method Standard 141a, Method 2051, at a spreading rate of  $50 \pm 10$  square feet per gallon, and allowed to cure for 21 days at room temperature. The test shall then be run using the Gardner Mandrel Impact Tester in accordance with ASTM D 2794, using a one-half inch indenter with an impact load of six inch-pounds. The coating shall show no chipping under this impact load.

### **Salt-Spray Resistance**

A concrete specimen shall be coated at the rate of  $50 \pm 10$  square feet per gallon and cured for 21 days at room temperature. In accordance with ASTM B 117, the coated specimen shall be exposed to a five percent salt solution for 2,500 hours where the atmospheric temperature is maintained at  $90^\circ \pm 2^\circ \text{F}$ . At the end of the 2,500 hours of exposure, the coating shall show no ill effects, loss of adhesion, or deterioration.

### **Flexibility**

A sheet metal specimen shall be coated at a rate of  $50 \pm 10$  square feet per gallon and allowed to cure for 48 hours at room temperature. The coated specimen shall be bent at 180 degrees over a one-inch round mandrel. After bending, the coating shall show no breaking.

In addition to the certification and test reports required above, a service record shall be supplied showing that the coating material has a satisfactory service record on concrete and, when applicable, galvanized surfaces for a period of not less than five years prior to the date of submission of the service record. The coating shall also have shown satisfactory service characteristics without peeling, chipping, flaking, and non-uniform change in texture or color. The structure for the specific product shall be named in the service record.

In addition to the above requirements, each batch delivered to the project shall be sampled and tested for color and the following product analysis data submitted:

- (a) Weight per gallon
- (b) Viscosity in Kreb units
- (c) Weight percent pigment
- (d) Weight percent vehicle solids
- (e) Infrared spectra of vehicle solution
- (f) Drying time

**SURFACE PREPARATION**

Prepare concrete surfaces and galvanized surfaces in accordance with Section 420-17(B) and Section 442-13 of the *Standard Specifications*, respectively, or the manufacturer's recommendations, whichever is more restrictive. All surfaces to be coated shall be free of efflorescence, flaking coatings, dirt, oil, curing compounds, release agents and other deleterious substances prior to the application of the coating.

Concrete curing compounds and release agents shall be removed. Water blasting will be allowed; however, the blasting operation shall not remove or damage the concrete.

Prior to application of the coating, all concrete surfaces to be coated shall be sprayed with water. If the water soaks into the concrete surfaces, the coating may be applied once all surfaces dry. If the water beads up and is repelled, the surfaces require further cleaning before application of the coating.

**APPLICATION**

The coating application, including equipment used, shall be in accordance with the manufacturer's recommendations. The coating shall be applied by qualified personnel with previous experience similar to the work outlined in the plans developed by the Design-Build Team.

The material shall be thoroughly mixed in its original container and shall not be thinned. Containers with coatings that have formed skins shall not be permitted for use.

The base coating may be applied over damp, but not wet concrete surfaces and shall be applied at a rate of  $50 \pm 10$  square feet per gallon. The application rate shall produce a uniform color texture. The base coating shall be applied only when the ambient temperature is between 40° F and rising, and 100° F. It shall not be applied over frozen surfaces or if rain is imminent. If a freshly applied surface is damaged by rain, re-coating may be necessary based solely on the Engineer's assessment of the damage.

Schedule the application of the base coating as one of the final finishing operations or when construction-generated dust will be minimal. To prevent lap marks, a wet edge shall be maintained at all times. Stopping and starting in mid-sections will not be allowed. Start or end at natural breaks in the surface (e.g. at panel edges, corners or joints). When applying the base coating with a roller, the material shall be applied in vertical strokes initially, cross rolled for even film and appearance, and then finished with vertical strikes.

Apply the anti-graffiti coating 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.

**FINISHED PRODUCT**

All coating material in the finished state shall be capable of accommodating the thermal and elastic expansion ranges of the concrete or, when applicable, galvanized surfaces without cracking.

The texture of the completed finish coat shall be similar to that of rubbed concrete. The completed finished coating shall be tightly bonded to the structure and present a uniform appearance and texture. Additional coats may be required by the Engineer in order to produce the desired surface texture and uniformity.

Coatings shall be entirely removed from the structure and reapplied if there is failure to positively adhere as evident by chipping, flaking, peeling, or the desired surface appearance is not achieved.

The average thickness of the completed finish coating shall not exceed 1/8 of an inch. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

### **PERMANENT SOIL REINFORCEMENT MAT**

(9-1-11) (Rev. 8-20-24)

DB Special

#### **Description**

This work consists of furnishing and placing permanent soil reinforcement mat (PSRM), of the type specified, over previously prepared areas at locations shown on the plans developed by the Design-Build Team and as directed by the Engineer.

#### **Materials**

The product shall be a permanent soil reinforcement mat constructed of synthetic stabilized, non-biodegradable synthetic fibers processed to form a rigid permanent three-dimensional structure to promote soil stability in combination with vegetation under hydraulic stresses. Organic biodegradable fibers (such as straw, coir, excelsior or blends thereof) may also be incorporated into the PSRM, and evenly distributed throughout the mat. PSRMs utilizing organic fibers shall have a bottom and top UV stabilized netting stitched together with UV stabilized thread to retain the organic fibers. All PSRMs shall meet the following minimum physical properties:

| <b>Property</b>                | <b>Test Method</b> | <b>Value</b> | <b>Unit</b> |
|--------------------------------|--------------------|--------------|-------------|
| Thickness                      | ASTM D6525         | ≥0.25        | in          |
| Tensile Strength (MD)          | ASTM D6818         | 225          | lbs/ft      |
| Tensile Strength (TD)          | ASTM D6818         | 175          | lbs/ft      |
| Vegetation Establishment (Min) | ASTM D7322         | 250          | %           |
| UV Stability <sup>1</sup>      | ASTM D4355         | ≥80          | %           |

<sup>1</sup>ASTM D4355 Tensile Strength and % strength retention of material after 1,000 hours of exposure.

PSRM shall also meet the minimum performance values by type as shown in the table below:

| Property                                       | Test Method | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 | Unit               |
|--|-------------|--------|--------|--------|--------|--------|--------------------|
| Maximum Permissible Shear Stress (Unvegetated) | ASTM 6460   | 2.25   | 2.5    | 3.0    | 3.25   | N/A    | lb/ft <sup>2</sup> |
| Maximum Permissible Shear Stress (Vegetated)   | ASTM 6460   | 6.0    | 8.0    | 10.0   | 12.0   | 16.0   | lb/ft <sup>2</sup> |
| Maximum Allowable Velocity (Vegetated)         | ASTM 6460   | 8.0    | 12     | 16.0   | 20.0   | 24.0   | ft/s               |

Staples shall be used as anchors. Provide staples to meet Article 1060-8 of the *Standard Specifications*.

### Construction Methods

All areas to be protected with the PSRM shall be brought to final grade and prepared 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. Preserve the required line, grade and cross section of the area covered. Unroll the PSRM in the direction of the flow of water and apply without stretching so that it will lie smoothly but loosely on the soil surface. Bury the up-channel or top of slope end of each piece of PSRM in a narrow trench at least six inches deep and tamp firmly. Where one roll of matting ends and a second-roll begins, overlap the end of the upper roll over the beginning of the second roll so there is a six inch overlap. Install staple checks four inches on center and every 30 feet longitudinally in the matting or as directed by the Engineer. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting at least four inches where two or more widths of matting are laid side by side.

Place staples across matting at ends, junctions and check trenches approximately ten inches apart. Place staples along the outer edges and down the center of each strip of matting three feet apart. Place staples along all lapped edges ten inches apart. Install product with netting and biodegradable fibers on the top side if present. Trenching and stapling shall fit individual cut or fill slope conditions and conform to manufacturer's installation recommendations for the type specified. Any conflict between the manufacturer's installation recommendations and this Special Provision will be resolved by the more stringent measures being required.

Apply all soil amendments and one-half of the seed in accordance with Section 1660 of the *Standard Specifications* of the types at the rates specified in the contract prior to installation of the PSRM. For PSRMs that do not contain biodegradable fibers, apply 3/4 inch to one inch loose, friable topsoil uniformly over the PSRM and gently work to incorporate into the structure of the PSRM completely filling the voids until the level of soil is at the top of the PSRM. Apply the remainder of the seed and gently work into the surface of the topsoil in-fill and mulch. For all other PSRMs, apply 3/4 inch to one inch of loose, friable topsoil uniformly over the PSRM and gently work to create a suitable seed bed. Apply the remainder of the seed and gently work into the surface of the topsoil. At the sole discretion of the Engineer, topsoil may be omitted for PSRMs

containing biodegradable fibers. All seed shall be applied prior to installation of PSRM if topsoil is omitted and will not need to be mulched.

**NONWOVEN GEOTEXTILE INTERLAYER**

(1-16-24)  
07

DBI 10

**Description**

Furnish and install a nonwoven geotextile interlayer at locations shown in the plans prepared by the Design-Build Team.

**General**

The Design-Build Team shall schedule a Pre-Pave Meeting at least three weeks prior to paving to discuss installation and construction procedures for the nonwoven geotextile interlayer with representatives from the Design-Build Team including Paving Superintendent, Subcontractor, Geotextile Manufacturer, Engineer, Roadway Inspector, Area Roadway Construction Engineer, Division Construction Engineer, and the State Pavement Construction Engineer.

**Materials**

The geotextile interlayer shall be constructed of a non-woven needle-punched geotextile, with no thermal treatment (calendaring or IR). The material shall be resistant to chemicals, mildew, and rot and shall not have any tears or holes that will adversely affect the in-situ performance and physical properties of the installed material.

Furnish with each shipment a Type 3 Certification in accordance with Article 106-3 of the NCDOT *Standard Specifications* certifying that the paving mat is a non-woven needle-punched geotextile with no thermal treatment (calendaring or IR) meeting the requirements shown:

| <b>Physical Properties of Non-Woven Geotextile Interlayer</b>  |                                       |                    |  |
|--|---------------------------------------|--------------------|--|
| <b>Property</b>  | <b>Test Method</b>                    | <b>Units</b>       | <b>Value</b>   |
| Minimum Mass per unit area   | ASTM D 5261                           | oz/yd <sup>2</sup> | 15.0   |
| Minimum thickness under load<br>(a) at 2 kPa (0.29 psi)<br>(b) at 20 kPa (2.9 psi)<br>(c) at 200 kPa (29 psi)                  | ASTM D 5199                           | in                 | (a) 0.12<br>(b) 0.10<br>(c) 0.04                     |
| Minimum wide-width tensile strength  | ASTM D 4595                           | lb/ft              | 685  |
| Maximum wide-width elongation  | ASTM D 4595                           | %                  | 130  |
| Minimum water permeability in normal direction under load (pressure) at 20 kPa (2.9 psi)                                       | Mod. ASTM D 5493 or ASTM D 4491       | ft/s               | 3.3x10 <sup>-4</sup>                                 |
| Minimum in-plane water permeability (transmissivity) under load (pressure)<br>(a) at 20kPa (2.9 psi)<br>(b) at 200kPa (29 psi) | Mod. ASTM D 6574 or ASTM D 4716       | ft/s               | (a) 1.6x10 <sup>-3</sup><br>(b) 6.6x10 <sup>-4</sup> |
| Minimum weather resistance retained strength   | ASTM D 4355 at 500 hrs. exposure      | %                  | 60   |
| Alkali resistance, minimum polypropylene / polyethylene  | Manufacturer certification of polymer | %                  | 96   |

Note: Requirements must be met for 95 percent of samples.

### General Requirements

A trained and experienced installer, certified by the Geotextile Manufacturer, shall be present on-site during the installation of the geotextile and until the crew has a comfort level working with this material.

Ensure that any potential for keying of the two cementitious layers is minimized through proper repair techniques. Clean the underlying surface to remove loose debris before applying the interlayer. Roll the geotextile out on the underlying layer. The geotextile shall be tight and without excess wrinkles and folds. No more than 650 feet of geotextile shall be installed in advance of the paving operation at a given time. The interlayer shall be placed no more than three days before concrete placement.

Keep driving on the interlayer to a minimum. Tight radius turns and excessive acceleration and braking shall be avoided.

The geotextile shall be secured to the underlying layer with pins or nails punched through two-inch to 2.75-inch galvanized washers or disks every six feet or less. Additional fasteners shall be used as needed to ensure that the geotextile does not shift or fold before or during concrete



placement. Edges of the geotextile shall overlap by eight inches +/- two inches. No more than three layers of geotextile shall overlap at any location. Transverse seams of adjacent rolls shall be staggered to prevent four layers from coinciding at any location. The free edge of the geotextile shall extend beyond the edge of the new concrete into a location that facilitates drainage.

### **GREENWAYS AND MULTI-USE PATHS:**

(2-18-14)(Rev. 1-16-24)

Z-200

#### **Description**

This special provision provides for revisions to the *Standard Specifications* for work on a greenway or multi-use path not designed or intended to carry highway traffic.

#### **Materials**

Refer to the *Standard Specifications* except as noted in these Special Provisions. Use materials on the NCDOT Approved Products List (APL) where applicable.

#### **Construction Methods**

Construct Greenway in accordance with the contract plans, *Standard Specifications* except as noted below:

| SECTION                          | ARTICLE                                | PAGE | REVISION  |
|----------------------------------|--|------|---|
| 235:<br>Embankments              | 235-3(C):<br>Embankment<br>Compaction  | 2-24 | <b>Delete first sentence and replace with the following:</b><br>Compact each layer for its full width to a density equal to at least 90% of that obtained by compacting a sample of the material in accordance with AASHTO T 99 as modified by the Department.  |
| 500:<br>Fine Grading<br>Subgrade | 500-2(C):<br>Compaction<br>of Subgrade | 5-1  | <b>Delete first sentence and replace with the following:</b><br>Compact all material to a depth of up to 8 inches below the finished surface of the subgrade to a density equal to at least 92% of that obtained by compacting a sample of the material in accordance with AASHTO T 99 as modified by the Department. |
| 500:<br>Fine Grading<br>Subgrade | 500-3:<br>Tolerances                   | 5-2  | <b>Delete Article 500-3 and replace with the following:</b><br>A tolerance of $\pm 1$ inch from the established greenway grade will be permitted after the subgrade has been graded to a uniform surface.   |

| SECTION   | ARTICLE   | PAGE | REVISION   |
|---|---|------|--|
| 505:<br>Aggregate<br>Subgrade                         | 505-3:<br>Construction<br>Methods                     | 5-8  | <b>Delete first paragraph and replace with the following:</b><br>Perform shallow undercut up to 12 inches as necessary to remove unsuitable material. If necessary, install geotextile for soil stabilization in accordance with Article 270-3. Place Class III select material or Class IV subgrade stabilization (standard size no. ABC) by end dumping on geotextiles. Do not operate heavy equipment on geotextiles until geotextiles are covered with Class III or ABC. Compact ABC to 92% or to the highest density that can be reasonably attained. |
| 520:<br>Aggregate<br>Base Course                      | 520-7:<br>Shaping and<br>Compaction                   | 5-12 | <b>Delete first sentence in second paragraph and replace with the following:</b><br>For both nuclear and ring tests, compact each layer of the base to a density equal to at least 92% of that obtained by compacting a sample of the material in accordance with AASHTO T 180 as modified by the Department.<br><br><b>Delete the third paragraph.</b>  |
| 610:<br>Asphalt<br>Concrete<br>Plant Mix<br>Pavements | 610-10:<br>Density<br>Requirements                    | 6-23 | <b>Delete Article 610-10 and replace with the following:</b><br>Compact the asphalt plant mix to at least 85% of the maximum specific gravity.   |
| 610:<br>Asphalt<br>Concrete<br>Plant Mix<br>Pavements | 610-13:<br>Final Surface<br>Testing and<br>Acceptance | 6-24 | <b>Delete Article 610-13.</b>  |
| 848:<br>Concrete<br>Sidewalks                         | 848-3:<br>Construction<br>Methods                     | 8-31 | <b>Delete second paragraph and replace with the following:</b><br>Construct concrete greenway based on the typical sections in the plans. Place groove joints at a spacing equal to the width of the greenway. Transverse Expansion Joints are required every 40 feet.   |

**STRUCTURE PRESERVATION****Description**

This work shall consist of furnishing all labor, equipment, and materials to perform the following proposed preservation work on existing bridge 350143 as a part of the I-5719/U-5800 Design-Build project in Gaston County.

NOTES: See preliminary roadway and structure plans, provided by the Department for widening of the approach roadway and the existing bridge 350143. The work included in these plans and project special provision provided elsewhere in this RFP, are for the preservation of the existing structure ONLY and does not consider any proposed work as a part of the Design-Build project.

- Deck (top and bottom) and median rail repairs (no repairs to the outside rails are a part of this work due to the proposed widening)
- Approach Slab/Roadway Headers
- Proposed Joints and Proposed Joint Repairs
- Substructure Repairs – Concrete Repairs, Shotcrete Repairs, Epoxy Resin Injection
- Cleaning and Painting Structural Steel
- Bridge Jacking
- Bearing Replacement
- Drift Removal
- Misc. Steel Repairs
- Remove and Replace End Bent 2 Slope Joint Seal
- Epoxy Coat top of Bent Caps
- Proposed beams and proposed bearings

Unless otherwise noted on the plans, no separate payment will be made for seeding, mulching, or any measures required to control erosion or prevent off-site sedimentation. The cost of this work shall be included in the lump sum price bid for mobilization.

The Design-Build Team shall provide all necessary access, understructure platforms, scaffolding, ladders, etc., provide all staging areas, materials storage, waste disposal, provide environmental controls to limit loss of materials from sawing equipment and chipping equipment; and any other incidental necessary to complete the work.

Existing dimensions and bridge condition are from the best information available. The Design-Build Team shall field verify the information shown in the plans prior to commencing repairs or ordering material. Notify the engineer of any discrepancies.

The Design-Build Team shall be responsible for fulfilling all requirements of the *Standard Specifications*, except as specified herein.

The Design Build Team shall reference the Special Provisions listed below found on the Structures Management Unit website:

- Submittal of Working Drawings
- Crane Safety
- Falsework and Formwork
- Securing of Vessels

## **FOAM JOINT SEALS FOR PRESERVATION (SPECIAL)**

### **SEALS**

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that are spilled on or applied to the surface. Use a resilient, UV stable, preformed, impermeable, flexible, expansion joint seal. The joint seal shall consist of low-density, closed cell, cross-linked polyethylene non-extrudable foam. The joint seal shall contain no EVA (Ethylene Vinyl Acetate). Cell generation shall be achieved by being physically blown using nitrogen. No chemical blowing agents shall be used in the cell generation process.

Use seals manufactured with grooves  $1/8" \pm$  wide by  $1/8" \pm$  deep and spaced between  $1/4"$  and  $1/2"$  apart along the bond surface running the length of the joint. Use seals with a depth that meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than  $1/4"$ . Provide a seal that has a working range of 30% tension and 60% compression and meets the requirements given below.

| TEST                | TEST METHOD                           | REQUIREMENT                  |
|---------------------|---------------------------------------|------------------------------|
| Tensile Strength    | ASTM D3575, Suffix T                  | 110 – 130 psi                |
| Compression Set     | ASTM D1056<br>Suffix B, 2 hr recovery | 10% - 16%                    |
| Water Absorption    | ASTM D3575                            | < 0.03 lb/ft <sup>2</sup>    |
| Elongation at Break | ASTM D3575                            | 180% - 210%                  |
| Tear Resistance     | ASTM D624 (D3575, Suffix G)           | 14 – 20 pli                  |
| Density             | ASTM D3575,<br>Suffix W, Method A     | 1.8 – 2.2 lb/ft <sup>3</sup> |
| Toxicity            | ISO-10993.5                           | Pass (not cytotoxic)         |

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

**BONDING ADHESIVE**

Use a two-component, 100% solid, modified epoxy adhesive supplied by the joint seal manufacturer that meets the requirements given below.

| TEST                 | TEST METHOD   | REQUIREMENT          |
|----------------------|---------------|----------------------|
| Tensile strength     | ASTM D638     | 3,000 psi (min.)     |
| Compressive strength | ASTM D695     | 7,000 psi (min.)     |
| Hardness             | Shore D Scale | 75-85 psi            |
| Water Absorption     | ASTM D570     | 0.25% by weight max. |
| Elongation to Break  | ASTM D638     | 5% (max.)            |
| Bond Strength        | ASTM C882     | 2,000 psi (min.)     |

Use an adhesive that is workable to 40°F. When installing in ambient air or surface temperatures below 40°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

**SAWING THE JOINT**

The concrete at the face of the joint (elastomeric concrete, polyester polymer concrete, Portland cement concrete, etc.) shall have sufficient time to cure such that no damage can occur to the concrete prior to sawing to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved flowable, non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one (1) or two (2) passes of the saw by placing and spacing two (2) metal blades on the saw shaft to the desired width for the joint opening.

The desired depth is the depth of the seal plus ¼" above the top of the seal plus approximately 1" below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a ¼" chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

**PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION**

The elastomeric concrete or polyester polymer concrete at the joint shall cure a minimum of 24 hours prior to seal installation. Portland cement concrete at the joint shall cure following the special provisions.

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Design-Build Team prior to blast cleaning and installing the seal, at no cost to the Department.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the joint concrete may be exposed after sandblasting.

After blasting, either brush the surface with clean brushes made of hair, bristle, or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast-cleaned surface and remove any traces of oil, grease, or smudge deposited in the cleaning operations.

Bond the seal to the blast-cleaned surface on the same day the surface is blast cleaned.

**SEAL INSTALLATION**

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to ensure the seal is the same length as the deck opening. When the joint seal requires splicing, use the heat welding method by placing the joint material ends against a Teflon heating iron of 425-475°F for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. Stir each epoxy bonding agent component independently, using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two (2) components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the joint

concrete, as well as both sides of the joint seal, making certain to fill completely the grooves with epoxy. With gloved hands, compress the joint seal and with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately  $\frac{1}{4}$ " below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval.

(A) Watertight Integrity Test

- (1) Upon completion of each foam seal expansion joint, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch

above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about six (6) inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

- (2) Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of five (5) hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The foam seal expansion joint is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.
- (3) If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- (4) If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

Do not place pavement markings on top of foam joint seals.

**BASIS OF PAYMENT**

*Foam Joint Seals for Preservation* will be measured and paid for at the contract unit price bid per linear foot and will be full compensation for furnishing all material, labor, tools, and equipment necessary for installing these seals in place and accepted.

| <b>Pay Item</b>                   | <b>Pay Unit</b> |
|-----------------------------------|-----------------|
| Foam Joint Seals for Preservation | Linear Feet     |

**EXPANSION JOINT SEAL REPAIR****(SPECIAL)****1.0 GENERAL**

The work covered by this Project Special Provision consists of furnishing and installing the expansion joint seals and replacing all missing or broken miscellaneous hardware as shown on the contract drawings. All materials, labor, equipment, and incidentals necessary for the proper installation of the expansion joint seals are included.

**2.0 MATERIAL**

Provide replacement hardware for existing broken or missing hardware per the plans and field conditions.

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:



|   | ASTM<br>TEST METHOD | REQUIREMENTS   |
|---|---------------------|--|
| Hardness, Durometer -<br>Shore A          | D2240               | 60 ± 5, Neoprene (upward<br>corrugated shape -<br>fabric reinforced)<br>75 ± 5, EPDM and Neoprene<br>(upward non-corrugated<br>shape)<br>80 ± 5, EPDM (upward corrugated<br>shape-fabric reinforced) |
| Tensile Strength                          | D412                | 2000 psi (min.)  |
| Elongation at Break                       | D412                | 250% (min.)  |
| Width of Gland in<br>Relaxed Condition    | N/A                 | 10" ± 0.25"  |
| Thickness of Upturned<br>portion of gland | N/A                 | 0.25" non-corrugated shape,<br>-0.032" to +0.032"  |
| Thickness of Upturned<br>portion of gland | N/A                 | 0.1875" corrugated shape,<br>-0.032" to +0.032"  |
| Thickness of Flat<br>portion of gland     | N/A                 | 0.1563", -0.032" to +0.032"  |

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Inspect the condition of the existing hold-down plates for cracks, deformations or other damage that the Engineer might determine necessitates replacement of a hold-down plate. Replacement plates shall conform to AASHTO M270 Grade 36 steel or approved equal.

Field splice hold-down plates only at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

Replace hold-down bolts with new bolts that conform to ASTM F593 alloy 304 stainless steel. Replace washers with new washers that conform to ASTM F844 except they shall be made from alloy 304 stainless steel.

### **3.0 SHOP DRAWINGS**

Submit nine sets of working drawings to the Engineer for review, comments, and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template.
- The proposed chronology of installation including the sequence and direction of the removal and replacement of the existing gland.
- The proposed method for removing the hold-down plate.

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Design-Build Team. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal repair.

### **4.0 INSTALLATION**

#### **Expansion Joint Seal Repairs Under Staged Closures**

For expansion joint seal repairs that are staged, perform steps 1 through 4 for the initial stage for gland replacement:

1. Loosen the existing bolts and hold down plates and remove the existing gland. Remove the existing neoprene sealant and clean the existing base angle and hold-down plates of oil, grease, and other latents.
2. Lay the new gland on the base angle and field mark the new gland for the bolt holes. Holes in the new gland shall be punched 7/8" in diameter with a circular hand punch.
3. In order to check for proper alignment, place the new gland and hold-down plates on the base angle. Do not apply new neoprene sealant. Bolt the hold-down plates to the base angle with new bolts and washers, but do not tighten. The engineer shall inspect the joint seal gland, plates, and bolts for proper alignment.
4. After inspection, remove the hold-down plates and new gland. Apply new neoprene sealant to the base angle in accordance with the "installation sketch." Place new gland and hold-down plates on the base angle. Bolt the hold-down plates to the base angle assembly and torque the bolts to 88 ft-lbs with a torque wrench. Check the

torque after three (3) hours and, if necessary, retighten to 88 ft-lbs. A final check shall be made at seven (7) days. Torque shall not be less than 80 ft-lbs after seven (7) days.

After completion of steps 1 through 4, open to traffic the stage that has had the new gland installed and close to traffic the next adjacent stage requiring a new gland. Continue with steps 1 through 4 for removal of existing gland and placement of a new expansion joint gland. Proceed similarly for each successive stage. After completion of installation of the joint gland for all stages, traffic may be returned, temporarily, to all stages.

After completion of installation of the new gland for all stages, perform step 5 for each closure stage:

5. After proper torqueing, clean the bolt hole recesses and the recess between the joint seal device and concrete, completely fill these recesses with new neoprene sealant.

Allow sealant applied during step 5 to cure for a minimum of 4 hours before allowing traffic on the bridge. Alternatively, and if the sealant has not cured sufficiently to prevent sealant from adhering to passing traffic, the Design-Build Team may propose a method (broadcast sand or other) to prevent sealant from adhering to passing traffic.

Unless otherwise approved by the Engineer, step 5 shall be completed within 7 days of installation of new gland.

The Engineer shall be notified of any damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint. If directed by, the Engineer submit a proposed method of repair and repair material specifications for approval. This work to repair damaged deck or irregularities will be considered extra work.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

## **5.0 INSPECTION**

### **Watertight Integrity Test**

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 2 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no extra cost to the Department.

## 6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seal repair will be at the contract unit price per linear foot for "Expansion Joint Seal Repair" which price and payment will be full compensation for furnishing and installing all material, including any steel accessory plates for sidewalks, medians and rails, any replacement steel hold-down plates, labor, tools, and incidentals necessary for installing the expansion joint seal repair in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

| Pay Item                    | Pay Unit    |
|-----------------------------|-------------|
| Expansion Joint Seal Repair | Linear Feet |

## EPOXY RESIN INJECTION

(08-08-22)

### GENERAL

For repairing cracks, an applicator certified by the manufacturer of epoxy injection system to be used is required to perform the epoxy resin injection. The Design-Build Team shall submit documentation that indicates the firm, supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have five (5) years of relative experience with a record of satisfactory performance on similar projects.

The Design-Build Team furnishes all materials, tools, equipment, appliances, labor and supervision required when repairing cracks with the injection of an epoxy resin adhesive.

**Description**

Using Epoxy Resin Injection, repair all cracks 0.060" wide or greater in bent columns, struts, piles and caps, girders, bridge rail parapets and in the cantilevered portion of the superstructure deck.

Repair the column cracks to the top of the slope protection.

Repair any crack, void, honeycomb or spall area unsuitable for repair by injection with epoxy mortar.

**SUBMITTALS**

Prior to construction, the Design-Build Team shall submit the following to the Engineer for review and approval:

- (A) Materials – Information detailing the materials and their properties, storage and handling requirements, and Material Safety Data Sheets. Material certifications and sampling shall be as required as per the NCDOT *Standard Specifications* Section 106.
- (B) Injection Procedures – Preparation and epoxy injection installation procedures, including written instructions from the manufacturer of the proportioning dispenser and the procedures recommended to monitor and assure its proportioning accuracy of the unit.
- (C) Contingencies – Proposed injection repair procedures in the event that during testing it is found that the injection installation procedure did not completely fill the cracks with epoxy.
- (D) Qualifications – The resumes of the Design-Build Team's staff and/or the epoxy resin manufacturer's Technical Representative that will be on site performing the epoxy injection. The resumes shall detail the installer's applicable certifications and epoxy injection installation experience.
- (E) References – The names and telephone numbers of contact persons for recent (< 2years) epoxy injection projects.

**COOPERATION**

Cooperate and coordinate with the Technical Representative of the epoxy resin manufacturer for satisfactory performance of the work.

Have the material manufacturer's Technical Representative present when the epoxy resin injection process begins and until the Engineer is assured that their service is no longer needed.

The expense of having this representative on the job is the Design-Build Team's responsibility at no additional cost to the Department .

### **MATERIAL PROPERTIES**

Provide a two-component structural epoxy adhesive for injection into cracks or other voids. Provide modified epoxy resin (Component "A") that conforms to the following requirements:

|  | Test Method                              | Specification Requirements |
|--|--|----------------------------|
| Viscosity @ $40 \pm 3^{\circ}\text{F}$ , cps | Brookfield RVT Spindle<br>No. 4 @ 20 rpm | 6,000 – 8,000              |
| Viscosity @ $77 \pm 3^{\circ}\text{F}$ , cps | Brookfield RVT Spindle<br>No. 2 @ 20 rpm | 400 - 700                  |
| Epoxide Equivalent Weight                    | ASTM D1652                               | 152 - 168                  |
| Ash Content, %                               | ASTM D482                                | 1 max.                     |

Provide the amine curing agent (Component "B") used with the epoxy resin that meets the following requirements:

|  | Test Method                              | Specification Requirements                               |
|--|--|--|
| Viscosity @ $40 \pm 3^{\circ}\text{F}$ , cps | Brookfield RVT Spindle<br>No. 2 @ 20 rpm | 700 - 1400   |
| Viscosity @ $77 \pm 3^{\circ}\text{F}$ , cps | Brookfield RVT Spindle<br>No. 2 @ 20 rpm | 105 - 240  |
| Amine Value, mg KOH/g                        | ASTM D664*                               | 490 - 560  |
| Ash Content, %                               | ASTM D482                                | 1 max.   |
|  |  | * Method modified to use perchloric acid in acetic acid. |

Certify that the Uncured Adhesive, when mixed in the mix ratio that the material supplier specifies, has the following properties:

Pot Life (60 gram mass)  
 @  $77 \pm 3^{\circ}\text{F}$  - 15 minutes  
 minimum @  $100 \pm 3^{\circ}\text{F}$  - 5  
 minutes minimum

Certify that the Adhesive, when cured for seven (7) days at  $77 \pm 3^{\circ}\text{F}$  unless otherwise specified, has the following properties:

|   | Test Method | Specification Requirements      |
|---|-------------|---------------------------------|
| Ultimate Tensile Strength   | ASTM D638   | 7,000 psi (min.)                |
| Tensile Elongation at Break   | ASTM D638   | 4% max.                         |
| Flexural Strength   | ASTM D790   | 10,000 psi (min.)               |
| Flexural Modulus  | ASTM D790   | 3.5 x 10 <sup>5</sup> psi       |
| Compressive Yield Strength  | ASTM D695   | 11,000 psi (min.)               |
| Compressive Modulus   | ASTM D695   | 2.0 - 3.5 x 10 <sup>5</sup> psi |
| Heat Deflection Temperature   | ASTM D648*  | 125°F min.                      |
| Cured 28 days @ 77 ± 3°F  |             | 135°F min.                      |
| Slant Shear Strength,<br>5,000 psi (34.5 MPa)<br>compressive strength<br>concrete | AASHTO T237 |                                 |
| Cured 3 days @ 40°F<br>wet concrete   |             | 3,500 psi (min.)                |
| Cured 7 days @ 40°F<br>wet concrete   |             | 4,000 psi (min.)                |
| Cured 1 day @ 77°F<br>dry concrete  |             | 5,000 psi (min.)                |
| * Cure test specimens so the peak exothermic temperature does not exceed 77°F.    |             |                                 |

Use an epoxy bonding agent, as specified for epoxy mortar, as the surface seal (used to confine the epoxy resin during injection).

#### EQUIPMENT FOR INJECTION

Use portable positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two (2) components at the nozzle to meter and mix the two (2) injection adhesive components and inject the mixed adhesive into the crack. Use electric or air powered pumps that provide in-line metering and mixing.

Use injection equipment with automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to  $200 \pm 5$  psi and equipped with a manual pressure control override.

Use equipment capable of maintaining the volume ratio for the injection adhesive as prescribed by the manufacturer. A tolerance of  $\pm 5\%$  by volume at any discharge pressure up to 200 psi is permitted.

Provide injection equipment with sensors on both the Component A and B reservoirs that automatically stop the machine when only one component is being pumped to the mixing head.

#### **PREPARATION**

Follow these steps prior to injecting the epoxy resin:

- (A) Remove all dirt, dust, grease, oil, efflorescence and other foreign matter detrimental to the bond of the epoxy injection surface seal system from the surfaces adjacent to the cracks or other areas of application. Acids and corrosives are not permitted.
- (B) Provide entry ports along the crack at intervals determined by the Design-Build Team to ensure full penetration of the crack.
- (C) Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.
- (D) Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.
- (E) Perform an air pressure check of the surface seal to ensure the system is airtight prior to proceeding with the injection.

#### **EPOXY INJECTION**

Before epoxy adhesive injection occurs, the Design-Build Team shall test discharge one pint of epoxy to calibrate the equipment and to demonstrate that the workmen and equipment are working properly.

Follow approved preparation and installation procedures submitted by the Design-Build Team. It is the Design-Build Team's responsibility to achieve full penetration of cracks being injected.

Perform epoxy adhesive injection continuously until cracks are completely filled. Pressure shall be maintained until complete refusal of material is achieved. Any stoppage of injection for more than 15 minutes shall result in the injection equipment being cleaned, at no additional cost to the Department, before resuming injection.

If port to port travel of epoxy adhesive is not indicated, or the surface seal and/or ports become dislodged, immediately stop the work and notify the Engineer.

#### **TESTING**

The Design-Build Team shall core 3" diameter by 6" deep samples of the cured epoxy to verify the cracks have been completely filled with epoxy. When coring, care shall be taken to avoid existing steel reinforcement, where possible. Injection will not proceed beyond the



initial 50 feet until three (3) cores have been submitted to, and approved by, the Engineer. If the epoxy does not penetrate a minimum of 6" or the full depth of the crack, whichever is less, the repair will be rejected, and the Design-Build Team shall follow their proposed repair procedure that has been approved by the Engineer. The presence of the technical representative will be required when repairs begin.

The Engineer will take possession of the cores from the repaired concrete for compressive strength testing. If the failure plane is located at the repaired crack, a minimum compressive strength of 3,000 psi is required of these cores. The cost of coring is incidental to the pay item for epoxy injection. If the core fails, the Design-Build Team will be required to take corrective action before proceeding and another 50' test section will be required.

After the Design-Build Team demonstrates acceptable repairs, cores will be taken at a rate of one per 100 linear feet of repair until completion of the work or unacceptable cores are encountered.

### **FINISHING**

When cracks are completely filled, allow the epoxy adhesive to cure for sufficient time to allow the removal of the surface seal without any draining or runback of epoxy material from the cracks.

Fill all cored holes with Type 3 grout in accordance with Section 1003 of the *Standard Specifications*.

Remove the surface seal material and injection adhesive runs or spills from concrete surfaces.

Finish the face of the crack and all core holes flush to the adjacent concrete, removing any indentations or protrusions caused by the placement of entry ports or grout placement.

### **BASIS OF PAYMENT**

*Epoxy Resin Injection* will be paid at the contract unit price per linear foot. For full depth cracks, payment will be made for one side only. Such payment will be full compensation for all materials, tools, equipment, labor, coring and for all incidentals necessary to complete the work.

| <b>Pay Item</b>       | <b>Pay Unit</b> |
|-----------------------|-----------------|
| Epoxy Resin Injection | Linear Foot     |

## **CONCRETE REPAIRS**

(11-30-23)

### **GENERAL**

Work includes removal of concrete in spalled, delaminated and/or cracked areas of the existing bent caps, bent columns, underside of bridge decks, deck slabs, girders, and bridge rails in reasonably close conformity with the lines, depth, and details shown on the plans,

described herein and as established by the Engineer. This work also includes straightening, cleaning, and replacement of reinforcing steel, doweling new reinforcing steel, removing all loose materials, removing and disposing of debris, formwork, applying repair material, and protecting adjacent areas of the bridge and environment from material leakage. The repair material shall be one of the materials described in this Project Special Provision, unless otherwise noted in the plans or Special Provisions prepared by the Design-Build Team.

The location and extent of repairs shown on the plans described herein are general in nature. The Engineer shall determine the extent of removal in the field based on an evaluation of the condition of the exposed surfaces. The Design-Build Team shall coordinate removal operations with the Engineer. No more than 30% of a round or square column or 30% of the bearing area under a beam shall be removed without a temporary support system and approval from the Engineer.

Repair, to the Engineer's satisfaction, any portion of the structure that is damaged from construction operations. No extra payment is provided for these repairs.

#### **SURFACE PREPARATION**

Adhere to the following surface preparation requirements or the repair material manufacturer's requirements, whichever is more stringent.

Prior to starting the repair operation, delineate all surfaces and areas assumed to be deteriorated by visually examining and sounding the concrete surface with a hammer or other approved method. The Engineer is the sole judge in determining the limits of deterioration.

Prior to concrete removal, introduce a shallow saw cut, 1/2" in depth, around the repair area at right angles to the concrete surface. Sawcut should be located a minimum 2" beyond the perimeter of the deteriorated concrete area to be repaired. Remove all concrete within the sawcut to a minimum depth of 1/2". If concrete removal exposes reinforcing steel, remove all deteriorated concrete 1" below the reinforcing steel with a 17 lb (maximum) pneumatic hammer, with points that do not exceed the width of the shank, or with hand picks or chisels, as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1" below the reinforcing steel.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel in repair areas to remove all debris, loose concrete, loose mortar, rust, scale, etc. After blasting, examine the reinforcing steel to ensure at least 90% of the original diameter remains. If there is more than 10% reduction in the rebar diameter, splice in and securely tie supplemental reinforcing bars as directed by the Engineer. This might require additional removal of concrete, in order to achieve an appropriate splice length of the reinforcing steel.

Thoroughly clean the repair area of all dirt, grease, oil, or foreign matter, and remove all loose or weakened material by abrasive blasting before applying concrete repair material. Acid etch with 15% hydrochloric acid, only if approved by the Engineer. Follow acid etching by scrubbing and flushing with copious amounts of clean water. Check the cleaning using moist pH paper. Water cleaning is complete when the paper reads ten (10) or higher.

Follow all abrasive blasting with vacuum cleaning.

The time between removal of deteriorated concrete and applying concrete repair material shall not exceed 72 hours. If the time allowance exceeds 72 hours, prepare the surface at the direction of the Engineer before applying concrete repair material.

#### **APPLICATION AND SURFACE FINISH**

Apply repair material to damp surfaces only when allowed by repair material recommendations and approved by the Engineer. Prepare damp surfaces in accordance with the *Standard Specifications* and/ or repair material manufacturer's recommendations. Use a blowpipe to facilitate removal of free surface water. Only oil-free compressed air is to be used in the blowpipe.

When surface preparation is completed, mix and apply repair material in accordance with the *Standard Specifications* and/ or repair material manufacturer's recommendations.

Use aggregate that is washed, kiln-dried, and bagged. Maximum size of aggregate shall not exceed 2/3 of the minimum depth of the repair area, or 3/4 of the depth of excavation behind the reinforcing steel, whichever is smaller.

Unless otherwise required by the repair material manufacturer, apply bonding agent to all repair areas immediately prior to placing repair material.

Repair areas shall be formed unless otherwise approved by the Engineer. Form and finish all repaired areas, including chamfered edges, as close as practicable to their original "As Built" dimensions and configuration. After applying the repair material, remove excessive material and provide a smooth, flush surface, unless directed otherwise.

Cure finished Class A concrete repair material by maintaining 95% relative humidity at the repair and surrounding areas by fogging, moist curing, or other approved means for seven (7) days. Cure polymer modified concrete repair material in accordance with manufacturer's recommendations.

#### **REPAIR MATERIAL OPTIONS**

##### **(A) Polymer Modified Concrete Repair Material**

Repair material shall be polymer modified cement mortar for vertical or overhead applications and shall be suitable for applications in marine environments. Material shall

be approved for use by NCDOT. Submit repair material to the Engineer for review and approval prior to beginning the work. Color of repair material shall be concrete gray.

**(B) Class A Concrete Repair Material**

Repair material shall be Class A Portland Cement Concrete as described in Article 1000-3 of the *Standard Specifications*.

**TEMPORARY WORK PLATFORM**

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the *American Institute of Steel Construction Manual*. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited. Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

**MEASUREMENT AND PAYMENT**

*Concrete Repairs* will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete including the cost of materials, reinforcing steel, labor, tools, equipment and incidentals necessary to complete the repair work. Depth will be measured from the original outside concrete face. The Design-Build Team and Engineer will measure quantities after removal of unsound concrete and before application of repair material. Payment will also include the cost of abrasive blasting, surface cleaning and preparation, blast cleaning of reinforcing steel, placement of new reinforcing steel, cost of temporary work platform, testing of the soundness of the exposed concrete surface, furnishing and installation of repair mortar material, curing and sampling of concrete, and protection/cleaning of adjacent areas from splatter or leakage.

Reinforcing Steel that is required for the repairs will be in accordance with Section 425 of the *Standard*

*Specifications*.

Payment will be made

under:

| Pay Item         | Pay Unit   |
|------------------|------------|
| Concrete Repairs | Cubic Feet |

**SHOTCRETE REPAIRS**

(11-30-23)

**GENERAL**

The work covered by this Project Special Provision consists of removing deteriorated concrete from the structure in accordance with the limits, depth and details shown on the plans developed by the Design-Build Team, described herein and as established by the Engineer. This work also includes removing and disposing all loose debris, cleaning and repairing reinforcing steel and applying structural shotcrete.

The location and extent of repairs shown on the plans are general in nature. The Engineer shall determine the extent of removal in the field based on an evaluation of the condition of the exposed surfaces.

Any portion of the structure that is damaged from construction operations shall be repaired to the Engineer's satisfaction, at no extra cost to the Department.

**MATERIAL REQUIREMENTS**

Use prepackaged dry mix shotcrete conforming to the requirements of ASTM C1480, the applicable sections of the *Standard Specifications* and the following:

| Test Description   | Test Method                | Age (Days) | Specified Requirements |
|--|----------------------------|------------|------------------------|
| Silica Fume (%)  | ASTM C1240                 | -          | 10 (Max.)              |
| Air Content - As Shot (%)                                | ASTM C231 or<br>ASTM C457  | -          | 5 ± 2                  |
| Minimum Compressive Strength (psi)                       | ASTM C109                  | 7<br>28    | 3,000<br>5,000         |
| Minimum Bond Pull-off Strength (psi)                     | ASTM C1583<br>or ASTM C882 | 28         | 250                    |
| Rapid Chloride Permeability Tests<br>(range in coulombs) | ASTM C1202                 | -          | 100 – 1,000            |

Admixtures are not allowed unless approved by the Engineer. Store shotcrete in an environment where temperatures remain above 40°F and less than 95°F

All equipment must operate in accordance with the manufacturer's specifications and material must be placed within the recommended time.

**QUALITY CONTROL****(A) Qualification of Shotcrete Contractor**

The shotcrete Design-Build Team shall provide proof of experience by submitting a description of jobs similar in size and character that have been completed within the last five (5) years. The name,

address and telephone number of references for the submitted projects shall also be furnished. Failure to provide appropriate documentation will result in the rejection of the proposed shotcrete Design-Build Team.

#### (B) Qualification of Nozzleman

The shotcrete Design-Build Team's nozzleman shall be certified by the American Concrete Institute (ACI). Submit proof of certification to the Engineer prior to beginning repair work. The nozzleman shall maintain certification at all times while work is being performed for the Department. Failure to provide and maintain certification will result in the rejection of the proposed nozzleman.

#### TEMPORARY WORK PLATFORM

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the American Institute of Steel Construction Manual. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited. Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

#### SURFACE PREPARATION

Prior to starting the repair operation, delineate all surfaces and areas assumed to be deteriorated by visually examining and sounding the concrete surface with a hammer or other approved method. The Engineer is the sole judge in determining the limits of deterioration.

Prior to removal, introduce a shallow saw cut approximately ½" in depth around the repair area at right angles to the concrete surface. Remove all deteriorated concrete 1 inch below the reinforcing steel with a 17 lb (maximum) pneumatic hammer with points that do not exceed the width of the shank or with hand picks or chisels as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1 inch below the reinforcing steel.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel in repair areas to remove all debris, loose concrete, loose mortar, rust, scale, etc. After sandblasting examine the reinforcing steel to ensure at least 90% of the original diameter remains. If there is more than 10% reduction in the rebar diameter, splice in and securely tie supplemental reinforcing bars as directed by the Engineer.

Provide stainless welded wire fabric at each repair area larger than one square foot if the depth of the repair exceeds 2 inches from the existing, intact exterior face of the concrete member. Provide a minimum 4" x 4" - 12 gage stainless welded wire fabric unless otherwise shown on the plans. Rigidly secure the welded wire fabric to existing steel or to  $\frac{3}{16}$ " diameter stainless hook fasteners adequately spaced to prevent sagging. Encase the welded wire fabric in shotcrete a minimum depth of 1½ inches.

With the exception of overhead applications, the Design-Build Team has the option to use synthetic fiber reinforcement as an alternate to welded wire fabric if attaching welded wire fabric is impractical or if approved by the Engineer. Welded wire fabric and synthetic fiber reinforcement shall not be used in the same repair area.

Thoroughly clean the repair area of all dirt, grease, oil or foreign matter, and remove all loose or weakened material before applying shotcrete. Saturate the repair area with clean water the day before applying shotcrete. Bring the wetted surface to a saturated surface dry (SSD) condition prior to applying shotcrete and maintain this condition until the application begins. Use a blowpipe to facilitate removal of free surface water. Only oil-free compressed air is to be used in the blowpipe.

The time between removal of deteriorated concrete and applying shotcrete shall not exceed five (5) calendar days. If the time allowance exceeds (5) calendar days, prepare the surface at the direction of the Engineer before applying shotcrete.

#### **APPLICATION AND SURFACE FINISH**

Apply shotcrete only when the surface temperature of the repair area is greater than 40°F and less than 95°F. Do not apply shotcrete to frosted surfaces. Maintain shotcrete at a minimum temperature of 40°F for three (3) calendar days after placement.

Apply shotcrete in layers. The properties of the applied shotcrete determine the proper thickness of each layer or lift.

The nozzleman should hold the nozzle three (3) to four (4) feet from the surface being covered in a position that ensures the shotcrete strikes at right angles to the surface being covered without excessive impact. The nozzleman shall maintain the water amount at a practicable minimum, so the mix properly adheres to the repair area. Water content should not become high enough to cause the mix to sag or fall from vertical or inclined surfaces, or to separate in horizontal layers.

Use shooting wires or guide strips that do not entrap rebound sand. Use guide wires to provide a positive means of checking the total thickness of the shotcrete applied. Remove the guide wires prior to the final finish coat.

To avoid leaving sand pockets in the shotcrete, blow or rake off sand that rebounds and does not fall clear of the work, or which collects in pockets in the work. Do not reuse rebound material in the work

If a work stoppage longer than two (2) hours takes place on any shotcrete layer prior to the time it has been built up to required thickness, saturate the area with clean water and use a blowpipe as outlined previously, prior to continuing with the remaining shotcrete course. Do not apply shotcrete to a dry surface.

Finish all repaired areas, including chamfered edges, as close as practicable to their original dimensions and configuration, unless otherwise required to provide a minimum 2" of cover for reinforcing steel exposed during repair. If necessary to extend shotcrete repair material beyond the original member dimensions and geometry, coordinate with the Engineer to determine methods, geometry, and dimensions of the final finished surface to provide a minimum 2" of cover on reinforcing steel. Slightly build up and trim shotcrete to the final surface by cutting with the leading edge of a sharp trowel. Use a rubber float to correct any imperfections. Limit work on the finished surface to correcting imperfections caused by trowel cutting.

Immediately after bringing shotcrete surfaces to final thickness, thoroughly check for sags, bridging, and other deficiencies. Repair any imperfections at the direction of the Engineer.

Cure the completed shotcrete surface in accordance with Article 420-15(B) Water Method of the *Standard Specifications* for seven (7) calendar days. If the water method is impracticable and if approved by the Engineer, a membrane curing compound may be used in accordance with Subarticle 420-15(C) of the *Standard Specifications* at double the manufacturer's recommended coverage rate.

#### **MATERIAL TESTING & ACCEPTANCE**

Each day shotcreting takes place, the nozzleman shall shoot one 18" x 18" x 3.5" test panel in the same position as the repair work that is being done to demonstrate the shotcrete is being applied properly. Store, handle and cure the test panel in the same manner as the repaired substructure and do not disturb for the first 24 hours after shotcreting.

Approximately 72 hours after completing the final shotcrete placement, thoroughly test the surface with a hammer. At this time, the repair area should have sufficient strength for all sound sections to ring sharply. Remove and replace any unsound portions prior to the final inspection of the work. No additional compensation will be provided for removal and replacement of unsound shotcrete.

In accordance with Subarticle 1002-3(H) of the *Standard Specifications*, core three (3) 3" diameter samples from each test panel. Compressive strength values on test panels shall equal or exceed the required 28-day strength requirements. Should failures occur on the test panel cores, acceptance of the material will be determined by tests on cores from the installed work on the structure. A minimum of (3) three cores shall be taken from the area in question of the structure. The average compressive strength of the cores taken from the structure shall equal or exceed the specified strength of the shotcrete applied, and no single core shall have



strength less than 85% of the specified value. Any cores taken from the structure shall penetrate into the existing concrete at least two (2) inches. Cores shall also be inspected for delamination, sand pockets, segregation, and voids.

The adequacy of the bond between the existing concrete and the shotcrete shall be determined by direct tension bond testing, in accordance with ASTM C1583 or ASTM C882, as directed by the Engineer. A minimum bond strength of 250 psi will be accepted as satisfactory. Bond failure less than 250 psi attributable to the failure of existing concrete will not be cause for rejection. The cost of up to three passing direct tension bond tests shall be the responsibility of the Design-Build Team; additional passing pull-off tests will be the responsibility of the Department.

Any repair work failing to meet the requirements of this Project Special Provision will be rejected and the Design-Build Team shall implement a remediation plan to correct the deficiency at no additional cost to the Department. No extra payment will be provided for drilling extra cores. Patch all core holes in the repaired structure to the satisfaction of the Engineer.

#### **MEASUREMENT AND PAYMENT**

*Shotcrete Repairs* will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete including the cost of materials, labor, tools, equipment and incidentals necessary to complete the repair work. Depth will be measured from the original outside concrete face. If modifications to the dimensions and geometry are approved by the Engineer to achieve proper clearance over reinforcing steel, depth measurements will be made from the modified final outside face. The Design-Build Team and Engineer will measure quantities after removal of unsound concrete and before application of repair material. Payment will also include the cost of sandblasting, surface cleaning and preparation, cleaning of reinforcing steel, placement of new steel, cost of temporary work platform, testing for soundness and bond strength, curing of shotcrete and taking core samples from the test panels and the structure.

Payment will be made under:

| <b>Pay Item</b>   | <b>Pay Unit</b> |
|-------------------|-----------------|
| Shotcrete Repairs | Cubic Feet      |

**GROUT FOR STRUCTURES**

(12-1-17)

**GENERAL**

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

**MATERIAL REQUIREMENT**

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the *Standard Specifications*.

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

Construction loading and traffic loading shall not be allowed until the 3-day compressive strength is achieved.

**SAMPLING AND PLACEMENT**

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

**MEASUREMENT AND PAYMENT**

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

**SILICONE JOINT SEALANT FOR SLOPE PROTECTION**

(SPECIAL)

**1.0 SEALS**

Provide and install a low modulus silicone sealant (non-sag or self-leveling) and backer rod which conforms to the Standard Specifications (Subsections 1028-3 and 1028-4, respectively) and this Special Provision. Use silicone approved for use on joints in slope protection as indicated on project plans and provide a seal with a working range of minimum 50% compression and expansion. Silicone joint seal product shall be designated as approved for use on the NCDOT Approved Products List. If non-sag or self-leveling sealants are to be in contact with each other, they shall be from the same manufacturer and shall be compatible for such use.

**2.0 PREPARATION OF FORMED OR SAWED JOINT FOR SEAL INSTALLATION**

All adjacent concrete and/or slope protection repair work shall cure a minimum of 24 hours prior to seal installation.

The Engineer will thoroughly inspect the joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Design-Build Team prior to blast cleaning and installing the seal.

Clean the joints by sandblasting the joint opening to provide a firm, clean joint surface free of curing compound, loose material, and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces.

After blasting, either brush the surface with clean brushes made of hair, bristle, or fiber, blow the Surface with compressed air, or vacuum the surface until all traces of blast products and Abrasives are removed from the surface, pockets, and corners. If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast cleaned surface and remove any traces of oil, grease, or smudge deposited in the cleaning operations.

Install the backer rod and silicone sealant in the blast cleaned opening on the same day the Surface is blast cleaned.

**3.0 SEAL INSTALLATION**

Install the low modulus silicone joint sealant(s) as indicated on the plans, in accordance with the manufacturer's procedures and recommendations, and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project, to provide guidance for the proper installation of the silicone joint sealant(s).

After a joint has been sealed, remove excess joint sealer on the slope protection concrete as soon as possible. The installed system shall be watertight and will be monitored until final inspection and approval.

**4.0 MEASUREMENT AND PAYMENT**

*Silicone Joint Sealant for Slope Protection* will be measured and paid for at the contract unit price bid per linear foot and will be full compensation for furnishing all

material, including back rod, bond breaker, labor, tools, and equipment necessary for installing these seals in place and accepted.

| <b>Pay Item</b>                             | <b>Pay Unit</b> |
|---|-----------------|
| Silicone Joint Sealant for Slope Protection | Linear Feet     |

**EPOXY COATING AND DEBRIS REMOVAL**

(SPECIAL)

**GENERAL**

This work applies to all bents and end bents of all bridges throughout the project as noted in the plans. Pressure wash, clean and epoxy coat top of the all bent and end bent caps under open joints and at the expansion joints of steel girder spans after painting of all girders is concluded.

Debris removal from the top of bent caps shall be incidental to epoxy coating the top of bent caps.

Use a Type 4A flexible and moisture insensitive epoxy coating in accordance with Section 1081 of the *Standard Specifications*. Provide a Type 3 material certification in accordance with Article 106-3 showing the proposed epoxy meets Type 4A requirements.

**SURFACES**

Apply the epoxy protective coating to the top surface area, including chamfer area of bent caps under open joints and expansion joints of the steel girder spans, excluding areas under elastomeric bearings.

Thoroughly clean all dust, dirt, grease, oil, laitance and other objectionable material from the concrete surfaces to be coated. Air blast all surfaces immediately before applying the protective coating.

Use only cleaning agents preapproved by the Engineer.

**APPLICATION**

Apply epoxy protective coating only when the air temperature is at least 40°F and rising, but less than 95°F and the surface temperature of the area to be coated is at least 40°F. Remove any excess or free-standing water from the surfaces before applying the coating. Apply one coat of epoxy protective coating at a rate such that it covers between 100 and 200 sf/gal.

Under certain combinations of circumstances, the cured epoxy protective coating may develop an oily condition on the surface due to amine blush. This condition is not detrimental to the applied system.

Apply the coating so the entire designated surface of the concrete is covered and all pores are filled. To provide a uniform appearance, use the exact same material on all visible surfaces.

**BASIS OF PAYMENT**

*Epoxy Coating* will be measured and paid for by the contract unit price per square foot and shall be full compensation for furnishing all material, labor, tools and equipment necessary for

cleaning and coating the tops of bent caps. Debris removal from the top of bent caps shall be incidental to epoxy coating the top of bent caps.

| Pay Item      | Pay Unit    |
|---------------|-------------|
| Epoxy Coating | Square Feet |

## **PAINTING EXISTING STRUCTURE**

### **(11-30-23) GENERAL**

This work shall consist of furnishing all labor, equipment, and materials necessary to clean and paint the structural steel of the existing bridge, including girders or beams, diaphragms, all bearing plates, anchor bolts, nuts, and washers of the existing structure. Work includes: removal, containment and disposal of the existing paint system; preparation of the surface to be painted and applying the new paint system; a containment enclosure; and any incidentals necessary to complete the project as specified and shown on the plans developed by the Design-Build Team.

### **DESCRIPTION**

**Bridge #350143:** This bridge was built in 1960, widened in 1992, and carries I-85 NB and SB over the South Fork of the Catawba River in Gaston County. The superstructure consists of 9 simple spans and 5 continuous spans with 15 lines of varying steel beams with and without cover plates: W33x118 W36x135, W36x150, W36x152, W36x160, W36x170, W36x182, W36x194 and W36x210 beams @ various spacing with steel diaphragms. The bridge has an overall length of 896'-3" with a concrete deck and a 108'-0" total deck width. The minimum vertical clearance is 22'-10". The existing paint system is aluminum over red lead, and the estimated area to be cleaned and painted is 140,000 sq. ft.

### **OBSERVATION PERIOD**

The Design-Build Team maintains responsibility for the coating system for a 12-month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the Engineer. The Design-Build Team shall guarantee the coating system under the payment and performance bond (refer to Article 103-7 of the *Standard Specifications*). To successfully complete the observation period, the coating system shall meet the following requirements after 12 months service:

(A) No visible rust, contamination or application defect is observed in any coated area.

(B) Painted surfaces have a uniform color and gloss.

(C) Painted surfaces have an adhesion that meets an ASTM D3359, 3A rating.

Final acceptance is made only after the paint system meets the above requirements.

**SUBMITTALS**

Submit all of the following to the Engineer for review and approval before scheduling the pre- construction meeting. Allow at least two (2) weeks for the review process.

- (A) The existing paint systems include toxic substances such as red lead oxide, which are considered hazardous if improperly removed. The Design-Build Team shall be currently certified for Society for Protective Coatings (SSPC) Quality Program (QP) 2, Category A, and have successfully completed lead paint removal and field painting on similar structures within 18 months prior to this bid. Lead abatement work completed within the 18 month period shall have been completed in accordance with contract specifications, free of citation from safety or environmental agencies. Lead abatement work shall include, but not be limited to:

abrasive blasting; waste handling, storage and disposal; worker safety during lead abatement activities (fall protection, personal protective equipment (PPE), etc.); and containment. This requirement is in addition to the Design-Build Team pre-qualification requirements covered by Article 102-2 of the *Standard Specifications*.

The apparent low bidder shall submit a list of projects for which QP 2 work was performed within the last 18 months including owner contact information and submit to the Engineer a "Lead Abatement Affidavit". See link for form:

<https://www.ncdot.gov/initiatives-policies/Transportation/bridges/Documents/leadabatementaffidavit.pdf>.

- (B) Work schedule which shall be kept up to date, with a copy of the revised schedule being provided to the Engineer in a timely manner.
- (C) Containment system plans and design calculations in accordance with SSPC Guide 6, Class 2A and other project requirements, signed and sealed by a Professional Engineer licensed by the State of North Carolina.
- (D) Bridge wash water sampling and disposal plan.
- (E) Subcontractor identification.
- (F) Lighting plan for night work in accordance with Section 1413 of the *Standard Specifications*.
- (G) Traffic control plan with NCDOT certified supervisors, flaggers and traffic control devices.
- (H) Health and safety plan addressing at least the required topics as specified by the SSPC QP 1 and QP 2 program and including hazard communication, respiratory health, emergency procedures, and local hospital and treatment facilities with directions and phone numbers, disciplinary criteria for workers who violate the plan and accident

investigation. The plan shall address the following: hazardous materials, personal protective equipment, general health and safety, occupational health and environmental controls, fire protection and prevention, signs signals, and barricades, materials handling, storage, use, and disposal, hand and power tools, welding and cutting, electrical, scaffolds, fall protection, cranes, derricks, hoists, elevators, and conveyors, ladders, toxic and hazardous substances, airless injection and high pressure water jet (HPWJ).

(I) Provide the Engineer a letter of certification that all employees performing work on the project have blood lead levels that are below the Occupational Safety and Health Administration (OSHA) action level.

(J) Provide the Engineer with Competent Person qualifications and summary of work experience.

(K) Environmental Compliance Plan.

(L) Quality Control Plan (Project Specific) with quality control qualifications and summary of work experience.

(M) Bridge and Public Protection Plan (Overspray, Utilities, etc. - Project/Task Specific).

(N) Abrasive Blast Media:

(1) Product Data Sheet.

(2) Blast Media Test Reports in accordance with Article 442-4 of the *Standard Specification*.

(O) Coating Material:

(1) NCDOT HICAMS Test Reports (testing performed by NCDOT Materials and Tests Unit).

(2) Product Data Sheets.

(3) Material Safety Data Sheets.

(4) Product Specific Repair Procedures.

(5) Acceptance letters from paint manufacturers for work practices that conflict with Special Provisions and/or paint manufactures product data sheets.

#### **PRE-CONSTRUCTION MEETING**

Submittals shall be reviewed and approved by the Engineer prior to scheduling the pre-construction meeting. Allow no less than two (2) weeks for a review process. When requesting a pre-construction meeting, contact the Engineer at least seven (7) working days in advance of the desired pre-construction date. The Design-Build Team's project supervisor,



Competent Person, quality control personnel and certified traffic control supervisor shall attend the pre-construction meeting in order for the Design-Build Team and NCDOT team to establish responsibilities for various personnel during project duration and to establish realistic timeframes for problem escalation.

#### CONTAINMENT SYSTEM

Prior to performing any construction or painting operations on the structure, the Design-Build Team shall furnish the Engineer with plans and design calculations for a sufficiently designed containment system, which will provide access for any repairs on structural steel members, cleaning and surface preparations for structural steel members, and coating operations for structural steel members of the bridge. The containment system shall not be installed, and no work shall begin, until the Engineer has reviewed and approved, in writing, the submitted containment system plans and design calculations. Containment system plans and design calculations shall be prepared, sealed, and signed by a Professional Engineer licensed by the State of North Carolina. Allow a minimum of two (2) weeks for review of the containment plans and calculations.

The containment system shall meet or exceed the requirements of Class 2A containment in accordance with SSPC Guide 6. The Design-Build Team shall determine the required capacity of the containment system, which, at a minimum, shall include loads due to wind, repair materials and repair operations, equipment, and tools; however, the capacity shall not be less than that required by Federal or State regulations. Design steel members to meet the requirements of the *American Institute of Steel Construction Manual*. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. The containment system shall be constructed of materials capable of withstanding damage from any of the work required on this project and shall provide a two (2) hour resistance to fire.

In the containment system plans, describe how debris is contained and collected. Describe the type of tarpaulin, bracing materials, and the maximum designed wind load. Design wind loads shall be in accordance with the Falsework and Formwork Special Provision. Describe the dust collection system and how a negative pressure of 0.03 inches of water column is maintained inside the enclosure, while blasting operations are being conducted. Describe how the airflow inside the containment structure is designed to meet all applicable OSHA Standards. Describe how water run-off from rain will be routed by or through the enclosure. Describe how wash water will be contained and paint chips separated. Describe what physical containment will be provided during painting application to protect the public and areas not to be painted.

Drilling holes in the superstructure for the purpose of attaching the containment system is prohibited.

The Design-Build Team will be responsible for certifying the containment system has been constructed in accordance with the approved plans.

The containment system shall be cleaned after each workday.

Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

Protect non-metallic parts of bearings from blasting and painting (i.e.: Pot Bearings, Elastomeric Pads, and Disc Bearings).

#### **WASH WATER SAMPLING AND DISPOSAL PLAN**

All wash water shall be collected and sampled prior to disposal. Representative sampling and testing methodology shall conform to North Carolina Administrative Code 15A NCAC 02B.0103, "Analytical Procedures". Wash water shall be tested for pollutants listed in 15A NCAC 02B.0211(3), 15A NCAC 02T.0505(b)(1) and 15A NCAC 2T.0905(h). Depending on the test results, wash water disposal methods shall be described in the disposal plan. Wash water shall be disposed of in accordance with all current Federal and State regulations. See link for NCDOT Guidelines for Managing Bridge Wash Water:

<https://www.ncdot.gov/initiatives-policies/Transportation/bridges/Documents/WashWater.pdf>

#### **WASTE HANDLING OF PAINT AND ABRASIVES**

Comply with all Federal, State, and local regulations. Failure to comply with the regulations could result in fines and loss of qualified status with NCDOT.

Comply with the Resource Conservation and Recovery Act (RCRA - 40 CFR 261 - 265) and the Occupational Safety and Health Act (OSHA - 29 CFR 1910 - 1926) regulations for employee training, and for the handling, storage, labeling, recordkeeping, reporting, inspections and disposal of all hazardous waste generated during paint removal.

A summary of Generator Requirements is available at the following NCDOT web link, which cites the specific regulations for each Generator category:

<https://www.deq.nc.gov/waste-management/dwm/hw/guidance-document-table-documents/summary-generator-requirements-0/download?attachment>

No work shall begin until the Design-Build Team furnishes the Engineer with a written waste disposal plan. Any alternative method for handling waste shall be pre-approved by the Engineer. Example guidance on Design-Build Team's waste disposal plan content can be found in the information below:

<https://www.deq.nc.gov/waste-management/dwm/hw/guidance-document-table-documents/generator-category-guidance/download?attachment>

(A) Guidance for Small Quantity Generator (SQG) can be found at the following weblink:

<https://www.deq.nc.gov/waste-management/dwm/hw/guidance-document-table-documents/small-quantity-generator-checklist-0/download?attachment>



(C) Toxicity characteristic 40 CFR 261.24

<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-261/subpart-C/section-261.24>

(D) Analytical Methods for Characteristic Hazardous Waste Determination

<https://www.deq.nc.gov/waste-determination-test-method/download?attachment>

All sampling shall be performed in the presence of the Engineer's representative.

The Competent Person shall obtain composite samples from each barrel of the wash water and waste generated by collecting two or more portions taken at regularly spaced intervals during accumulation. Composite the portions into one sample for testing purposes. Acquire samples after 10% or before 90% of the barrel has accumulated. The intent is to provide samples that are representative of widely separated portions, but not the beginning and end of wash water or waste accumulation.

Perform sampling by passing a receptacle completely through the discharge stream or by completely diverting the discharge into a sample container. If discharge of the wash water or waste is too rapid to divert the complete discharge stream, discharge into a container or transportation unit sufficiently large to accommodate the flow and then accomplish the sampling in the same manner as described above.

Comply with the NCDEQ Hazardous Waste Compliance Manual. Record quantities of waste by weight and dates of waste generation. Waste accumulated at the project site shall be properly labeled. Until test results are received, accumulate all waste, and label as "NCDOT Bridge Paint Removal Waste – Hazardous Waste Pending Analysis" and include the date generated and contact information for the Engineer. Accumulate waste containers in an enclosed, sealed, and secured storage container protected from traffic from all directions. Obtain approval for the protection plan for these containers from the Engineer. If adequate protection cannot be obtained by use of existing guardrail, provide the necessary supplies and equipment to maintain adequate protection. The NCDEQ Hazardous Waste Compliance Manual can be found at:

<https://www.deq.nc.gov/waste-management/dwm/hw/guidance-document-table-documents/hazardous-waste-generator-compliance-manual/download?attachment>

Once test results are received and waste is characterized, label waste as either "Hazardous Waste - Pending Disposal" (for hazardous waste) or "Paint Waste - Pending Disposal" (for non-hazardous waste). All waste, hazardous or non-hazardous, requires numbered shipping manifests and/or equivalent material accountability.

Once the waste has been collected, and the quantities determined, prepare the appropriate shipping documents and manifests, and present them to the Engineer.

As of October 1, 2019, "Provisional ID Numbers" (starting with the prefix "NCP") are no longer issued by the North Carolina Hazardous Waste Section. EPA Identification (ID) Numbers are now issued for sites operating as "Short Term Generators."

(E) Short Term Generator Guidance:

<https://files.nc.gov/ncdeq/Waste%20Management/DWM/HW/8700-guidelines/Short-Term-Generators.pdf>

For questions about Short Term Generator Notification:

Andrew Minter: Administration Specialist  
Officer Hazardous Waste Section  
Phone: 919-707-8265  
Email: [Andrew.Minter@deq.nc.gov](mailto:Andrew.Minter@deq.nc.gov)  
[Laura.Alexander@deq.nc.gov](mailto:Laura.Alexander@deq.nc.gov)

Laura Alexander: Business  
Hazardous Waste Section  
Phone: 919-707-8214  
Email:

The Engineer will verify the type and quantity of hazardous waste and obtain an EPA ID number (for new sites) or update an existing EPA ID number electronically using the EPA's RCRAInfo database:

<https://frcrainfo.epa.gov/frcrainfoprodactionfsecuredflogin>

(F) Link to Quick Reference Guide for RCRAInfo Registration and Notification Submittal

<https://www.deq.nc.gov/waste-management/dwm/hw/8700-guidelines/quick-reference-guide-rcrainfo-registration-and-notification/download?attachment>

(G) Link to the more comprehensive RCRAInfo Registration and Notification Tutorial

<https://www.deq.nc.gov/waste-management/dwm/hw/hw-guidelines/rcrainfo-registration-and-electronic-notification-tutorial/download?attachment>

The hazardous waste fee will be assessed at the time the short-term EPA ID number is requested and must be paid prior to the EPA ID number being issued. When completing the RCRAInfo notification, the Hazardous Waste Section requires a valid email address for the site contact since this is the person who will be contacted to pay the fee. NOTE: The cost for waste disposal (including lab and Short-Term Generator EPA ID number) shall be included in the bid price for this contract. At the time of shipping, the Engineer will ensure the proper EPA ID number has been entered in Box 1 of the manifest as well as sign and date the manifest. The maximum on-site accumulation time shall be **90 calendar days**. All waste, whether hazardous or non-hazardous will require numbered shipping manifests. The cost for waste disposal (including lab and Short-Term Generator EPA ID number) shall be included in the bid price for this contract.

If you have site specific questions, please contact your local Hazardous Waste Section Inspector. Inspector contact information and regions are on the map at this link:

<https://www.deq.nc.gov/compliance-map-inspector/download?attachment?attachment>

Testing labs shall be certified in accordance with the National Lead Laboratory Accreditation Program (NLLAP) and/or the National Environmental Laboratory Accreditation Program (NELAP).

(H) A list of NLLAP certified laboratories may be obtained at:

<https://www.epa.gov/system/files/documents/2023-05/nllap.pdf>

(I) A list of NELAP certified laboratories may be obtained at:

<https://lams.nelac-institute.org/Search>

All test results shall be documented on the lab analysis as follows:

(J) For leachable lead:

(1) Soils/Solid/Liquid- EPA 1311/200.7/6010

Area sampling will be performed for the first two (2) days at each bridge location. The area sample will be located within five (5) feet of the containment and where the highest probability of leakage will occur (access door, etc.). Results from the area sampling will be given to the Engineer within 72 hours of sampling (excluding weekends). If the results of the samples exceed  $20 \mu\text{g}/\text{m}^3$  corrective measures shall be taken and monitoring shall be continued until two (2) consecutive sample results are less than  $20 \mu\text{g}/\text{m}^3$ .

Time Weighted Average (TWA) may suspend the work if there are visible emissions outside the containment enclosure or pump monitoring results exceeding the level of  $30 \mu\text{g}/\text{m}^3$ .

Where schools, housing and/or buildings are within 500 feet of the containment, the Design-Build Team shall perform initial Total Suspended Monitoring (TSP) Lead monitoring for the first ten (10) days of the project during abrasive blasting, vacuuming and containment removal. Additional monitoring will be required during abrasive blasting two (2) days per month thereafter. Results of the TSP monitoring at any location shall not exceed  $1.5 \mu\text{g}/\text{m}^3$ .

## **EQUIPMENT MOBILIZATION**

The equipment used in any travel lanes and paved shoulder shall be mobile equipment on wheels that has the ability to move on/off the roadway in less than 30 minutes. All work

conducted in travel lanes shall be from truck or trailer supported platforms and all equipment shall be self-propelled or attached to a tow vehicle at all times.

#### **QUALITY CONTROL INSPECTOR**

Provide a quality control (QC) inspector in accordance with the SSPC QP guidelines to ensure that all processes, preparation, blasting and coating application are in accordance with the requirements of the contract. The inspector shall have written authority to perform QC duties to include continuous improvement of all QC internal procedures. The presence of the engineer or inspector at the work site shall in no way lessen the Design-Build Team's responsibility for conformity with the contract.

#### **QUALITY ASSURANCE INSPECTOR**

The quality assurance inspector which may be a Department employee or a designated representative of the Department shall observe, document, assess, and report that the Design-Build Team is complying with all of the requirements of the contract. Inspectors employed by the Department are authorized to inspect all work performed and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The inspector is not authorized to alter or waive the requirements of the contract. Each stage in preparing the structure to be coated which includes but not limited to washing, blasting,

coating testing and inspection shall be inspected and approved by the Engineer or an authorized representative.

#### **SUBLETTING OF CONTRACT**

Only contractors certified to meet SSPC QP 2, Category A, and have successfully completed lead paint removal and field painting on all similar structures within 18 months prior to this bid are qualified for this work. Work is only sublet by approval of the Engineer.

#### **PREPARATION OF SURFACES**

Before any other surface preparation is conducted, all surfaces shall be power washed to remove dust, salts, dirt, and other contaminants. All wash water shall be contained, collected, and tested in accordance with the requirements of NCDOT Guidelines for Managing Bridge Wash Water. Obtain approval of the Engineer and allow all cleaned surfaces to dry to the touch and without standing water before beginning surface preparation or painting activities.

Surface preparation is done with materials meeting Article 1080-12 of the 2 *Standard Specifications*. No silica sand or other silica materials are permitted for use. The profile shall be between 1.0 and 3.0 mils when measured on a smooth steel surface. Conduct and document at least two (2) tests per beam/girder and two (2) tests per span of diaphragms/cross bracing.

Spread tarpaulins over all pavements and surfaces underneath equipment used for abrasive blasting as well as equipment and containers used to collect abrasive media. This requirement will be enforced during activity and inactivity of equipment.

Before the Design-Build Team departs from the work site at the end of the workday, collect all debris generated during surface preparation and all dust collector hoses, tarps or other appurtenances containing blasting residue in approved containers.

Clean a 3" x 3" area at each structure to demonstrate the specified finish, and the inspector will preserve this area by covering it with tape, plastic or some other suitable means so that it can be retained as the Dry Film Thickness (DFT) gauge adjustment standard. An acceptable alternative is for the Design-Build Team to provide a steel plate with similar properties and geometry as the substrate to be measured.

The Design-Build Team and/or quality assurance representative shall notify the Engineer of any area of corroded steel that has lost more than 50% of its original thickness.

All parts of the bridges not to be painted and the travelling public shall be protected from overspray. Submit a plan to protect all parts of bridge that are not required to be painted and a plan to protect the traveling public and surrounding environment while applying all coats of paint to a structure.

Ensure that chloride levels on the surfaces are  $7 \mu\text{g}/\text{cm}^2$  or lower using an acceptable sample method in accordance with SSPC Guide 15. The frequency of testing shall be two (2) tests per span after all surface preparation has been completed and immediately prior to painting. Select test



areas representing the greatest amount of corrosion in the span as determined by the Engineers' representative. Additional testing may be required if significant amounts of chloride are detected.

All weld splatter, slag or other surface defects resulting in a raised surface above the final paint layer shall be removed prior to application of primer coat.

#### **PAINTING OF STEEL**

Paint System 1, as specified in these Special Provisions and Article 442-8 of the *Standard Specifications*, is to be used for this work. System 1 is an inorganic zinc primer, two coats acrylic paint, and one stripe coat of acrylic paint over blast-cleaned surfaces in accordance with SSPC- SP-10 (Near White Blast). Perform all mixing operations over an impervious surface with provisions to prevent runoff to grade of any spilled material. The Design-Build Team is responsible for reporting quantities of thinner purchased as well the amounts used. No container with thinner shall be left uncovered, when not in use.

Apply 2" stripe coat, by brush or roller only, to all exposed edges of steel including fasteners before applying the finish coat. Locate the edge or corner in the approximate center of the paint stripe.

Any area where newly applied paint fails to meet the specifications shall be repaired or replaced by the Design-Build Team, at no additional cost to the Department. All repair processes must be approved by the Engineer before the repair may be made. Repaired areas shall meet the *Standard Specifications*. The Design-Build Team shall apply an additional finish coat of paint to areas where the tape adhesion test is conducted.

#### **MATERIALS**

Only paint suppliers that have a NCDOT qualified inorganic zinc primer may furnish paints for this project. All paints applied to a structure shall be from the same supplier. Before any paints are applied the Design-Build Team shall provide the Engineer a manufacturer's certification that each batch of paint meets the requirements of the applicable Section 1080 of the *Standard Specifications*.

The inspector randomly collects a one-pint sample of each paint product used on the project. Additional samples may be collected as needed to verify compliance to the specifications.

Do not expose paint materials to rain, excessive condensation, long periods of direct sunlight, or temperatures above 110°F or below 40°F. In addition, the Design-Build Team shall place a device that records the high, low, and current temperatures inside the storage location. Follow the manufacturer's storage requirements if more restrictive than the above requirements.

#### **INSPECTION**

Surface Preparation for System 1 shall be in accordance with SSPC SP-10. Any area(s) not meeting the requirements of SSPC SP-10 shall be remediated prior to application of coating.

Surface inspection is considered ready for inspection when all blast abrasive, residue and dust is removed from surfaces to be coated.

#### (A) Quality Assurance Inspection

The Design-Build Team furnishes all necessary OSHA approved apparatus such as ladders, scaffolds and platforms as required for the inspector to have reasonable and safe access to all parts of the work. The Design-Build Team illuminates the surfaces to be inspected to a minimum of 50-foot candles of light. All access points shall be illuminated to a minimum of 20-foot candles of light.

NCDOT reserves the right for ongoing Quality Assurance (QA) inspection to include but not limited to surface contamination testing, adhesion pull testing, and DFT readings as necessary to assure quality.

Inform the Engineer and the Division Safety Engineer of all scheduled and unannounced inspections from SSPC, OSHA, EPA and/or others that come on site. Furnish the Engineer a copy of all inspection reports except for reports performed by a third party and or consultant on behalf of the Design-Build Team.

#### (B) Inspection Instruments

At a minimum, furnish the following calibrated instruments and conduct the following quality control tests:

- (1) Sling Psychrometer - ASTM E337 - bulb type
- (2) Surface Temperature Thermometer
- (3) Wind Speed Indicator
- (4) Tape Profile Tester - ASTM D4417 Method C
- (5) Surface Condition Standards - SSPC VIS-1 and VIS-3
- (6) Wet Film Thickness Gage - ASTM D4414
- (7) Dry Film Thickness Gage - SSPC-PA2 Modified
- (8) Solvent Rub Test Kit - ASTM D4752
- (9) Adhesion Test Kit - ASTM D3359 Method A (Tape Test)
- (10) Adhesion Pull test - ASTM D4541
- (11) Surface Contamination Analysis Kit or (Chloride Level Test Kit) SSPC Technology Guide 15

**(C) Quality Control**

Maintain a daily quality control record in accordance with Subarticle 442-12(D) of the *Standard Specifications* and make such records available at the job site for review by the inspector and submit to the Engineer as directed. In addition to the information required on [Form M&T-610](#), submit all Dry Film Thickness (DFT) readings on a form equivalent to [Form M&T-611](#). These forms can be found at:

<https://connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx?Method=MM-05-02>

(1) Measure DFT at each spot on the attached diagram and at the required number of locations as specified below:

(a) For span members less than 45 feet; three (3) random locations along each girder in each span.

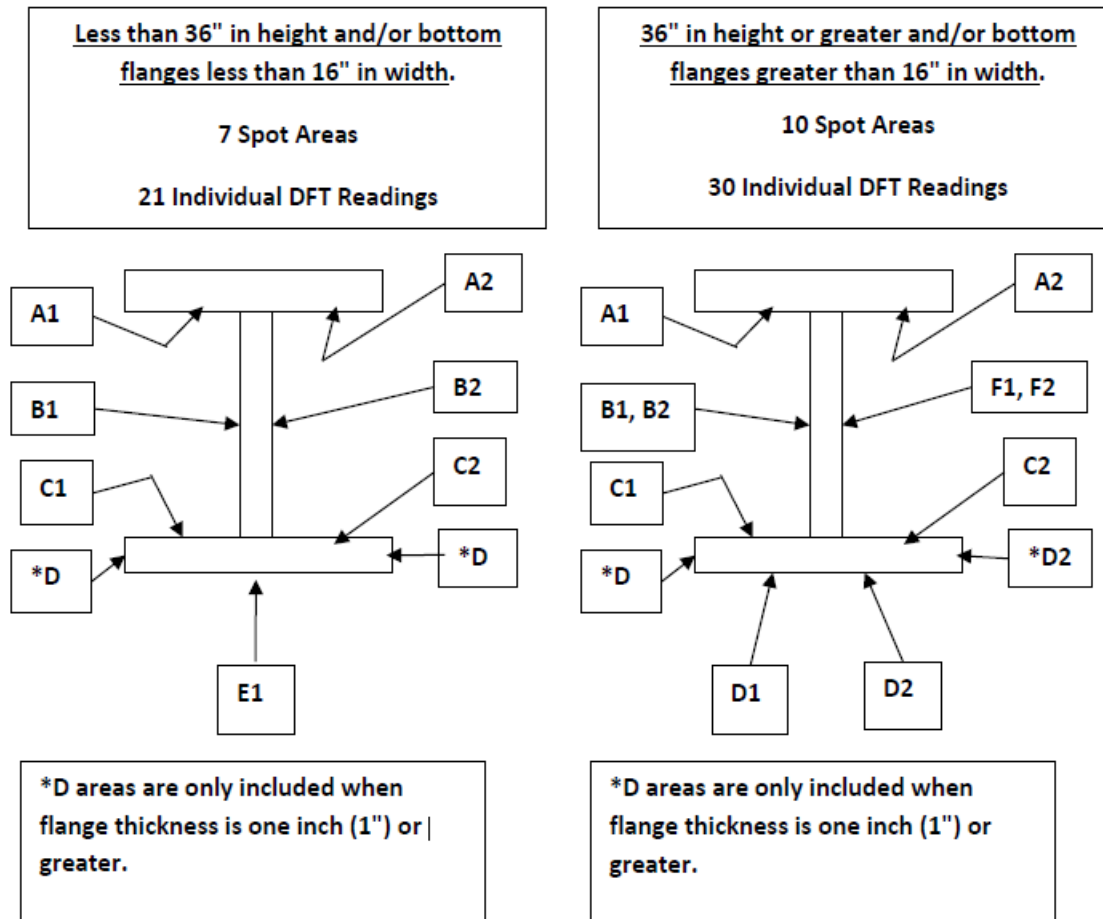
(b) For span members greater than 45 feet; add one additional location for each additional ten (10) feet in span length.

DFT measurements for the prime coat shall not be taken for record until the zinc primer has cured in accordance with ASTM D4752 (MEK Rub Test) with no less than a four

(4) resistance rating.

Stiffeners and other attachments to beams and or plate girders shall be measured at no less than five (5) random spots per span. Also, dry film thickness is measured at no less than six (6) random spots per span on diaphragms/cross frames.

Each spot is an average of three (3) to five (5) individual gage readings as defined in SSPC PA-2. No spot average shall be less than 80% of minimum DFT for each layer applied; this does not apply to stripe coat application. Spot readings that are non-conforming shall be re-assessed by performing additional spot measurements not to exceed one-foot intervals on both sides of the low areas until acceptable spot averages are obtained. These non-conforming areas shall be corrected by the Design-Build Team prior to applying successive coats.



- (2) Two (2) random adhesion tests (1 test = 3 dollies) per span are conducted on interior surfaces in accordance with ASTM D4541 (Adhesion Pull Test) after the prime coat has been properly cured in accordance with ASTM D4752 (MEK Rub Test) with no less than a four (4) resistance rating and will be touched up by the Design-Build Team. The required minimum average adhesion is 400 psi.
- (3) Cure of the intermediate and stripe coats shall be accessed by using the thumb test in accordance with ASTM D1640 (Curing Formation Test) prior to the application of any successive layers of paint.
- (4) One random Cut Tape adhesion test per span is conducted in accordance with ASTM D3359 (X-Cut Tape Test) on interior surface after the finish coat is cured. Repair areas shall be properly tapered and touched up by the Design-Build Team.

**SAFETY AND ENVIRONMENTAL COMPLIANCE PLANS**

Personnel access boundaries are delineated for each work site using signs, tape, cones, or other approved means. Submit copies of safety and environmental compliance plans that comply with SSPC QP 2 Certification requirements.

**HEALTH AND SAFETY RESPONSIBILITIES**

This project may involve toxic metals such as arsenic, lead, cadmium and hexavalent chromium. It is the Design-Build Team's responsibility to test for toxic metals and if found, comply with the OSHA regulations, which may include medical testing.

Ensure a "Competent Person" as defined in OSHA 29 CFR 1926.62; one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them; is on site during all surface preparation activities and monitors the effectiveness of containment, dust collection systems and waste sampling. Before any work begins, provide a written summary of the Competent Person's safety training.

Comply with Subarticle 442-14(B) of the *Standard Specifications*.

Comply with Subarticle 442-14(D) of the *Standard Specifications*. Ensure employee blood sampling test results are less than 50 micrograms per deciliter. Remove employees with a blood sampling test of 50 or more micrograms per deciliter from work activities involving any lead exposure.

An employee who has been removed with a blood level of 50 micrograms per deciliter or more shall have two (2) consecutive blood sampling tests spaced one week apart indicating that the employee's blood lead level is at or below 40 micrograms per deciliter before returning to work activities involving any lead exposure.

All OSHA recordable accidents that occur during the project duration are to be reported to the Engineer within twenty-four (24) hours of occurrence. In addition, for accidents that involve civilians or property damage that occurs within the work zone the Division Safety Engineer shall be notified immediately.

Prior to blasting operations, the Design-Build Team shall have an operational OSHA approved hand wash station at each bridge location and a decontamination trailer at each bridge or between bridges unless the work is on the roadway, or the Design-Build Team shall show reason why it is not feasible to do so and provide an alternative site as approved by the Engineer. The Design-Build Team shall assure that all employees whose airborne exposure to lead is above the Permissible Exposure Limit (PEL) shall shower at the end of their work shift.

**STORAGE OF PAINT AND EQUIPMENT**

Provide a location for materials, equipment, and waste storage. Spread tarpaulins over all pavements and surfaces underneath equipment used for abrasive recycling and other waste handling equipment or containers. All land and or lease agreements that involve private property shall disclose to the property owner that heavy metals may be present on the Design-Build Team's equipment. Prior to storing the Design-Build Team's equipment on private property, provide a notarized written consent signed by the landowner received by the Engineer at least forty-eight (48) hours before using property. All storage of paint, solvents, and other materials applied to structures shall be stored in accordance with Subarticle 442-9(C) of the *Standard Specifications* or the manufacturers' requirements. The more restrictive requirements will apply.

**UTILITIES**

Protect all utility lines or mains that may be supported on, under, or adjacent to bridge work sites from damage and paint overspray.

**MEASUREMENT AND PAYMENT**

The cost of inspection, surface preparation, and repainting the existing structure is included in the lump sum price bid for *Cleaning and Repainting of Bridge #350143*. This price is full compensation for furnishing all inspection equipment, all paint, cleaning abrasives, cleaning solvents and all other materials; preparing and cleaning surfaces to be painted; applying paint in the field; protecting work area, traffic and property; and furnishing blast cleaning equipment, paint spraying equipment, brushes, rollers, any other hand or power tools and any other equipment.

*Pollution Control* will be paid at the contract lump sum price which will be full compensation for all collection, handling, storage, air monitoring, and disposal of debris and wash water, all personal protective equipment, and all personal hygiene requirements, and all equipment, material and labor necessary for the daily collection of the blast debris into specified containers; and any measures necessary to ensure conformance to all safety and environmental regulations as directed by the Engineer.

*Painting Containment for Bridge #350143* will be paid at the lump sum contract price and will be full compensation for the design, materials, installation, maintenance, and removal of the containment system.

Payment will be made under:

| Pay Item                                  | Pay Unit |
|---|----------|
| Cleaning and Repainting of Bridge #350143 | Lump Sum |
| Pollution Control                         | Lump Sum |
| Painting Containment for Bridge #350143   | Lump Sum |

**MISCELLANEOUS HARDWARE REPAIRS**

(SPECIAL)

**DESCRIPTION**

This work consists of furnishing and installing missing steel hardware throughout the structure at locations directed by the Engineer. All missing connection bolts/hardware should be replaced if broken or missing. This does not include bearing anchor bolts.

The Design-Build Team shall be responsible for sizing all connection hardware prior to ordering material.

All material shall be the minimum requirements for new hardware set forth by the Standard Specifications.

All installation requirements shall be set forth by the Standard Specifications.

**MEASUREMENT AND PAYMENT**

No direct payment will be made for furnishing and installing broken or missing miscellaneous hardware throughout the structure. All items and incidentals needed to complete the work shall be incidental to the various pay items for the contract.

**DRIFT REMOVAL**

(SPECIAL)

**DESCRIPTION**

The Design-Build Team shall remove all drift and debris located around the bridge, as well as located in or around the water as per the plans or as directed by the Engineer.

The Design-Build Team shall notify the Engineer of any discoveries, such as scour holes or bridge damage, as soon as they are discovered.

The Design-Build Team shall contain all drift and debris within the work area, so as not to allow them to float downstream of the work area.

The Design-Build Team shall removal all drift and debris materials from the project site and properly dispose of them.

The Design-Build Team shall be responsible for drift and debris removal for the duration of the project.

The Design-Build Team shall access the drift from in-water barges and boats, but no access to the drift will be allowed from the stream banks or the bridge deck, unless otherwise allowed by the Engineer.

## **SUBMITTALS**

The Design-Build Team shall submit to the Engineer for approval the proposed method(s) for drift and debris removal prior to starting work.

## **BASIS OF PAYMENT**

Drift Removal will be measured and paid for at the contract lump sum bid price and will be full compensation for furnishing all material, labor, tools, and equipment necessary for removal and disposal as accepted.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| Drift Removal   | Lump Sum        |

## **MAINTENANCE AND PROTECTION OF TRAFFIC**

(SPECIA

### **L) BENEATH STRUCTURE**

#### **1.0 GENERAL**

Maintain traffic on Willow Drive and Dickson Rd as shown in Traffic Control Plans or as directed by the Engineer. The maintenance of traffic shall be coordinated closely with the design build project and proposed work.

Provide a minimum temporary vertical clearance of 16'-6" at all times during construction.

Provide a minimum temporary horizontal clearance of 14'-0" at all times during construction.

The Design-Build Team shall submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Design-Build Team of the responsibility for the safety of the method or equipment.

Access must be maintained to the "Coats North America (PHAR HP) plant and the "South Fork Trail and Blueway Access" at all times during construction or as otherwise approved by the Engineer.



**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Design-Build Team means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**BRIDGE JACKING**

(SPECIAL)

**DESCRIPTION**

Bridge jacking at end bents and interior bents is to facilitate beam or bent cap repairs and to replace and/ or reset bearings, as necessary. This work shall consist of furnishing all engineering, labor, equipment, and materials necessary for construction and subsequent removal of jacking support system, including jacks, jack supports, shims and all necessary blocking. Included under this item shall be all work to raise and support the existing structure as specified on the plans and as noted herein.

**UTILITY COORDINATION**

Utility owners with active utilities on the bridge shall be notified by the Design-Build Team of the jacking operation 30 days before the operation begins.

**SCOPE OF WORK**

Work for bridge jacking includes calculating existing and applied bridge loads, designing proper strength jacking scheme, evaluating stresses imposed on the bridge members, setting blocking and jacks, jacking bridge girders, mechanically locking jacks, and lowering bridge spans onto bearing assemblies.

Submit calculations, working drawings, and jacking procedure to the Engineer for review and approval prior to the start of work. Calculations and jacking procedure shall account for all loads expected while bridge is jacked or temporarily supported. Working drawings and all calculations (for determination of all applied loads, for design of the jacking scheme, to evaluate stresses imposed on the bridge members, and any other necessary calculations) for the required jacking scheme shall be sealed by an engineer licensed in the State of North Carolina. Included in the submittal, the Design-Build Team shall submit all relevant information about the jacking system to be used.

Prior to bridge jacking, complete all diaphragm modifications necessary at the location where jacking is to occur. If a span connected to an end bent is to be jacked, ensure the curtain wall is either clear of the girders, or fully free to move with the jacked span prior to jacking. Lock jacks and install blocking while the bridge is in the raised condition. While in the raised condition, follow bridge plans for any work that may be required. After all repairs requiring bridge jacking are completed, lower the bridge onto the bearing assemblies. Complete repair work, as needed.

Unless otherwise allowed by the Engineer, all bridge jacking operations shall be complete before new deck overlay or deck joints and seals are placed on the existing structure.

Bridge jacking will be designated as one of two jacking arrangements, as

follows: Type I

Type I Bridge Jacking shall be applicable for jacking at individual beam or bearing locations. On a particular bridge bent or end bent, there might be more than one Type I Bridge Jacking. When jacking individual beam or bearing locations, all adjacent bearings of beams not being jacked may

be loosened to decrease the resistance of the deck slab during jacking. The maximum differential between adjacent beams that are being jacked is 1/8". Should the jacking of an individual beam require the jacking of adjacent beams to reduce stresses or damage in the bridge, the jacking of the individual beam and adjacent beams shall be considered one Type I Bridge Jacking. All bearings loosened shall be tightened back after repair operations are completed and the jacks and blocking have been removed.

#### Type II

Type II Bridge Jacking shall be applicable for jacking an entire span end (i.e., all beams at one time) on a bent or end bent.

#### **BASIS OF PAYMENT**

Payment will be made at the price bid for each set-up to complete *Type I Bridge Jacking Bridge No. 350143* or *Type II Bridge Jacking Bridge No. 350143* as shown in the contract plans. The price per each jacking set-up Type required will be full compensation for designing proper strength jacking scheme (calculations, working drawings, and jacking procedure), all materials, equipment, tools, labor, and incidentals necessary to complete the work of this scope, including any jacking frames, jacking plates, and concrete repair required due to jacking operations.

Payment will be made under:

| <b>Pay Item</b>                          | <b>Pay Unit</b> |
|--|-----------------|
| Type I Bridge Jacking Bridge No. 350143  | Each            |
| Type II Bridge Jacking Bridge No. 350143 | Each            |

**BRIDGE DECK OVERLAY AND SURFACE REPAIRS**  
**(SPECIAL)****DESCRIPTION**

This Project Special Provision addresses the surface preparation and repair activities required to repair deck and joint header areas as specified in the plans. Unless specifically mentioned below, all requirements specified for the bridge deck are also required for the approach slabs.

Work includes: removal of unsound and sound bridge deck overlay and concrete and existing failed patches in deck repair areas; preparation of repair areas prior to placement of Polymer Concrete (PC) repair material; applying primer, proportioning, mixing, placing, finishing, and curing of PC repair material; and any incidentals necessary to complete bridge deck overlay and surface repairs, as specified or as shown on the plans.

**EQUIPMENT**

All equipment for cleaning the existing concrete surface and mixing and applying the overlay system shall be in accordance with the System Provider's recommendations, as approved by the Engineer prior to commencement of any work:

- (A) Equipment capable of sawing concrete to the specified plan depth.
- (B) Power driven hand tools for removal of unsound concrete are required that meet the following requirements:
  - (1) Pneumatic hammers weighing a nominal 15 lbs. or less.
  - (2) Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
- (C) Hand tools, such as hammers and chisels, for removal of final particles of unsound concrete.
- (D) Shotblasting and sandblasting equipment to adequately prepare the bridge deck substrate, as required in this special provision. Provide equipment to supply oil-free and moisture-free compressed air for final surface preparation.
- (E) Vacuum capable of picking up dust and other loose material from prepared deck surface.
- (F) Equipment to supply oil-free and moisture-free compressed air for final surface preparation.

**MANAGEMENT AND DISPOSAL OF CONCRETE DEBRIS**

All concrete debris shall become the property of the Design-Build Team. The Design-Build Team shall be responsible for disposing of all debris generated by shotblasting, sandblasting, and any other surface preparation operations, in compliance with applicable regulations concerning such disposal.

All costs associated with management and disposal of all debris shall be included in the payment of other items.

**SURFACE PREPARATION (SP) PLAN SUBMITTAL**

Prior to beginning surface preparation activities, the Design-Build Team shall submit for review and approval the Surface Preparation (SP) Plan. The SP Plan shall detail the type of equipment that is intended to be used and the means by which the Design-Build Team will achieve the following requirements:

(A) Estimate depth of reinforcing steel.

(B) Demolition of existing bridge deck concrete and overlay to depth required.

The SP Plan shall also include a schedule showing lane closures with estimated amount of bridge deck to be demolished and prepared, anticipated areas of Class II/III to be repaired, and PC to be placed within that lane closure time.

**SURFACE PREPARATION**

Prior to any construction, take the necessary precautions to ensure debris from bridge deck preparation and repairs is not allowed to fall below the bridge deck.

Remove all existing loose, disintegrated, unsound, or contaminated concrete and overlay to the limits shown on the plans with the following requirements.

During surface preparation, precaution shall be taken to assure that traffic is protected from rebound, dust, and construction activities. Appropriate shielding shall be provided as required and directed by the Engineer. During surface preparation, the Design-Build Team shall provide suitable coverings, as needed to protect all exposed areas not to receive overlay or repairs, such as curbs, sidewalks, parapets, etc. All damage or defacement resulting from surface preparation shall be repaired to the Engineer's satisfaction at no additional cost to the Department.

(A) Sealing of Bridge Deck: Seal all expansion joints subject to run-off water from the demolition, shotblasting, sandblasting, preparation, and PC repair material placement process with material approved by the Engineer, prior to beginning any demolition. The expansion joints shall remain sealed until it has been determined that water and materials from the deck demolition, preparation, and repair placement operations cannot be

discharged through them any longer. Take all steps necessary to eliminate the flow of water or materials through the expansion joints, and any other locations water or materials could leak from the deck.

All deck drains in the immediate work area and other sections of the bridge affected by the work being performed shall be sealed prior to beginning deck repair work. Drains shall remain sealed until it has been determined that water and materials from the deck demolition, preparation, and repair placement operations cannot be discharged through them any longer.

- (B) Class II Surface Preparation (Partial Depth): At locations specified on the plans or identified by the Engineer for Class II Surface Preparation, remove by chipping with hand tools, or other methods approved by the Engineer, all unsound patches and unsound concrete and as necessary as described in this special provision or in the plans.

Provide a 1" deep saw cut around the perimeter of areas noted for bridge deck or patch removal. Remove, using the type of tools listed above, all concrete or patch material within the sawcut to a minimum depth of 1" and as necessary to remove unsound concrete. All loose and unsound concrete or patch material shall be removed.

Properly dispose of the removed concrete, clean, repair, or replace rusted or loose reinforcing steel, and, in accordance with this special provision, thoroughly clean the newly exposed substrate surface to be free of all grease, oil, curing compounds, acids, dirt, or loose debris. Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

In overhangs, removing concrete areas of less than 0.60 ft<sup>2</sup>/ft length of bridge without overhang support is permitted unless the Engineer directs otherwise. Overhang support is required for areas removed greater than 0.60 ft<sup>2</sup>/ft length of bridge. Submit details of overhang support to the Engineer for approval prior to beginning the work.

- (C) Class III Surface Preparation (Full Depth): At locations specified on the plans or identified by the Engineer for Class III Surface Preparation, remove the concrete by chipping with hand tools the full depth of slab. Dispose of the removed concrete, clean, repair or replace damaged reinforcing steel and thoroughly clean the newly exposed surface. Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

For areas of less than 3 ft<sup>2</sup>, suspending forms from existing reinforcing steel using wire ties is permitted. For larger areas, support forms by blocking from the beam flanges, or other approved method.

Overhang support is required for full depth removal adjacent to bridge rails. Submit details of overhang support to the Engineer for approval prior to beginning the work.

- (D) Preparation of Reinforcing Steel: Remove concrete without cutting or damaging existing steel unless otherwise noted in the plans. Clean, repair, or replace rusted or loose

reinforcing steel. Damaged reinforcing steel, such as bars with nicks deeper than 20% of the bar diameter, shall be repaired or replaced. Reinforcing steel which has a cross section reduced to 75% or less shall be replaced with new reinforcing steel of similar cross section area. Replacement bars shall be Grade 60 and meet the material requirements of Section 1070 of the *Standard Specifications*.

Replacement bars shall be spliced to existing bars using either minimum 30 bar diameter lap splices to existing steel with 100% cross sectional area or approved mechanical connectors.

For reinforcing steel left unsupported by the concrete removal process, support and protect the exposed reinforcing steel against displacement and damage from loads, such as those caused by removal equipment and delivery buggies. All reinforcing steel damaged or dislodged by these operations shall be replaced with bars of the same size at the Design-Build Team's expense.

Reinforcing steel exposed and satisfactorily cleaned and prepared will not require additional cleaning, if encased in concrete within seven (7) days. Rebar exposed for more than seven (7) days shall be satisfactorily cleaned and prepared, prior to placement of the new concrete. The satisfactory cleanliness and preparation of the reinforcing steel shall be determined by the Engineer.

When large areas of the deck on composite bridges are removed resulting in the debonding of the primary reinforcing bars, the removal shall be performed in stages to comply with the construction sequence shown on the plans or as directed by the Engineer.

(E) Surface Cleaning: The surface of concrete substrate and repaired areas shall be prepared for application of the repair material by abrasive sandblasting in order to remove all existing grease, slurry, oils, paint, dirt, striping, curing compound, rust, membrane, weak surface mortar, or any other contaminants that could interfere with the proper adhesion of the repair material. The final prepared surface shall adhere to the following requirements:

(1) If expansion joints are not being replaced or have been replaced prior to sandblasting, they shall be protected from damage from the shotblasting operation. Deck drains and areas of curb or railing above the proposed surface shall be protected from the sandblasting operation.

(2) The areas to receive repair material shall be cleaned by abrasive sandblasting. Do not begin sandblasting until all chipping or material removal operations are completed and the deck is dry. All contaminants shall be picked up and stored in the vacuum unit and no dust shall be created during the blasting operation that will obstruct the view of motorists in adjacent roadways. The number of passes of the sandblasting unit shall be adjusted, so as to result in all weak or loose surface mortar being removed, aggregates within the concrete being exposed, and open pores in the concrete exposed, as well as a visible

change in the concrete color. Cleaned surfaces shall not be exposed to vehicular traffic unless approved by the Engineer. If the repair area becomes contaminated before placing the repair material, the Design-Build Team shall abrasive sandblast the contaminated areas to the satisfaction of the Engineer at no additional cost to the Department.

- (3) Prior to the repair material placement, any loose particles shall be removed by magnets, oil free compressed air, and vacuuming, such that no trapped particles remain. Power washing will not be allowed.
- (4) The areas to be overlaid shall be blown off with oil and moisture free compressed air just prior to placement of the primer and shall be completely dry.
- (5) Cleaning methods other than those detailed by specification may be suggested by the PC System Provider and approved by the Engineer.
- (6) All steel surfaces that will be in contact with the repair material shall be cleaned in accordance with Structural Steel Paint Council (SSPC) Surface Preparation (SP) No. 10, Near-White Blast Cleaning, except that wet blasting methods shall not be allowed.

(F) Safety: Provide a containment system for handling expected and unexpected blow through of the deck. The containment system shall retain runoff water and debris and protect the area under the bridge deck. The Design-Build Team shall be responsible for any injury or damage caused by these operations. The containment system shall remain in place until the concrete has been cast and attained minimum strength.

Provide adequate lighting when performing deck preparation activities at night. Submit a lighting plan to the Engineer for approval prior to beginning work.

(G) Concrete Deck Repair: Repair and fill the properly prepared repair areas of the existing bridge concrete deck or overlay with PC repair material. For concrete deck repairs with PC:

- (1) Removal and surface preparation of the repair area shall be in accordance with and shall be paid for under pay items in this special provision.
- (2) Materials, equipment, priming, placement, finishing, and curing of PC repair materials used for concrete deck repairs shall meet the requirements of Polymer Concrete Bridge Deck and Overlay Repair special provision.

Unless otherwise indicated, all repairs shall be placed and finished to match the existing bridge deck grade elevation.



**MEASUREMENT AND PAYMENT**

*Class II Surface Preparation* will be measured and paid for at the contract unit price per square yard and will be full compensation for Class II (partial depth) deck preparation where required by the plans. The cost will also include removal and disposal of unsound and contaminated concrete; removal of all existing patches, as necessary; cleaning and preparation of the substrate material; cleaning, repairing, or replacing of reinforcing steel; priming, proportioning, mixing, placing, finishing, and curing of PC repair material; and all materials, labor, tools, equipment and incidentals necessary to complete the work.

*Class III Surface Preparation* will be measured and paid for at the contract unit price per square yard and will be full compensation for Class III (full depth) deck preparation and repair where required by the plans. The cost will also include removal and disposal of unsound and contaminated concrete; removal of all existing patches, as necessary; cleaning and preparation of the substrate material; cleaning, repairing, or replacing of reinforcing steel; priming, proportioning, mixing, placing, finishing, and curing of PC repair material; and all materials, labor, tools, equipment and incidentals necessary to complete the work.

Reinforcing Steel that is required for the repairs will be in accordance with Section 425 of the *Standard Specifications*.

Payment will be made under:

| <b><u>Pay Item</u></b>        | <b><u>Pay Unit</u></b> |
|-------------------------------|------------------------|
| Class II Surface Preparation  | Square Yard            |
| Class III Surface Preparation | Square Yard            |

**POLYMER CONCRETE BRIDGE DECK AND OVERLAY REPAIR MATERIAL**  
 (SPECIAL)
**DESCRIPTION**

This work consists of furnishing and placing a Polymer Concrete (PC) concrete bridge deck and overlay repair material with a resin primer on concrete surfaces. The surface of the concrete shall be prepared in accordance with the Bridge Deck Overlay and Surface Repairs special provision and the PC concrete bridge deck and overlay repair material (PC repair material) shall be proportioned, mixed, applied, and finished in accordance with this special provision in conformity with the lines, grades, thickness, and typical cross-sections shown on the plans developed by the Design-Build Team or as approved by the Engineer. Unless specifically mentioned below, all requirements specified for the bridge deck are also required for the approach slabs.

If the bridge deck has an existing PC overlay in place, the proposed PC repair material shall be the same as the existing PC overlay material. If the Design-Build Team elects to provide a PC repair material other than the existing PC overlay material, he shall submit for review

and approval information (testing, etc.) indicating that the proposed PC repair material is compatible with and will appropriately bond to the existing PC overlay material. The Design-Build Team shall select one of the PC repair material systems below:

(A) Polyester Polymer Concrete (PPC) with a High Molecular Weight Methacrylate (HMWM) resin primer.

(B) Epoxy Polymer Concrete (EPC) with an epoxy resin primer.

Work includes: mixing and placement of resin primer; proportioning, mixing, placing, finishing, and curing of PC repair material ; and any incidentals necessary to complete the project as specified or as shown on the plans developed by the Design-Build Team.

The System Provider is the manufacturer that will provide the PC system for the PC repair material. The System shall include the necessary and appropriate PC components, as well as the necessary and appropriate resin primer components. Design-Build Team shall not change System Provider during project, without approval from the Engineer.

## **QUALIFICATIONS AND SUBMITTALS**

The Design-Build Team shall submit the following requested items and any other relevant documents at least two (2) weeks prior to the PC Repair Material Pre-placement Conference. These submittals are for approval and shall be directed to the Engineer.

(A) PC Repair Material System: The Design-Build Team shall submit two (2) copies of the System Provider's material information, written installation instructions, safety data sheets, and independent test results for approval.

(B) System Provider Qualifications: The Design-Build Team shall install a PC system with all components provided through a single System Provider with documented experience successfully supplying at least five (5) PC repair or overlay projects of similar size and scope installed within the past five (5) years. The Design-Build Team shall submit documentation of the System Provider's project experience including the following:

(1) Project Location

(2) Owner Agency

(3) Project construction date

(4) PC repair or overlay quantities

(5) Reference name and contact information for owner representative

System Provider Technical Representative Qualifications: The System Provider Technical Representative shall be an employee of the PC system manufacturer, have a minimum of

five (5) successful PC repair material projects within the last five (5) years, and be completely competent in all aspects of the work, including surface preparation, mixing, placement, curing, and testing of the PC system. The Technical Representative shall have experience on a minimum of five (5) successful projects of similar size and scope. The Design-Build Team shall submit documentation of the System Provider Technical Representative's experience including the following:

- (1) Years of Experience with PC systems
- (2) Project location
- (3) Project construction date
- (4) PC repair or overlay quantities
- (5) Reference name and contact information for owner representative

The Technical Representative shall be available on-site during surface preparation and PC repair material placement, for a minimum of two (2) days per project, to give the installer advice and guidance on the installation of the PC system. This includes, but is not limited to: deck concrete surface preparation, PC materials, PC application, PC curing, or any time there are questions or issues that may arise. The Technical Representative shall be on site for the first PC placement and shall remain on site until the Engineer is satisfied with the PC preparation, placement, and finishing operations.

(C) PC Placement Plan: The Design-Build Team shall submit a PC Placement Plan that includes the following:

- (1) Schedule of PC repair work and testing for each bridge.
- (2) Anticipated concrete deck repair locations and repair method.
- (3) Staging plan describing PC repair work placement sequence including:
  - (a) Sequence of placement.
  - (b) Placement sizes.
- (4) Description of equipment used for:
  - (a) Surface preparation, including hammers and sandblasting.
  - (b) Applying resin primer.
  - (c) Measuring, mixing, placing, and finishing the PC repair material.

- (d) Applying surface finish sand/fine aggregate.
- (5) Method of protecting and finishing inlets and bridge drains.
- (6) Method for isolating expansion joints.
- (7) Method for measuring and maintaining PC repair material thickness and profile.
- (8) Cure time for PC repair material.
- (9) Storage and handling of resin primer and PC components.
- (10) Procedure for disposal of excess resin primer, PC materials, and containers.
- (11) Procedure for cleanup of mixing and placement equipment.
- (E) Equipment: If a continuous automated mixer is to be used for mixing the Polymer Concrete, the Design-Build Team shall submit documentation of current certification that mixing equipment has been calibrated (Caltrans California test CT 109 or similar accepted).

## **MATERIALS**

The Polymer Concrete shall consist of a resin binder and aggregate as specified below. It shall also include a compatible primer which when mixed with other specified ingredients and applied as specified herein, is capable of producing a Polymer Concrete meeting the requirements of this specification.

- (1) Verification. The Design-Build Team shall submit a Certified Test Report from independent labs for all of the materials associated with the PC repair material in accordance with this special provision.
- (2) Packaging and Shipment. All components shall be shipped in strong, substantial containers, bearing the manufacturer's label specifying batch/lot number, brand name, and quantity. If bulk resin is to be used, the Design-Build Team shall notify the Engineer in writing ten (10) working days prior to the delivery of the bulk resin to the job site. Bulk resin is any resin that is stored in containers in excess of 55 gallons.
- (3) Sampling. NCDOT reserves the right to retain and test samples of components of the PC repair material system. This includes requiring submittal of samples prior to the first installation or on-site sampling during construction.

Only use materials that are specified for the selected PC repair material system. Mixing materials from different PC repair material systems shall not be permitted.

(A) **Polyester Polymer Concrete (PPC)** materials shall consist of a polyester resin binder, a High Molecular Weight Methacrylate (HMWM) primer, and aggregate.

(1) **Polyester Resin Binder:** Polyester resin binder shall have the following properties:

- (a) Be an unsaturated isophthalic polyester-styrene co-polymer. The resin content shall be 12% +/-1% of the weight of the dry aggregate.
- (b) Contain at least 1 percent by weight gamma-methacryloxypropyltrimethoxysilane, an organosilane ester silane coupler.
- (c) Be used with a promoter that is compatible with suitable methyl ethyl ketone peroxide and cumene hydroperoxide initiators.
- (d) Meet the required values for the material properties shown in Table 1, below.

Accelerators or inhibitors may be required to achieve proper setting time of PPC. They shall be used as recommended by the PC repair material System Provider.

**Table 1**  
**POLYESTER RESIN BINDER PROPERTIES (PPC ONLY)**  
(Each lot sent to job shall be tested)

| Property   | Test Method | Requirement   |
|--|-------------|---|
| Viscosity*   | ASTM D 2196 | 75 – 200 cps (RVT No.1 Spindle, 20 RPM at 77 °F)  |
| Specific Gravity*                                  | ASTM D 1475 | 1.05 to 1.10 at 77 °F   |
| Elongation   | ASTM D 638  | 35 percent, minimum Type I specimen, thickness 0.25 ± 0.03” at Rate = 0.45 inch/minute. |
|  | ASTM D 618  | Sample Conditioning: 18/25/50+5/70  |
| Tensile Strength                                   | ASTM D 638  | 2,500 psi, minimum Type I specimen, thickness 0.25 ± 0.03” at Rate = 0.45 inch/minute.  |
|  | ASTM D 618  | Sample Conditioning: 18/25/50+5/70  |
| * Test shall be performed before adding initiator. |             |   |

(2) **High Molecular Weight Methacrylate (HMWM) Primer:** Primer for the substrate concrete surface shall be a wax-free, low odor, high molecular weight methacrylate primer, and consist of a resin, initiator, and promoter. The primer shall conform to requirements indicated in Table 2, below, and all components shall be supplied by the System Provider.

Initiator for the methacrylate resin shall consist of a metal drier and peroxide. If supplied separately from the resin, the metal drier shall not be mixed with the peroxide directly; a VIOLENT EXOTHERMIC REACTION will occur. The containers and measuring devices shall not be stored in a manner that allows leakage or spilling to contact the containers or materials of the other.

**Table 2**  
**HMWM PRIMER PROPERTIES (PPC ONLY)**  
**(Tested yearly)**

| Property  | Test Method                 | Requirement  |
|---|-----------------------------|--|
| Viscosity**   | ASTM D 2196                 | 25 cps maximum (Brookfield RVT with UL adapter, 50 RPM at 77 °F)   |
| Volatile Content**                                  | ASTM D 2369                 | 30 percent, maximum  |
| Specific Gravity**                                  | ASTM D 1475                 | 0.90 minimum at 77 °F  |
| Flash Point   | ASTM D 3278                 | 180 °F minimum   |
| Vapor Pressure**                                    | ASTM D 323                  | 1.0 mm Hg, maximum at 77 °F  |
| PCC Saturated Surface-Dry Bond Strength (Adhesive)  | California Test 551, part 5 | 700 psi, minimum at 24 hours and 70 ± 1°F (with PPC at 12% resin content by weight of the dry aggregate), primed surface |
| **Test shall be performed before initiator is added |                             |  |

(B) Epoxy Polymer Concrete (EPC) materials shall consist of an epoxy resin binder/primer and aggregate.

(1) Epoxy Resin Binder/Primer: Epoxy resin binder/primer shall have the following properties:

- (a) Be a low viscosity epoxy resin. The resin content shall be 12% +/-1% of the weight of the dry aggregate.
- (b) Be 100% solids epoxy.
- (c) Be a two-part, low modulus epoxy resin.
- (d) Be moisture insensitive.
- (e) Meet the required values for the material properties shown in Table 3, below.

Accelerators or inhibitors may not be used to achieve proper setting time of EPC.

**Table 3**  
**EPOXY RESIN BINDER/PRIMER PROPERTIES (EPC ONLY)**  
**(Each lot sent to job shall be tested)**

| Property         | Test Method | Requirement   |
|------------------|-------------|---|
| Viscosity        | ASTM D 2196 | 75 – 150 cps (RVT No.1 Spindle, 20 RPM at 77 °F)  |
| Specific Gravity | ASTM D 1475 | 1.05 to 1.08 at 77 °F   |
| Elongation       | ASTM D 638  | 35 percent, minimum Type I specimen, thickness 0.25 ± 0.03” at Rate = 0.45 inch/minute. |
|                  | ASTM D 618  | Sample Conditioning: 18/25/50+5/70  |
| Tensile Strength | ASTM D 638  | 2,800 psi, minimum Type I specimen, thickness 0.25 ± 0.03” at Rate = 0.45 inch/minute.  |
|                  | ASTM D 618  | Sample Conditioning: 18/25/50+5/70  |

(C) Aggregates: PC repair material aggregate shall be used for PPC and EPC and have the following properties:

- (1) No more than 45 percent crushed particles retained on the No. 8 sieve when tested in accordance with American Association of State Highway and Transportation Officials (AASHTO) Test Method T335.
- (2) Fine aggregate consists of natural sand only.
- (3) Weighted-average aggregate absorption of no more than 1.0 percent when tested under AASHTO Test Methods T84 and T85.
- (4) At the time of mixing with resin, have moisture content of not more than one-half (½) of the weighted-average aggregate absorption when tested under AASHTO Test Method T255.
- (5) Moh’s hardness of seven (7) or greater.
- (6) Comply with the requirements for the aggregate gradation indicated in Table 4, below:

**Table 4**  
**AGGREGATE**  
**GRADATION**  
**(Tested yearly)**

| Sieve Size | Percent Passing |
|------------|-----------------|
| 3/8"       | 100             |
| No. 4      | 60-85           |
| No. 8      | 55-65           |
| No. 16     | 29-50           |
| No. 30     | 16-36           |
| No. 50     | 5-20            |
| No. 100    | 0-7             |
| No. 200    | 0-3             |

(D) Sand/Fine Aggregate: Sand or fine aggregate for an abrasive finish shall be used for PPC and EPC and have the following properties:

- (1) Commercial-quality blast sand/fine aggregate.
- (2) Not less than 95 percent pass the No. 8 sieve and not less than 95 percent retained on the No. 20 sieve when tested under AASHTO Test Method T27.
- (3) Shall be dry at the time of application.

(E) Composite system: The composite PC repair material system shall have the following properties indicated in Table 5, below:

**Table 5**  
**COMPOSITE**  
**PROPERTIES**  
**(Tested every 2 years)**

| Property                                | Test Method | Requirement   |
|---|-------------|---|
| PCC Saturated Surface Dry Bond Strength | CT 551      | 500 psi minimum at 24 hrs. and 70° F (without primer, at 12% resin content by weight of the dry aggregate, on Saturated Surface Dry Specimen) |
| Abrasion Resistance                     | CT 550      | < 2g weight loss (at 12% resin content by weight of the dry aggregate)  |
| Modulus of Elasticity                   | ASTM C 469  | 1,000,000 psi to 2,000,000 psi (at 12% resin content by weight of the dry aggregate)  |

#### **CONSTRUCTION REQUIREMENTS**

(A) PC Repair Material Pre-placement Conference: A Pre-placement Conference shall be held before any PC repair operations begin. Attendees shall include representatives from



all parties involved in the work. If necessary, teleconferencing of attendees may be approved by the Engineer.

(B) PC Repair Material Placement Notice: Design-Build Team shall provide a minimum 48 hours' notice to the Engineer, prior to placement of PC repair material on any structure.

(C) Initial Application: Prior to full-scale placement of PC repair material, one or more initial applications shall be placed to demonstrate proper initial set time and the effectiveness of the mixing, placing, and finishing equipment proposed. The set time can be determined as the time elapsed from resin catalyzation until the in-place PC initial application cannot be deformed by pressing with a finger, indicating the resin binder is no longer in a liquid state. Each initial application shall be approximately three (3) square feet or an approximately twelve (12) feet long section of deck joint header repair and have the same thickness as the specified in the plans. Conditions during the construction of the initial application(s) and equipment used shall be similar to those to be used for construction of the repair locations. The size and location of the initial application(s) shall be coordinated with and approved by the Engineer.

The number of initial applications required shall be as many as necessary for the Design-Build Team to demonstrate the ability to construct an acceptable initial repair application and competency to perform the work. However, the installer or proposed equipment/techniques may be rejected if not shown to be acceptable after three (3) initial applications.

PC repair material direct tension bond testing shall be performed in accordance with Section (E)(1) of this special provision. Acceptable test results shall be achieved on initial application before the full-scale installation may proceed.

(D) Equipment: All equipment for cleaning the existing concrete surface and mixing and applying the PC repair material system shall be in accordance with the System Provider's recommendations, as approved by the Engineer prior to commencement of any work.

(1) Surface Preparation Equipment: Provide appropriate scarifying, shotblasting, sandblasting, hammering, and other equipment to adequately prepare the bridge deck substrate, as required in the Bridge Deck Overlay and Surface Repairs special provision.

(2) Mixing Equipment:

A portable mechanical mixer of appropriate size for proposed batches, as recommended by the System Provider, may be used for all PC patching applications and for smaller area repair applications, if approved by the Engineer. If portable mechanical mixers are used, sufficient hand record-keeping must be employed to document the proper proportioning and mixing of the PC components and aggregates.

Proposed record keeping methods shall be submitted to the Engineer for review and approval prior to implementing such measures.

A continuous automated mixer may be used for all PC repair material applications. The continuous mixer shall:

- (a) Employ an auger screw/chute device capable of sufficiently mixing catalyzed resin with dry aggregate.
- (b) Employ a plural component pumping system capable of handling binder resin and catalyst while maintaining proper ratios to achieve set/cure times within the specified limits. Catalyzed resin shall flow through a static mix tube for sufficient duration to completely mix the liquid system.
- (c) Be equipped with an automatic metering device that measures and records aggregate and resin volumes. Record volumes at least every five (5) minutes, including time and date. Submit recorded volumes at the end of the work shift to the Engineer.
- (d) Have a visible readout gage that displays volumes of aggregate and resin being recorded.
- (e) Produce a satisfactory mix consistently during the entire placement.

(3) Finishing Equipment: Finishing may be accomplished with a Vibratory Screed, hand Screeding, or Self-Propelled Slip-Form Paving Machine.

- (a) Vibratory Screed: A vibratory screed may be used for finishing the PC repair material, but must be approved by the Engineer at least two (2) weeks prior to PC repair material placement.
- (b) Hand screeding: Hand screeding may be used for small repair areas, with the approval of the Engineer. Design-Build Team shall indicate how the PC repair material will be adequately consolidated and vibrated into place, prior to screeding.
- (c) Self-Propelled Slip-Form Paving Machine: A self-propelled slip-form paving machine, which is modified or specifically built to effectively place the PC repair material in a manner that meets the objectives and requirements of the project, may be used for PC repair material applications. The paving machine shall:
  - (i) Employ a vibrating pan to consolidate and finish the PC repair material.
  - (ii) Be fitted with hydraulically controlled grade automation to establish the finished profile. The automation shall be fitted with substrate grade averaging devices on both sides of the new placement; the device shall average 15 feet in front and behind the automation sensors; or the sensor shall be constructed to

work with string-line control. It is acceptable to match grade when placing lanes adjacent to previously placed PC.

(iii) Be calibrated for the projects requirements and calibrated periodically following the manufacturers recommendations.

(iv) Have sufficient engine power and weight to provide adequate vibration of the finishing pan while maintaining consistent forward placement speed.

(v) Be capable of both forward and reverse motion under its own power.

(E) Application of PC Repair Material: Methods indicated in this special provision are typical of general installations and may be modified per the System Provider's recommendations as approved by the Engineer. The application of the PC repair material shall not begin until the concrete deck is completely surface dry in accordance with ASTM D4263, with a wait time revised from 16 hours to two (2) hours, or as directed by the System Provider's Technical Representative. Prior to PC repair material application, the concrete surface temperature shall be within the specified temperature ranges below. Night work may be required when temperatures cannot be met during the day.

(a) For PPC repair materials, the concrete surface temperature shall be between 40° and 100° F.

(b) For EPC repair materials, the concrete surface temperature shall be between 60° and 90° F.

During PC repair material application, precaution shall be taken to assure that traffic is protected from rebound, dust, and construction activities. Appropriate shielding shall be provided as required and directed by the Engineer.

During PC repair material application, the Design-Build Team shall provide suitable coverings (e.g., heavy duty drop cloths) as needed to protect all exposed areas not to receive PC repair material, such as curbs, sidewalks, parapets, etc. All damage or defacement resulting from this application shall be cleaned and/or repaired to the Engineer's satisfaction at no additional cost to the Department.

(1) Primer Application: Immediately before placing primer, all exposed surfaces shall be completely dry and blown clean with oil-free compressed air. Exposed surfaces shall be protected from precipitation and heavy dew during and after the application of the primer.

After the exposed surfaces have been prepared and are dry, primer shall be applied in accordance with the System Provider's recommendations. Primer shall be placed within five (5) minutes of mixing at approximately 90-100 ft<sup>2</sup>/ gal or the rate acceptable to the Engineer.

Primer shall be applied by flooding and uniformly spread to completely cover surfaces to receive PC repair material. Care shall be taken to avoid heavy application that results in excess ponding. Excess material shall be removed or distributed to meet the required application rate. Primer shall be reapplied to any areas that appear dry prior to PC repair material placement.

Primer shall not be allowed to leak onto areas that have not received surface preparation.

- (2) PC Repair Material Application: The PC repair material shall be applied during the interval between 15 minutes and two (2) hours after the primer has been applied. The PC repair material shall be placed prior to gelling. The PPC repair materials shall be placed within 15 minutes following addition of initiator, unless otherwise recommended by the System Provider's Technical Representative.

The resin binder shall be initiated for PPC repair materials and blended completely. Aggregate shall be added and mixed sufficiently.

The set time can be determined in the field when the in-place PC application cannot be deformed by pressing with a finger, indicating that the resin binder is no longer in a liquid state.

- (a) When using PPC, the initial set time shall be at least 30 minutes and at most 90 minutes. If the PPC initial set is not within 30 to 90 minutes, the material shall be removed and replaced.

When using EPC, the initial set time shall be at least 30 minutes and at most 180 minutes. If the EPC initial set is not within 30 to 180 minutes, the material shall be removed and replaced.

The PC repair material shall be consolidated and finished to the required grade and cross- section using PC placement equipment as defined herein.

If placement is performed with a self-propelled slip-form paving machine, grade control shall be maintained by grade averaging devices (skis) or string-line control, as described in section: Construction Requirements, (D) Equipment, (3) Finishing Equipment, (a) Self- Propelled Slip-Form Paving Machine, (ii), unless otherwise allowed by the Engineer.

If a vibratory screed is used, prior to placing the PC repair material, place and fasten screed rails in position to ensure finishing the new surface to the required profile. Do not treat screed rails with parting compound to facilitate their removal. Prior to placing the PC repair material, attach a filler block to the bottom of the screed and pass it over the repair area to check the thickness. The filler block thickness shall be equal to the design PC repair material thickness as shown in the plans. Remove all concrete that the block does not clear.

Place the PC repair material in one operation. Provide a minimum thickness as shown in the plans.

Although the paver or screed may yield a finished or nearly finished surface, additional finishing may be necessary. The PC repair material shall be finished, as necessary, through traditional concrete finishing methods, producing a slight resin bleed indicating complete consolidation of aggregates.

Resin content shall be as specified in the Materials section of this special provision and to yield a Polymer Concrete consistency that requires surface applied consolidation and finishing to consolidate aggregates and yield a slight sheen of bleed resin on top surface, yet does not yield excess bleed resin.

A surface friction sand/fine aggregate finish of at least 2.2 lbs/ yd<sup>2</sup> shall be broadcast onto the glossy surface immediately after sufficient finishing and before resin gelling occurs. To ensure adequate pavement friction, the completed PC repair material surface shall be free of any smooth or "glassy" areas such as those resulting from insufficient quantities of surface aggregate. Any such surface defects shall be repaired by the Design-Build Team in the manner recommended by the System Provider and approved by the Engineer at no additional cost to the Department.

All final edges of PC repair material not adjacent to barrier rail, parapet, or bridge deck joints shall be finished neat, straight, and square, unless otherwise noted on project plans or approved by the Engineer.

After application of surface friction sand and before the PC has gelled, unless otherwise indicated on the plans, the surface shall receive a texture produced by a wire broom or comb having a single row of tines which shall produce grooves, transverse to the longitudinal axis of the bridge, that are spaced at intervals of approximately ½" to ¾" center to center. The grooves of the hardened surface shall .08-.12" in width and .15-.25" in depth.

The tining shall be applied to the entire floor surface, except that area within 18" from the face of the curb.

Before completion of the project, all deck joints shall be sawcut, prepared, and sealed according to the details in the plans.

After the PC material has set, if final sawcutting for joint seals will not be done within 12 hours, at minimum, a single sawcut shall be made at the approximate midpoint of each joint. The sawcut shall be made within 12 hours or prior to opening of PC placement to traffic, if traffic will be allowed within 12 hours. Two (2) saw cuts may be made, but final saw cutting for the joints shall be done in accordance with the special provisions for the installation of the joint seals.

Any surface that is scarified shall be covered with the PC repair material before traffic is returned to the bridge deck, unless otherwise approved by the Engineer.

Upon approval by the Engineer, if traffic is to be returned to the site, but the PC repair material is not completed within the allowable lane closure time and is more than  $\frac{3}{4}$  inch higher in elevation than the adjacent pavement, the PC repair material edges shall be tapered. The leading edge of the PC repair material shall be tapered at a 4:1 (horizontal: vertical) slope. Tapered edges longitudinal to the direction of traffic and tapered edges on the trailing edge of the PC repair material and shall be at a 45-degree slope. Tapers of 45 degrees may remain, and PC repair material may be placed adjacent. Tapers with a 4:1 (horizontal: vertical) slope shall be sawcut square to the PC repair material surface, prior to placing adjacent PC repair material.

If a continuous automated mixer is to be used for mixing the Polymer Concrete, the Design-Build Team shall collect a ticket for each pass or portion of a pass that is provided by each mixer, and ensure that the following information is shown on each ticket:

- (a) Project Number.
- (b) Bridge Number.
- (c) Date and Time.
- (d) Location of Placement (Lane and Station Limits or location and length of placement along the length of the bridge).
- (e) Aggregate Weight.
- (f) Resin Binder Weight.

The tickets shall be available on site for Inspection personnel to use in tabulating quantities.

If hand mixing or portable mechanical mixers are used, sufficient hand record-keeping must be employed to document the proper proportioning and mixing of the PC components and aggregates, as well as other appropriate information required for continuous automated mixer as indicated above. Proposed record keeping methods shall be submitted to the Engineer for review and approval prior to implementing such measures.

Curing: The Design-Build Team shall allow the PC repair material to cure sufficiently before subjecting it to loads or traffic of any nature that may damage the PC repair material. Cure time depends upon the ambient and deck temperatures as well as initiator/accelerator levels.

The PC repair material shall be considered cured to a traffic ready state when a minimum reading of 25 on a properly calibrated Swiss hammer is achieved. Other rebound hammers may be used as approved by the Engineer.

(F) Acceptance Testing: Acceptance of the deck repairs, surface preparation, and PC repair material will be determined by the Engineer based on direct tension bond testing, and smoothness quality testing performed by the Engineer, assisted by the Design-Build Team.

(1) PC Repair Material Direct Tension Bond Testing: Direct tension bond (pull-off) tests shall be performed after 24 hours by the Design-Build Team in accordance with ASTM C1583. At a minimum, three (3) direct tension bond tests shall be performed on PC repair material placed in a single shift. For repair areas greater than 25,000 square feet, additional tests shall be performed at a frequency of one test per 25,000 square feet of additional repair area, rounded up. Additional testing may be required as directed by the Engineer.

The test result shall be the average of the tests for each structure. Test cores shall be drilled a minimum of ½" below the bond line.

The average minimum bond strength of the PC repair material system on normal weight concrete shall be 250 psi, with no individual test measured below 225 psi. An acceptable test will demonstrate that the PC repair material bond strength is sufficient, or by producing a concrete subsurface failure area greater than 50% of the test surface area. The Design-Build Team shall repair all direct tension test locations with PC repair material in accordance with this special provision.

Direct tension bond testing shall be performed by an independent testing firm and shall be arranged by the Design-Build Team. The Design-Build Team may perform the direct tension bond testing with the approval of the Engineer. Testing shall be performed using a calibrated tensile loading device, in the presence of the Engineer. The tensile loading device shall be calibrated annually. The cost of direct tension bond testing shall be included in the bid price for *Placing and Finishing PC repair material* item.

(2) Smoothness Quality Testing: As soon as practical after the PC repair material has hardened sufficiently, unless otherwise approved by the Engineer, the Design-Build Team shall test the finished surface with an approved rolling straightedge that is designed, constructed, and adjusted, so that it will accurately indicate or mark all deck areas which deviate from a plane surface by more than ⅛" in 10'. The Design-Build Team shall remove all high areas in the hardened surface in excess of ⅛" in 10' with an approved grinding or cutting machine. Any fins or other protrusions remaining after grinding operations shall be removed to the satisfaction of the Engineer. Additionally, the final PC deck surface shall not deviate from the line and elevation indicated on the plans by more than 0.3" over any 50' length. If approved by the

Engineer, correct low areas in an acceptable manner.

**(G) Corrective Work**

- (1) Repair of Surface Defects: The repair materials and finishing methods for surface defects in the PC repair material shall be in accordance with those used for the application of the PC repair material. All surface defects shall be repaired to the satisfaction of the Engineer before acceptance of the work is made.
- (2) Correction for Smoothness: Areas showing high spots of more than  $\frac{1}{8}$ " in 10' shall be marked and ground until the high spot does not exceed  $\frac{1}{8}$ " in 10'. Ground surface may be sawcut grooved to restore the texture if ordered by the Engineer. Areas showing lowspots of more than  $\frac{1}{8}$ " in 10' shall be marked and a proposed repair procedure shall be submitted to the Engineer. The use of the proposed repair procedure shall be as recommended by the System Provider and approved by the Engineer.
- (3) Replacement of Defective PC Repair Material: A defective PC repair material, or portion thereof, resulting in failing PC repair material pull bond test results shall be removed and replaced at the Design-Build Team's expense. The Design-Build Team shall submit a written corrective work proposal to the Engineer, which shall include the methods and procedures that will be used. The Design-Build Team shall not commence corrective work until the methods and procedures have been approved in writing by the Engineer. The Engineer's approval shall not relieve the Design-Build Team of the responsibility of producing work in conformity with the Contract.
- (4) Repair of Cracking: After a one-week cure period, if cracks are in the PC repair material, the Design-Build Team shall fill the cracks with properly catalyzed and mixed primer material at no cost to the Department. Care shall be taken to fill the cracks only and ensure minimal primer material is left on the finished surface of the PC repair material.

**MEASUREMENT AND PAYMENT**

No separate payment will be made for *PC Repair Material*. The cost of the equipment, labor, material, applying primer, proportioning, mixing, placing, finishing, curing, and any incidentals necessary to complete the work for the PC Repair Material shall be considered incidental to the pay items *Class II Surface Preparation* or *Class II Surface Preparation* under the Bridge Deck Overlay and Surface Repairs special provision.



**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 Alternative Delivery 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 Alternative Delivery 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, and 30 days for review of all railroad submittals), 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 *Alternative Delivery Submittal Guidelines*, which by reference are incorporated and made a part of this contract. All submittals shall be made simultaneously to the Alternative Delivery 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 the Department's review and acceptance of the design submittals.

For all design disciplines, the Design-Build Team shall inform the Alternative Delivery 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 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 Design-Build Project I-5719B / U-5800 widens I-85 to an eight-lane facility from NC 7 (Exit 23) to east of NC 273 (Exit 27) and improves the intersection at NC 7 (Main Street) and US 29 / 74 (Wilkinson Boulevard) in Belmont. The project is approximately 4.1 miles long. The project also reconstructs approximately 0.7 miles of railroad for the Piedmont and Northern Railway.

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, dynamic message signs (DMS), fiber-optic communications cable and conduit, and ITS integration
- **Permit Preparation / Application** - development of all documents for required permits
- **Railroad Design and Construction** – completion of construction plans and construction of the proposed facilities to meet the Railroad Owner's standards
- **Right of Way** - acquisition of right of way necessary to construct project
- **As-Built Plans**

**As-Constructed Drawings** will be developed by the NCDOT Division personnel or will be developed under a separate contract.

**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 I-5719 / U-5800 Type III Categorical Exclusion was approved on July 1, 2024.

## GENERAL SCOPE

The scope of work for this project includes design, construction and management of the project. The design work includes all aspects to widen approximately 4.1 miles of I-85 to an eight-lane divided facility, replacement of bridges, and reconfigure interchanges, replacement of one railway bridge and reconstruction of approximately 0.7 mile of railway spur line. 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*, *FHWA Manual of Uniform Traffic Control Devices*, *AREMA Manual for Railway Engineering* 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, railroad, utility coordination and relocation, and erosion and sediment control work items for the proposed eight-lane facility and repair of the control of access fence. Construction engineering and management shall be the responsibility of the Design-Build Team. Construction shall comply with 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)* 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 Design and Coordination
- Railroad Construction
- Geotechnical Engineering
- GeoEnvironmental
- Subgrade Stabilization
- 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

Traffic Signals and Signal Communications  
Construction  
Project Management  
Design and Construction Management  
Lighting (Construction Only)  
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 widen approximately 4.1 miles of I-85 to an eight-lane divided facility, replacement of bridges, reconfigure interchanges, replacement of one railway bridge and reconstruction of approximately 0.7 mile of railway spur line 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, American Railway Engineering and Maintenance-of-Way Association, 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 SOQ 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 “I-5719B / U-5800” 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 Alternative Delivery 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. The Department will only evaluate the maximum number of allowable pages noted below. Thus, the Department may 1) reject submissions that exceed the page limitations or 2) remove the page(s) that exceed the page limitations prior to evaluating the submission. The Department will notify the Proposer in writing of the reason(s) for the rejection or the details of the altered submission.**

### **TECHNICAL PROPOSAL**

Technical Proposals will be accepted until **4:00 p.m. Local Time on Wednesday, May 28, 2025**, 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 Requirements

**\*\*NOTE\*\*** Deleted Technical Proposal – Hard Copies Requirements

#### **TECHNICAL PROPOSAL - Electronic Copy**

An electronic copy shall be submitted including the introductory letter to Mr. Ronald E. Davenport, Jr., P.E. (two-page maximum length).

#### **Volume 1**

8 ½-inch by 11-inch

Maximum number of allowable pages shall be 50 pages

Printed on one side only

Double-spaced

Font size 12 - Within embedded tables, charts, and graphics only, minimal font size 10 is permissible

#### **Volume 2**

A copy of the Department's approval letter for each incorporated Formal ATC  
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

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

The 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 C205001  
TIP Number I-5719B / U-5800  
Gaston County

I-85, from NC 7 (McAdenville Road / Main Street) to NC 273 . Widen to eight lanes and improves the intersection at NC 7 (Main Street) and US 29 / 74 (Wilkinson Boulevard) in Belmont

Electronic copies of the Technical 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 "Technical Proposal for the Design-Build of State Highway Contract No. C205001"

**PRICE PROPOSAL – Hard Copy**

Price Proposals will be accepted until **4:00 p.m. Local Time on Thursday, June 5, 2025**, 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 C205001  
TIP Number I-5719B / U-5800  
Gaston County

I-85, from NC 7 (McAdenville Road / Main Street) to NC 273 . Widen to eight lanes and improves the intersection at NC 7 (Main Street) and US 29 / 74 (Wilkinson Boulevard) in Belmont

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. (Reference the Steel Price Adjustment Project Special

Provision found elsewhere in this RFP for additional requirements that are concurrent with the Price Proposal submittal)

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. C205001".

### **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* | 30            |
| 3. Schedule and Milestones                 | 20            |
| 4. Innovation / Added Value                | 10            |
| 5. Maintenance of Traffic and Safety Plan  | 30            |
| 6. Oral Interview                          | 5             |

\* The OEPP is considered Pass/Fail. If a bidder fails to meet the requirements, they will be considered nonresponsive.

**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 five 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 - 30 points*****Natural Environmental Responsibility***

- Identify efforts to minimize impacts on wetlands, streams 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.
- Describe the Design-Build Team's approach to Sedimentation and Erosion Control for the project.
- **\*\*Note\*\* Deleted Bullet on Construction Activities**
- 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.

***DBE Open-Ended Performance Plan (OEPP)***

- Provide DBE Open-Ended Performance Plan that details the Design-Build Team's commitment to meet the DBE goal.

- Provide details of the types of subcontracting work or services (with projected dollar amount) that the Design-Build Team will solicit DBEs to perform.
- Include an estimated time frame in which actual DBE subcontracts would be executed.
- Provide a schedule for submission of DBE commitment agreements by contract year based on the Design-Build Team's initial project schedule and throughout the life of the project.
- Provide details of the Good Faith Efforts that will be implemented following execution of the Contract to achieve the DBE goals outlined in the Contract.
- Identify the Point of Contact (POC) responsible for OEPP implementation.
- Provide details of the Design-Build Team's DBE Outreach efforts.
- Statement must be provided by the proposer agreeing to take all reasonable steps to follow the DBE Open-Ended Performance Plan (OEPP) and meet the DBE requirements as stated in the proposal.

### ***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; although an alternate pavement design, as approved as an ATC, may be considered in the evaluation.
- 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.
- Specify the proposed I-85 subgrade stabilization, or combination, with approximate limits of each type clearly noted.
- For all incorporated ATC pavement designs, include a minimum three-year extension of the 12-month guarantee.
- 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 Deficiency Assessment and Proposed Mitigation Table* that contains the box culvert and cross pipe attributes.
- Provide a *Box Culverts and Cross Pipes Hydraulic Assessment Table* that contains the box culvert and cross pipe attributes.

- Identify all hydraulically deficient drainage structures and note their proposed mitigation.

**\*\*NOTE\*\*** Deleted brief summary of the roundabout design

- Identify the months the Department should schedule the Concurrence Point 4B Meeting and the Concurrence Point 4C Meeting.
- For all major hydraulic crossings with a conveyance greater than the capacity of a single 72" diameter pipe, indicate the rise in the floodplain water elevation.
- Discuss the extent and limits of an allowable rise in water elevation in the floodplain(s), identify potentially impacted insurable structures, specify areas anticipated to require additional surveys and estimate the anticipated additional right of way impacts outside the project construction limits.
- Identify all bridge types to be constructed, including any special design features or construction techniques needed.
- 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.
- Identify the approximate location of the new Signal System CCTV Cameras and when they will be installed and operational in their permanent location.
- Identify the approximate location of new permanent ITS devices and when they will be installed and operational in their permanent location.
- Provide conceptual designs and renderings for the required aesthetic features in the Technical Proposal.
- Identify any aesthetic considerations not required herein that will be part of the design.
- 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.

**\*\*Note\*\*** Delete bullet on public access to project personnel

- 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 anticipated DMS locations, all proposed overhead sign structure locations, all overhead signs, and all 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 - 20 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.
- Specify the duration, in days, for ICT #21 through ICT #34.
- Identify the month of delivery of usable segments of the project.
- 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 / construction 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 - 30 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, residential, bus stops, mass transit facilities, park and ride lots, and emergency services 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.
- Identify the need for a Work Zone Speed Limit Reduction Ordinance and / or a \$250 Speeding Penalty Ordinance.
- 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 - 5 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 25%. 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             | 25.00              | 84              | 11.67              |
| 99              | 24.17              | 83              | 10.83              |
| 98              | 23.33              | 82              | 10.00              |
| 97              | 22.50              | 81              | 9.17               |
| 96              | 21.67              | 80              | 8.33               |
| 95              | 20.83              | 79              | 7.50               |
| 94              | 20.00              | 78              | 6.67               |
| 93              | 19.17              | 77              | 5.83               |
| 92              | 18.33              | 76              | 5.00               |
| 91              | 17.50              | 75              | 4.17               |
| 90              | 16.67              | 74              | 3.33               |
| 89              | 15.83              | 73              | 2.50               |
| 88              | 15.00              | 72              | 1.67               |
| 87              | 14.17              | 71              | 0.83               |
| 86              | 13.33              | 70              | 0.00               |
| 85              | 12.50              |                 |                    |

**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**

| Proposal   | Technical Score | Quality Credit (%) | Price Proposal (\$) | Quality Value (\$) | Adjusted Price (\$) |
|--|-----------------|--------------------|---------------------|--------------------|---------------------|
| A  | 95              | 20.83              | 3,000,000           | 624,900            | 2,375,100           |
| B  | 90              | 16.67              | 2,900,000           | 483,430            | 2,416,570           |
| C *  | 90              | 16.67              | 2,800,000           | 466,760            | 2,333,240           |
| D  | 80              | 8.33               | 2,700,000           | 224,910            | 2,475,090           |
| 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 **\$520,000.00** 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.

### **Project Close Out**

Project Close Out documentation shall be provided by the Design-Build Team and shall include, but be not limited to:

- **As-Built Plans** shall be submitted as a single submittal for all disciplines, i.e., Roadway, Structures, etc., to the Division in pdf format.
- **Final RFC Plans and Additional Files** shall be submitted for all disciplines by discipline, i.e., Roadway, Structures, etc., to the Alternative Delivery Unit and shall include, but are not limited to:

•

| <b>Discipline / Unit</b>                                 | <b>Final/Current<br/>RFC Plans<br/>(pdf format)</b> | <b>Final/Current<br/>RFC Plans<br/>(microstation files)</b> | <b>Additional Files</b>   |
|--|---|---|---|
| <b>Roadway Design</b>                                    | Yes   | Yes   | N/A   |
| <b>Structures</b>  | Yes   | N/A   | Computations  |
| <b>Hydraulics</b>  | Yes   | Yes   | Computations and Reports  |
| <b>Geotechnical</b>                                      | N/A   | N/A   | Boring files (gINT format)                                      |
| <b>Transportation<br/>Mngt</b>                           | Yes - Final<br>TMP for<br>Project                   | N/A   | N/A   |
| <b>Signing</b>   | Yes   | Yes   | Individual Sign Panel Designs<br>(microstation files)           |
| <b>Pavement</b>  | N/A   | N/A   | N/A   |
| <b>Pavement<br/>Markings</b>                             | Yes   | Yes   | N/A   |
| <b>Railroad<br/>Coordination</b>                         | N/A   | N/A   | Railroad Agreement & Project<br>Special Provisions (pdf format) |
| <b>Railroad<br/>Construction</b>                         | Yes   | Yes   | N/A   |
| <b>Traffic Signals and<br/>Signal<br/>Communications</b> | Yes   | Yes   | N/A   |
| <b>ITS</b>   | Yes   | Yes   | N/A   |
| <b>Lighting</b>  | Yes   | Yes   | N/A   |
| <b>Erosion and<br/>Sedimentation<br/>Control</b>         | Yes   | N/A   | Computations and NPDES<br>Inspection Records (pdf format)       |
| <b>Utilities - Dry</b>                                   | N/A   | N/A   | N/A   |
| <b>Utilities - Wet</b>                                   | Yes   | Yes   | N/A   |
| <b>Right of Way</b>                                      | Yes   | N/A   | Recordable set of Right of Way<br>Plans (pdf format)            |
| <b>Surveying</b>   | Yes   | Yes   | Surveying Support (dpm, gpk<br>and tin files)                   |

The Design-Build Team shall coordinate with the Alternative Delivery Project Manager and Division as to a final / complete listing of all disciplines and submittal needs for the project prior to project close out.

All electronic deliverables shall be in the referenced format.

The Design-Build Team shall denote in a “Read Me First” document what format, e.g., Bluebeam or Adobe, the files need to be opened in so that all information, seals, and signatures are visible to the viewer.

The Design-Build Team shall submit all **Project Close Out** documentation prior to the Department’s final acceptance of the project.

**ROADWAY SCOPE OF WORK** (4-10-25)

Throughout this RFP, references to the Preliminary Roadway Plans shall denote the December 13, 2023, MicroStation files and the I-5719 / U-5800 Public Meeting Maps dated October 2023.

Throughout this RFP, references to the mainline, -L- Line, and -L- shall denote I-85.

**Project Details**

- From west of the NC 7 (McAdenville Road / Main Street – Exit 23) western ramp (-Y6RPB- and -Y6RPC-) gore connections to east of NC 273 (Beatty Drive – Exit 27) at the western Catawba River bridge approach, the Design-Build Team shall design and construct an eight-lane divided freeway. 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 65-mph design speed for a rolling urban 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.
- Along the mainline, excluding the transitions required to tie to the existing outside shoulders at the southern and northern project limits, the Design-Build Team shall design and construct minimum 14-foot outside shoulders (twelve-foot useable shoulder width plus two feet), 12-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, excluding the transitions required to tie to the existing median widths at the southern and northern project limits, the Design-Build Team shall design and construct a minimum 27-foot full depth paved median along the -L- Line. Excluding the transitions required to tie to the existing median barrier at the southern and northern project limits, the Design-Build Team shall design and construct Type "T" or single slope double-faced concrete median barrier on the aforementioned full depth median pavement. Prior to the beginning of the eight-lane divided typical section, the Design-Build Team shall transition the existing median width to 27-feet. Prior to tying the proposed eight-lane divided typical section to the existing eight-lane divided typical section at the northern project limits, the Design-Build Team shall transition the 27-foot median width to the existing median width.
  - The Design-Build Team shall maintain the existing spread median located between Station 479+00+ -L- to Station 514+00+ -L-. The Design-Build Team may widen into the spread median to minimize right of way impact.

- At the southern end of the project, the Design-Build Team shall transition from the existing I-85 six-lane typical section to the proposed mainline eight-lane typical section in accordance with the following:
  - The outside southbound lane from the median shall become an “Exit Only” lane onto NC 7 (McAdenville Road / Main Street) at Exit 23. -Y6RPA- shall be designed as a single lane, parallel exit.
  - Beginning from -Y6RPD-, the Design-Build Team shall design and construct the new northbound outside lane. The -Y6RPD- entrance ramp shall become the outside I-85 northbound lane. To the extent practicable, the Design-Build Team shall maintain the existing -Y6RPD- alignment, adding spirals as needed, avoiding impacts to McAdenville Historic District.
  - From the -Y6RPB- and -Y6RPC- goes through the NC 7 (McAdenville Road/Main Street) / I-85 interchange, the Design-Build team shall use pavement markings to delineate the new outside northbound and southbound lanes and the lane transitions.
- The Design-Build Team shall design and construct -Y6RPB- and -Y6RPC- as shown in the I-5719B Southern Transition Sketches provided by the Department with the required acceleration / deceleration lengths to tie to the existing six-lane section.
- The minimum design speed for I-85 / SR 2093 (Belmont Mt. Holly Road) interchange (Exit 26) Loop D shall be 25 mph with a minimum 156-foot radius.
- Interchange configurations that do not provide a diamond interchange with a loop in the D quadrant at the I-85 / SR 2093 (Belmont Mt Holly Road/Main Street) interchange (Exit 26), shall require an approved ATC provided the intersection of the proposed -Y7- and the mainline, at approximately Station 530+00± -L-, does not significantly shift, i.e., not more than 25-foot up or down station.
- Between the following ramp terminals, the Design-Build Team shall design and construct a 12-foot wide auxiliary lane in both the southbound and northbound directions of the -L- Line:
  - I-85 / SR 2093 (Belmont Mt Holly Road/Main Street) interchange (Exit 26) and the I-85 / NC 273 (Beatty Drive) interchange (Exit 27).
- The Design-Build Team shall design and construct the following system(s) at the referenced locations to avoid impacts:
  - A retaining wall along the northbound outside shoulder of the mainline, from Station 546+60± -L- to Station 551+50± -L- to avoid impacts to the Gaston County Tourism Development Administrative Offices site.

Within the limits of the aforementioned retaining wall, 1) the Design-Build Team shall not acquire additional right of way beyond the limits shown on the Preliminary Roadway Plans provided by the Department without the Department's written approval; 2) the construction limits, including but not limited to all walls, fill slopes, drainage ditches, shall remain within the existing / proposed right of way; and 3) all existing and proposed slopes shall be 2:1 or flatter, requiring the Design-Build Team to flatten all existing slopes steeper than 2:1. The aforementioned written approval shall occur through 1) the ATC Process prior to Award or 2) coordination and / or submittals to the Alternative Delivery Unit after Award. (Reference the Alternative Technical Concepts and Confidential Questions Project Special Provision found elsewhere in this RFP).

- To avoid impacts to the Carolina Water Services, Inc. well located just outside the existing Right of Way at Station 483+83± - L - northbound, the Design-Build Team shall not acquire any additional right of way or easements, temporary or permanent, from Station 482+00 -L- to Station 485+00 -L- northbound.
- The Design-Build Team shall not preclude future Ramp Metering at -Y6RPD- by providing the following:
  - Design and construct concrete curb and gutter radius return from northbound -Y6- to -Y6RPD- for two 12-foot ramp lanes.
  - Holding the location of the inside shoulder hinge point, design a future typical section to accommodate the construction a 12-foot inside shoulder (four-foot of which shall be full depth paved shoulder), two 12-foot ramp lanes, and a minimum 14-foot outside shoulder (12-foot of which shall be full depth paved shoulder).
  - Holding the location of the inside shoulder hinge point, design an interim typical section to accommodate the construction a 12-foot inside shoulder (four-foot of which shall be full depth paved shoulder), one 16-foot ramp lane, and a minimum 14-foot outside shoulder (12-foot of which shall be full depth paved shoulder).
  - Design and construct all drainage systems and any retaining walls to accommodate the future typical section. The Design-Build Team shall not encroach, either by Right of Way acquisition or permanent easement, into the McAdenville Historic District boundary.
  - Construct the difference between the future and interim outside unpaved shoulder and slope.
- The Design-Build Team shall not preclude future Ramp Metering at -Y7RPB- by providing the following:
  - Design and construct concrete curb and gutter radius return from -Y7RPB- to southbound -Y7- for two 12-foot ramp lanes.
  - Holding the location of the outside shoulder hinge point, design a future typical section to accommodate the construction a minimum 14-foot outside shoulder (12-foot of which shall be full depth paved shoulder), two 12-foot ramp lanes, and a 12-foot inside shoulder (four-foot of which shall be full depth paved shoulder).



- Holding the location of the outside shoulder hinge point, design an interim typical section to accommodate the construction a minimum 14-foot outside shoulder (12-foot of which shall be full depth paved shoulder), one 16-foot ramp lane, and a 12-foot inside shoulder (eight-foot of which shall be full depth paved shoulder).
  - Design and construct all drainage systems and any retaining walls to accommodate the future typical section.
  - Construct the difference between the future and interim inside unpaved shoulder and slope.
- Unless noted otherwise elsewhere in this RFP, 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.
  - Unless noted otherwise elsewhere in this RFP, 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 14-foot outside shoulders, 12-foot of which shall be full depth paved shoulders on all ramps at the following interchanges:
    - NC 7 (McAdenville Road/Main Street) (Exit 23)
    - SR 2093 (Belmont Mt Holly Road/Main Street) (Exit 26)
  - At the I-85 / NC 273 (Beatty Drive) interchange (Exit 27), the Design-Build Team shall remove the existing outside paved shoulders, design and construct 14-foot outside shoulders, 12-foot of which shall be full depth paved shoulders, and mill and fill 1.5 inches of the remaining pavement on all ramps to the ramp terminal intersection.
  - From the southern project limits to Station 591+50+ -L- the Design-Build Team shall remove and replace the existing median and outside shoulders on I-85 (Reference the Pavement Management Scope of Work found elsewhere in this RFP).
  - From Station 591+50+ -L- to Station 594+00+ -L- the Design-Build Team shall transition from the proposed 12-foot travel lanes, 12-foot minimum median shoulders and 12-foot paved outside shoulders on the -L- Line to 12-foot travel lanes, 10-foot median shoulders and match the existing outside shoulders. The Design-Build Team shall remove and replace the existing shoulders in this section of I-85 (Reference the Pavement Management Scope of Work found elsewhere in this RFP).
  - From Station 594+00± -L- to Station 627+38± -L- the Design-Build Team shall mill and fill 1.5 inches of surface on I-85 north and south bound travel lanes and shoulders. The Design-Build Team shall provide the 12-foot travel lanes, 10-foot median shoulders and match the existing outside shoulders for the final lane configuration. Hydroplaning analysis and recommendations for mitigation shall be coordinated with the Department (Reference the Hydraulics Scope of Work).

- The Design-Build Team shall design and construct all directional ramps to meet a 65 mph design speed and semi-directional ramps to meet a 50 mph design speed using the 0.06 maximum superelevation table. The Design-Build Team shall design and construct all bridges on directional ramps with a four-foot outside bridge rail offset and a 12-foot inside bridge rail offset.
- The Design-Build Team shall design and construct loops that adhere to Tables 3-27 and Table 3-28, *Design Widths of the Traveled Way for Turning Roadways* and *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 10-foot berm. The minimum loop design shall be 30 mph with a minimum 230-foot radius, unless stated otherwise in the RFP.
- The Design-Build Team shall design and construct all diverging diamond interchanges (DDI) in accordance with the requirements noted below:
  - Between and through the DDI crossovers, the Design-Build Team shall design and construct lane widths that accommodate a WB-62; however, the minimum lane width between and through the DDI crossovers shall be 15 feet. All approach / departure lanes to / from the crossovers shall be tapered to the crossover lane-width prior to entering / after exiting the curve approaching / departing the crossover.
  - The Design-Build Team shall design and construct lane widths for all spurs (right and left turn movements from / to the ramps) that accommodate a WB-62; however, the minimum spur lane width shall be 15 feet. All approach / departure ramp lanes to / from the spurs shall be tapered to the spur lane width prior to entering / after exiting the spur. Regardless of the spur lane width, all spur alignments shall be located 15 feet from the outside edge of travel lane.
  - The four ramp channelization islands shall be grass covered and bordered with 2'-6" curb and gutter.
  - For DDIs designed and constructed with a single bridge on a -Y- Line or a bridge on the mainline, the Design-Build Team shall provide a minimum ten-foot wide pedestrian accommodation between the DDI crossovers that is located within the -Y- Line median. Along both sides of the aforementioned ten-foot pedestrian accommodation, the Design-Build Team shall provide barrier (2'-6" concrete dual flat-faced barrier with metal handrail and no glare screen) that extends a minimum of 42" above the walking surface. The barrier shall meet AASHTO Manual for Assessing Safety Hardware, TL-3 crash test requirements and terminate with a ten-foot taper that reduces the barrier height to 2'-3". Excluding within the aforementioned ten-foot taper, the handrail shall be installed in accordance with the 10-30-2013 Proposed Pedestrian Safety Rail Detail provided by the Department.

- For DDIs designed and constructed with dual bridges on a -Y- Line, the Design-Build Team shall provide a minimum ten-foot wide pedestrian accommodation between the DDI crossovers that is located along one direction of travel within the -Y- Line median. In accordance with requirements found elsewhere in this RFP, the Design-Build Team shall design and construct a positive separation barrier between vehicular traffic and pedestrian traffic on the bridge. (Reference the Structures Scope of Work found elsewhere in this RFP)
- The curves approaching / departing the crossovers shall slope from the median to the outside at a 0.02 cross slope.
- Unless noted otherwise elsewhere in this RFP, the maximum allowable cut and fill slope shall be 2:1. (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 required otherwise elsewhere in this RFP, the elimination of any retaining walls along the elevated sections of the mainline, including all ramps, that result in additional relocatees beyond those required by the Department's Preliminary Roadway Plans, shall require an approved ATC.
- Within the project limits, the Design-Build Team shall design and construct the relocated section of Cemetery Road -Cemetery Rd- off Hickory Grove Road -Y14- in accordance to driveway requirements, at a minimum, to match the existing typical section. The Design-Build Team shall acquire easement(s) for the proposed relocation.
- The Design-Build Team shall design and construct a modified reduced conflict intersection on -Y7A- US 29 / 74 (Wilkinson Boulevard) as shown in the Preliminary Roadway Plans. The Design-Build Team shall provide a center left turn lane with a minimum width of 23 feet, e.g., two – four-foot islands and a 12-foot lane with nine-inch offsets. The Design-Build Team shall adjust the western left over and bulb-out location as shown on the March 27, 2023, *Western Segment of the US 29 / 74 (Wilkinson Blvd) reduced conflict intersection (RCI) Concept Map*.
- The presence of a substandard vertical curve on -Y7A- US 29 / 74 (Wilkinson Boulevard) in the vicinity of -Y7C- (Main Street) may necessitate that the Design-Build Team supplement the approved NCDOT design exception to include a crest vertical curve design exception for a speed less than the currently posted 45 mph. The Design-Build Team shall investigate the existing condition, assess if a design modification can be made to meet the 45 mph posted speed, or proceed with the design exception documentation as appropriate.
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in the north and south bound directions on -Y7- NC 7 (N. Main Street) / SR 2093 (Belmont Mt Holly Road) north of -Y7A- US 29 / 74 (Wilkinson Boulevard) and taper to match the existing lane width of 11.5 feet south of Forney Avenue.

- Within the project limits, the Design-Build Team shall design and construct 11-foot lanes in the east and west bound directions on -Y7A- US 29 / 74 (Wilkinson Boulevard)
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in both directions on -Y7B – NC 7 (McAdenville Road) / McAdenville Road / Caldwell Farm Road and taper to match the existing lane width.
- Currently -Y7B – NC 7 (McAdenville Road) / McAdenville Road) has a posted speed limit of 45 MPH; the Department will be changing the posted speed limit to 35 MPH. Based on the pending change the Design-Build Team shall design -Y7B- NC 7 (McAdenville Road) / McAdenville Road) for 40 MPH.
- Within the project limits, the Design-Build Team shall design and construct -Y7C- NC 7 (N. Main Street) and -Y7D- existing North Main Street for a 40 mph design speed with a posted speed limit of 35 mph.
- Within the project limits, the Design-Build Team shall design and construct 11-foot lanes in the north and south bound directions on -Y7C- NC 7 (N. Main Street) south of -Y7A- US 29 / 74 (Wilkinson Boulevard).
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in the north and south bound directions on -Y7D- existing North Main Street between -Y7- NC 7 (North Main Street) and -Y7B- McAdenville Road / Caldwell Farm Road.
- Within the project limits, the Design-Build Team shall provide lane continuity in the north and south bound directions on -Y7- SR 2093 (Belmont Mt Holly Road) between -Y7B- McAdenville Road / Caldwell Farm Road and -L- I-85.
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in both directions on -Y7E – Wimmer Circle east of -Y7- SR 2093 (Belmont Mt Holly Road) and taper to match the existing lane width.
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in both directions on -Y7F – SR 2021 (Woodlawn Street) west of -Y7- SR 2093 (Belmont Mt Holly Road) to match the existing lane width.
- Within the project limits, the Design-Build Team shall design and construct 12-foot lanes in both directions on -Y7H – Wimmer Circle #1 east of -Y7- SR 2093 (Belmont Mt Holly Road) and taper to match the existing lane width.
- The Design-Build Team shall design and construct five-inch keyed-in monolithic 17.5 ft median concrete islands on SR 2093 (Belmont Mt Holly Road), from the SR 2093 (Belmont Mt Holly Road) / Wimmer Circle roundabout to the SR 2093 (Belmont Mt Holly Road) / SR 2021 (Woodlawn Street) / Wimmer Circle roundabout.

- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct -Y- Lines, service roads, multi-use paths / greenways, and cul-de-sacs / turnarounds 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 limits of -Y- Line and service road construction shall be of sufficient length to tie to existing based upon the current NCDOT guidelines and standards.
- The Design-Build Team shall design and construct -Y14- (Hickory Grove Road) with minimum eight-foot shoulders, four-foot of which shall be full depth paved.
- The Design-Build Team shall design and construct eight-foot bike lanes (five-foot lane with a three-foot buffer) in the north and south bound directions on -Y6- NC 7 (McAdenville Road / Main Street), from the C and D Ramps northward connecting to the existing bike lanes at Tennant Street. The Design-Build Team shall design and construct a five-foot sidewalk in the north bound direction of the -Y6- NC 7 (McAdenville Road / Main Street) bridge and a five-foot sidewalk in the south bound direction of -Y6- NC 7 (McAdenville Road / Main Street) from Sta. 14+10± -Y6- to Sta. 29+30± -Y6-.
- Excluding modifications included in the I-5719 Preliminary Roadway Plans provided by the Department, the Design-Build Team shall coordinate with, and obtain written approval from, the Engineer and any / all Municipalities for horizontal alignment revisions to municipal streets. The Department will not honor any request for additional contract time or compensation for any efforts required to obtain the aforementioned approval(s), including but not limited to public involvement, additional design effort, additional construction effort, and / or additional environmental agency coordination and approval.
- 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 *I-5719\_Traffic\_Analysis\_Future\_Year\_Tech\_Memo\_Final\_07-12-2024* 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 (RDM)*, if not provided in the aforementioned Memorandum, and 2) the desirable deceleration length, as defined in the *RDM* Figure 8-11.
  - Right turn lanes / tapers shall be provided in accordance with the NCDOT Right Turn Lane Warrants, as defined in the *RDM* (Reference Section 8.7, Figure 8-9).
  - Taper only right turn lanes shall be a minimum of 230-feet, 265-feet, and 300-feet 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 March 25, 2022, NCDOT *Congestion Management Capacity Analysis Guidelines* for the Department's review and acceptance.
- Unless otherwise noted elsewhere in this RFP, the Design-Build Team will not be required to design or construct ramps or bridges to accommodate future loops or future auxiliary lanes.
- 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 Research Report 1043: *Guide for Roundabouts* - 2023. 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 *I-5719\_Traffic\_Analysis\_Future\_Year\_Tech\_Memo\_Final\_07-12-2024 - 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 roundabout layouts shown in the Preliminary Roadway Plans only depict the Department's desire for roundabouts at the referenced intersections.
  - Prior to the Preliminary Plan submittal, the Design-Build Team shall provide a functional roundabout design (horizontal and vertical alignments), and fastest path and vehicle sweep path diagrams for **all movements** for review and acceptance.

Should the Design-Build Team after Preliminary Plans are accepted change the horizontal and / or vertical alignment of the roundabout the Design-Build Team shall provide a functional roundabout design (horizontal and vertical alignments), and fastest path and vehicle sweep path diagrams for **all movements** for review and acceptance prior to the Final Plan submittal.

- The Design-Build Team shall design and construct all roundabouts to accommodate a WB-62 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. All two-lane roundabouts shall be designed with stay-in-lane on entry, circulating, and exiting, using truck apron as needed. Large passenger vehicles, e.g., buses, should stay-in-lane without using the truck apron.
- The Department prefers an entry speed for single-lane roundabout of 20 mph and two-lane roundabouts of 25 mph. Thus, justification, in the Department's sole discretion, shall be provided for all entry speeds that exceed 20 and 25 mph, respectively.

- 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 Department prefers that the circulatory roadway for all roundabouts have a normal pavement slope of 2% outward from the interior truck apron.
- The Design-Build Team shall design and construct interior truck aprons for all roundabouts with a slope of 2% outward from the center island.
- The Design-Build Team shall design and construct all single-lane circular roundabouts with a minimum Inscribed Circle Diameter (ICD) of 130 feet and two-lane circular roundabouts with a minimum Inscribed Circle Diameter (ICD) of 180 feet.
- The Design-Build Team shall design and construct approach and entry lane widths at a minimum of 15 feet for single-lane and multi-lane (2-lane) roundabouts.
- The Design-Build Team shall design and construct exit widths and curbs to accommodate the design vehicle path within the curb lines, at a minimum of 18 feet for single-lane roundabouts.
- 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 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 five-inch keyed-in monolithic concrete islands for all roundabout approach / departure channelization islands, including the splitter islands.
- The Design-Build Team shall design and construct all splitters islands, and right-turn bypass lane separator islands with a minimum of 50 feet of tangent between reverse curves.
- The Design-Build Team shall design and construct all splitters islands, and right-turn bypass lane separator islands with a minimum six-foot width at pedestrian crossings. The Design-Build Team shall provide two-foot wide detectable warning surface at all pedestrian crossings in each direction of pedestrian travel. The Design-Build Team shall provide pedestrian crossings widths equal to the largest pedestrian facility being connected.
- Unless noted otherwise elsewhere in this RFP, 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 interior truck apron shall also be constructed with red dye concrete and stamped with a brick pattern.

- Except for required signing, the Design-Build Team shall not design and construct physical elements (raised central islands, landscaping, berming, or other types of raised features) that exceed 3.5 feet in height from approach lane(s) that would impede stopping, intersection and decision sight distances or the view angle.
- Unless noted otherwise elsewhere in this RFP, when roundabouts are constructed at adjacent ramp terminals, the Design-Build Team shall design and construct a continuous minimum five-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.
- For single lane roundabouts the Design-Build Team shall design and construct minimum 16-foot circulating lane inside the roundabout. For multi-lane (2-Lane) roundabouts the Design-Build Team shall design and construct a circulating width of 32 feet, with an inside circulating lane width of 15 feet and an outside circulating lane width of 17 feet.
- The Design-Build Team shall design and construct 1'-6" mountable curb and gutter with a curb height of 3 inches between the roundabout lane and the concrete truck apron. The gutter 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 14" concrete curb between the truck apron and the center island. The Design-Build Team shall provide details for both modified curbs.
- The Design-Build Team shall design and construct roundabout improvements shown on the March 15, 2023 *Woodlawn Street / Belmont Mt Holly Road / Wimmer Circle Concept Map* with the design elements noted below:
  - Urban design with curb and gutter along the periphery of the roundabout.
  - Construct single-lane exits from the roundabout into -Y7H- Wimmer Circle #1, SR 2093 (Belmont Mt Holly Road) north of the roundabout, and SR 2021 (Woodland Street).
  - Construct single-lane entry into the roundabout from -Y7H- Wimmer Circle #1 and SR 2093 (Belmont Mt Holly Road) north of the roundabout.
  - Construct a dedicated right turn lane with a free-flowing bypass lane from SR 2021 (Woodland Street) onto SR 2093 (Belmont Mt Holly Road) south of the roundabout. The bypass lane will become the second southbound lane on SR 2093 (Belmont Mt Holly Road) south of the roundabout.
  - Construct dual-lane entry into the roundabout from SR 2093 (Belmont Mt Holly Road) south of the roundabout.
  - Construct pedestrian crossings at all four legs of the roundabout.
  - Landscaped center island (Reference the Aesthetics Scope of Work found elsewhere in this RFP).



- The Design-Build Team shall design and construct a roundabout at the proposed SR 2093 (Belmont Mt Holly Road) and -Y7E- Wimmer Circle #2 located north of the P & N Railway crossing with the design elements noted below:
  - Urban design with curb and gutter along the periphery of the roundabout.
  - For 2-lane travel ways provide side by side fastest path and vehicle sweep path diagrams for two WB-62 and a WB-62 and a BUS.
  - Construct single-lane exit from the roundabout into -Y7E- Wimmer Circle #2.
  - Construct single-lane entry into the roundabout from -Y7E- Wimmer Circle #2.
  - Construct pedestrian crossings at all three legs of the roundabout.
  - Landscaped center island (Reference the Aesthetics Scope of Work found elsewhere in this RFP).
- 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, unless directed otherwise by the Engineer. (Reference 2024 NCDOT *Roadway Standard Drawings (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, unless directed otherwise by the Engineer.
- 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 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*.
  - 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 Alternative Delivery Unit after

Award. (Reference the *Alternative Technical Concepts and Confidential Questions* Project Special Provision found elsewhere in this RFP).

- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct all modifications, realignments and improvements to existing service roads in accordance with the following requirements:
  - Travel lane widths shall be the greater of 1) the width required for the functional classification and design year traffic, 2) the width shown in the Preliminary Roadway Plans provided by the Department, or 3) the existing width.
  - Provide paved shoulders from the edge of travel lane to the face of concrete barrier. All other shoulder widths (turf and paved) shall be the greater of 1) the width required for the functional classification and design year traffic or 2) the width shown in the Preliminary Roadway Plans provided by the Department.
- The Design-Build Team shall provide cul-de-sacs on all paved roads that are dead-ended. All cul-de-sacs shall be designed and constructed with a minimum 30-foot radius. The Design-Build Team shall provide turnarounds on all nonpaved roads that are dead-ended. All turnarounds shall accommodate a S-BUS-36 and be constructed with 8" ABC.
- The Design-Build Team shall maintain at all times the existing access (Dickson Road Extension) off Dickson Road located under the South Fork Catawba River Bridge at Station 432+50± -L-, as necessary, to maintain access to the Coats North America (Pharr HP) property, Parcel ID No. 3575970956.
- The Design-Build Team shall provide a design to avoid the two single family dwellings located on Parcel ID No. 3585371707, located at 405 and 409 Hickory Grove Road, Gastonia County, in the relocation of -Cemetery Rd-.
- The Design-Build Team shall provide two driveways to the AC Belmont, LLC property, Parcel ID No. 3595034666, from old North Main Street in Belmont.
- The Design-Build Team shall design and construct new service roads to meet a minimum 40 mph design speed using the 0.04 superelevation chart. The Design-Build Team shall design and construct all new service roads with two 11-foot lanes and six-foot minimum shoulders with a Type "B" ditch, as per the *RDM*.
- Unless noted otherwise elsewhere in this RFP, the mainline grade point and crown point shall be located such that the inside two lanes in each direction of travel slope towards the median and the remaining lanes slope towards the outside. Unless allowed otherwise below, the I-85 normal crown cross slope shall be 0.02. The normal crown cross slope for the outermost lane(s) in each direction of travel are to be steepened as required to minimize hydroplaning potential, not to exceed 0.03. Prior to the beginning of the mainline eight-lane divided typical section at the southern project limits, the Design-Build Team shall transition the existing mainline pavement cross slope and crown point / grade point to tie to proposed. The Design-Build Team

- shall transition the proposed mainline pavement cross slope and crown point / grade point at the eastern project limits between Station 589+50 -L- to Station 591+50 -L- to tie to existing. (Reference the Hydraulics Scope of Work found elsewhere in this RFP)
  - The crown point on the northbound section of the South Fork Catawba River Bridge shall be located such that the inside lanes in the direction of travel slope towards the median and the remaining lanes slope towards the outside. Prior to the bridge the Design-Build Team shall transition the proposed mainline pavement cross slope and crown point (2/2) / grade point to the proposed bridge cross slope and crown point (1/3) / grade point between Station 427+00 -L- to Station 429+00 -L-. The Design-Build Team shall transition from the proposed bridge cross slope and crown point (1/3) / grade point to the proposed mainline pavement cross slope and crown point (2/2) / grade point beyond the bridge between Station 442+00 -L- to Station 444+00 -L-.
- I-85 is a full control of access facility. The Design-Build Team shall bring to the Alternative Delivery 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 cultural, historic, or otherwise protected landmarks, including cemeteries, 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.
- The Design-Build Team shall include all cut and fill slopes within the proposed Right of Way / Control of Access for the I-85 and US 29 / 74 alignments. The Design-Build Team shall provide a minimum of 60 feet of Right of Way symmetrical about the centerline of all other roadways with all remaining cut and fill slopes being shown in easement.
- Prior to installation, the Design-Build Team shall be responsible for coordinating with, and obtaining 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:
  - The Design-Build team shall install four-foot chain-link fence at interchanges in-lieu of woven wire fence. The chain-link fencing shall begin at the beginning of control of access on the -Y-line and extend along the ramp to the main line tie in.
  - Throughout the construction limits, excluding areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall replace, in kind, all existing damaged control of access fence and all control of access fence that is damaged during construction.
  - The Design-Build Team shall install all missing control of access fence, matching the adjacent fence type.
- The Department will provide an approved I-5719 Interchange Access Report (IAR) based on the Preliminary Roadway Plans provided by the Department. If the Design-Build Team revises the roadway design such that the approved I-5719 IAR is nullified or an approved IAR is

- required for other interchanges, the Design-Build Team shall re-analyze the interchange(s) and complete a revised I-5719 IAR, if necessary, for NCDOT and FHWA review and approval. The Department will not honor any requests for additional contract time or compensation for any effort required to complete the aforementioned activities, including but not limited to additional design effort, additional construction effort, FHWA coordination / approvals, and / or environmental agency coordination / approvals.
- 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 *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, at a minimum, design and construct resurfacing grades for all roadways impacted by construction and all roadways shown to be resurfaced on the October 2023 I-5719 / U-5800 Public Meeting Maps provided by the Department. 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, collector distributor roads shall not be considered a one-way roadway of a divided facility and 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.
  - At a minimum, the Design-Build Team shall resurface all lanes and shoulders of -Y- Lines and service roads to the resurfacing limits shown on the on the October 2023 I-5719 / U-5800 Public Meeting Maps provided by the Department.
  - 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.
- Excluding greenways / multi-use paths located on berms adjacent to curb and gutter, all greenway / multi-use path typical sections shall 1) consist of a minimum ten-foot paved facility with two-foot turf shoulders and 2) be designed and constructed in accordance with the 2012 AASHTO Guide for the Development of Bicycle Facilities, except those sections of greenways / multi-use paths that are steeper than five percent shall be designed and constructed in accordance with the FHWA Designing Sidewalks and Trails for Access. (Reference the *Greenways and Multi-Use Paths* Project Special Provision and the Pavement Management Scope of Work found elsewhere in this RFP) The Design-Build Team shall design and construct all greenways / multi-use paths located on berms adjacent to curb and gutter as minimum ten-foot wide sidewalks with a minimum 15-foot berm.
  - During construction, the Design-Build Team shall maintain access to the existing Carolina Thread Trail, adjacent to the South Fork Catawba River, under Bridge No. 350143. The Design-Build Team shall repair any / all sections of the Carolina Thread Trail disturbed during construction to an equivalent standard as approved by the Engineer.
  - The Design-Build Team shall design and construct the Belmont Rail Trail MUP (-Y7TRAIL-) within the P&N Belmont Spur Corridor from the P&N Belmont Spur Corridor / -Y7- (Belmont Mt Holly Road) intersection to the northeast quadrant of the US 29 / 74 (Wilkerson Boulevard) / P&N Belmont Spur Corridor intersection. This section of the Belmont Rail Trail MUP will consist of a minimum ten-foot paved facility with two-foot stone shoulders. The Design-Build Team shall install 3,500 linear feet of 4-foot ornamental fence, offset 15-feet from the edge of path nearest to the center of track, between the P&N Belmont Spur and the Belmont Rail Trail. (Reference the Aesthetics Scope of Work found elsewhere in this RFP)
  - The Design-Build Team shall maintain the existing Carolina Thread Trail / South Fork Trail located along the west bank of the South Fork Catawba River under the bridge on the -L- Line over South Fork Catawba River.
  - Unless noted otherwise elsewhere in this RFP, all sidewalk shall be a minimum of 5-foot wide.
  - The Design-Build Team shall design and construct eight-foot sidewalks at the following locations:

- -Y7- SR 2093 (Belmont Mt Holly Road / North Main Street) station right from Forney Avenue to -Y7F- SR 2021 (Woodlawn Street).
- -Y7F- SR 2021 (Woodlawn Street) station left from -Y7- SR 2093 (Belmont Mt Holly Road / North Main Street) to the end of construction on -Y7F-.
- Sidewalk transitions, from proposed sidewalk width to existing sidewalk width, shall be a minimum of 10 feet.
- Prior to submitting the Technical Proposal and Price Proposal, the Design-Build Team shall investigate to determine the possibility of load limit restrictions being placed on any of the proposed haul roads. The Department will determine if load limit restrictions are warranted, or removal of existing load limit restrictions are appropriate through agreement in accordance with Section 105-15 of the *Standard Specifications*.
- Excluding the modifications required herein, the Design-Build Team shall inform the Alternative Delivery 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 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 Alternative Delivery 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 Alternative Delivery 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.

- Excluding locations where horizontal curvature reduces the mainline stopping sight distance along the median paved shoulder, and locations where bridge piers, concrete barrier, or overhead sign assemblies reduce the mainline median shoulder width to less than ten feet design exceptions will not be allowed for the -L- Line, including all ramps and loops. Design exceptions will not be allowed for service road vertical alignments over drainage pipes. The Department prefers not to have design exceptions for the -Y- Lines and service roads. If the Design-Build Team anticipates any allowable design exceptions, they shall be clearly noted in

the Technical Proposal. Prior to requesting / incorporating a design exception into the Preliminary Roadway Plans developed by the Design-Build Team, the Design-Build Team must obtain prior conceptual approval from the Alternative Delivery 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.

- The Design-Build Team is advised that the Department has approved design exceptions for the narrowing of the median shoulder width, less than ten feet, at the proposed center bridge piers for the four railway bridges, as found in the information provided.
- Prior to recording the Right of Way Plans, the Design-Build Team shall locate and install iron pins and caps with fiberglass right of way markers that delineate the proposed right of way for all parcels within the project limits.

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.

For all parcels, the Design-Build Team shall locate and install iron pins and 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 I-5719 / U-5800 Traffic Noise Report (TNR) that is based on the Department's preliminary design. The Design-Build Team shall reevaluate the **entire** I-5719B / U-5800 project and develop the Design Noise Report (DNR) based on the plans developed by the Design-Build Team, regardless of changes to the Department's preliminary design. Noise Wall 16 (NW16) and Noise Wall 17 (NW17), identified in the I-5719 / U-5800 TNR, will be reanalyzed and constructed as part of section A of I-5719 (I-5719A). 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. The DNR shall be developed in accordance with the NCDOT 2021 Traffic Noise Policy and the NCDOT 2022 Traffic Noise Manual; and be reviewed and accepted by NCDOT. In accordance with the NCDOT 2022 Traffic Noise Manual, this means the DNR must evaluate noise impacts beyond the project limits: specifically, 800 feet for freeway improvement

projects. However, the Design-Build Team shall design and construct the ultimate typical section of I-85 west of NC 7 (McAdenville Road / Main Street) to accommodate the future construction of NW 16 and NW 17. 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, as well as all costs associated with performing any additional geotechnical investigations necessary to design the foundations, 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 approved 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 *Standard Specifications*, if the accepted DNR (including any subsequent DNR Addenda) and balloting process require more than 1) 55,000.0 square feet of sound barrier wall on the shoulder, 2) 7,000.0 square feet of sound barrier wall off the shoulder, and / or 3) 0.0 square feet of sound barrier wall on a bridge, the amount over the aforementioned square foot areas will be paid for as extra work at the unit prices noted below:

- Sound barrier walls constructed on the shoulder - \$65.00 per square foot
- Sound barrier walls constructed off the shoulder - \$60.00 per square foot
- Sound barrier walls constructed on a bridge - \$70.00 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, bridge attachments / modifications, 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.

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 at least two of those receptors are located within ten times the average height of the proposed sound barrier wall.
- 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, *RDM*, including all revisions effective on the Technical Proposal submittal date, *Standard Drawings*, or as superseded by detail sheets located at:

<https://connect.ncdot.gov/resources/Specifications/Pages/2024-Roadway-Standard-Drawings.aspx>

*Roadway Design Policy and Procedure Manual*, *Roadway Design Guidelines for Design-Build Projects*, *Standard Specifications*, 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 *RDM*, including all revisions, the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* and 2019 Errata, the *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), Shoulder Drain and Under Drain Summary Sheet, 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.
- 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 *RDM*, 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 -L- Line outside shoulder approaching a bridge, the minimum outside bridge rail offset for bridges on the -L- Line 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.
- Unless noted otherwise elsewhere in this RFP, all guardrail / guiderail placement shall be in accordance with the *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 are resurfaced solely to adhere to the resurfacing limits shown in the October 2023 I-5719 / U-5800 Public Meeting Map provided by the Department, 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 Design-Build Team shall provide a 2" x 6" treated wooden rub rail mounted to the back side of all guardrail leading to or trailing from parapets that separate MUPs and travel lanes on bridges. (Reference Standard Drawing No. 862.01)
- 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*, and 2019 Errata or the anticipated / actual posted speed plus five mph. If a speed limit is not physically posted on an existing facility outside the municipal limits of the City of Belmont, General Statutes mandate the speed limit as 55 mph, resulting in a 60 mph design speed. If a speed limit is not physically posted on an existing facility within the municipal limits of the City of Belmont, General Statutes mandate the speed limit as 35 mph, resulting in a 40 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 the 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 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 expansion joint material. (Reference Section 1028-1 of the *Standard Specifications*)
- 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 adjacent 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 Alternative Delivery 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 of the travel way.
- A sag vertical curve low point will not be allowed on any proposed bridge or approach slab.
- Excluding the following -Y-Lines, all -Y- Line / -Y- Line intersection radius points, including service roads, the minimum -Y- Line pavement width shall be 30 feet:
  - -Y7E- (Wimmer Circle #2)
  - -Y7G- (Monastery Lane)
  - -Y7H- (Wimmer Circle #1)
- Excluding grades required to tie to existing, the minimum longitudinal grade shall be 0.50% or 0.30% with Department approval, 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 and intersections within diverging diamond interchanges, the following design vehicles shall be required for all turning movements:
  - WB-62 at all ramp / loop intersections with -Y- Lines (For side-by-side turning maneuvers, WB-62 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 undeveloped parcels, 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 most recent version, in effective on the Technical Proposal submittal date, of the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* and the minimum requirements noted below. Excluding the maximum grade requirement, 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 require 100 feet or longer to tie to existing.
  - 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.
  - Excluding grades required to tie to existing, the maximum driveway grade shall be 10.0%.
  - For shoulder sections, the minimum driveway turnout for residential and commercial properties shall be 16'-0" and 24'-0", respectively, or the existing width, whichever is greater. For curb and gutter sections, the minimum driveway turnout for residential and commercial properties shall be 20'-0" and 28'-0", respectively, or the existing width, whichever is greater.
- The Design-Build Team shall contact Mr. Gary W. Thompson, North Carolina Geodetic Survey Director, prior to disturbing any geodetic monument.
- The project shall follow the NCDOT-FHWA Oversight Agreement. This Agreement will be provided. Any changes that affect previous approvals shall be re-submitted by the Design-Build Team for FHWA acceptance.
- 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.
- Unless noted otherwise elsewhere in this RFP a 4:1 back slope shall extend from the back of the expressway gutter to the clear zone limit. Beyond that, a maximum 2:1 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; and / or 2) cultural, historical or otherwise protected landmarks.
  - To avoid additional right of way impact within the I-85 / NC 273 (Beatty Drive / Park Street) interchange (Exit 27) the Design-Build Team may utilize six feet of 4:1 back slope behind the expressway gutter low point before transitioning to 2:1. The 2:1 slope must be smooth and free from obstacles within the clear zone.
  - To avoid additional right of way impact to Cemetery Road along I-85 the Design-Build Team may utilize six feet of 4:1 back slope behind the expressway gutter low point before transitioning to 2:1. The 2:1 slope must be smooth and free from obstacles within the clear zone.
- Excluding locations to minimize impacts to existing 1) natural gas regulator stations; 2) sanitary sewer lift / pump stations; 3) structures; and / or 4) cultural, historical or otherwise protected landmarks, the front slope of all roadway ditches, including special drainage cut ditches, shall be in accordance with the desirable front slopes for the facility classification. Ditches located adjacent to the -L- Line and all ramps shall be designed and constructed in accordance with the desirable Ditch Type “A”, as shown in the *RDM* Section 4.4.6, Figure 4-4. Along -Y- Lines and along the outside of existing service roads that are modified, realigned and / or improved, the Design-Build Team will be allowed to use the minimum ditch widths for the facility classification.
- 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.) or to existing pavement at tie-in points, 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)
- Excluding areas that could impact cultural, historic or otherwise protected landmarks, the Department prefers that all berm widths behind curb and gutter shall be a minimum of ten feet. Thus, justification, in the Department’s sole discretion, shall be provided for all berm widths that are less than 10-foot outside the aforementioned areas.
- Shoulder berm gutter shall be installed in all fill sections with both 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. Unless required by hydraulic design, the Design-Build Team is not required to install shoulder berm gutter on the high side of superelevated curves with guardrail.
- Cut and fill slope transitions shall not exceed one increment (e.g. 3:1 to 4:1) per 50 feet where tying to existing topography does not control.
- 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.

**NCDOT Information Supplied**

- The NCDOT will provide copies of the I-5719 / U-5800 Categorical Exclusion, the latest list of environmental commitments, municipal agreements 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 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 I-5719 / U-5800 Public Meeting Maps. The Design-Build Team is cautioned that the preliminary designs shown on the aforementioned Maps and electronic design files 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 the I-5719 / U-5800 electronic design files.
- The NCDOT will provide final pavement designs for I-5719 / U-5800. 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 I-5719 / U-5800. 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)



**AESTHETICS SCOPE OF WORK** (04-9-25)**GENERAL**

The aesthetic design and construction of the project shall include aesthetic treatments to roadway, bridge and other elements in a cost and maintenance conscious manner.

The I-5719B / U-5800 Aesthetics are based on input from the Department and Local Governments within the Project Study Area and provides a visual representation of the desired aesthetic theme throughout the I-85 Corridor.

The Design-Build Team is encouraged to consider aspect ratios in the modification of any aesthetic element; but warned that design modifications shall not lessen the visual effect on the travelling public. The Design-Build Team shall ensure that all aspects of the aesthetic features, including but not limited to structural details and dimensions, adhere to the appropriate engineering standards and the RFP requirements.

The Design-Build Team shall provide conceptual drawing and renderings in the Technical Proposal. The Proposer shall also address the attributes of their approach to aesthetics in their Oral Presentation with the Technical Review Committee.

Aesthetic landscaping will not be the responsibility of the Design-Build Team.

**BRIDGE AESTHETICS**

Unless otherwise noted in this RFP, the Design-Build Team shall provide vertical abutments at all proposed bridges. The Design-Build Team shall provide square or rectangle columns and caps for all proposed interior bents.

Bridges within the project limits shall be constructed with the following betterments:

**High End Bridge Aesthetic Betterments**

High End Aesthetic Betterments shall, at a minimum, include the following elements:

- Vertical abutments (MSE), turned-back retaining walls (where used), or parallel wing walls (where used) shall have a brick veneer.
- Interior bent columns and caps shall be square or rectangular.
- Exterior face and bottom of exterior concrete girders, columns, and wingwalls (or earwalls where MSE abutments are used) shall be concrete
- Medallions on the ends of bent caps – City of Lowell logo without name at NC 7 (McAdenville Road / Main Street) and City of Belmont logo without name at SR 2093 (Belmont Mt Holly Road / Main Street)
- Debossed street / name identification on each side of the bridge

- Black protected coated two-bar rail system
- High-End Bridge Aesthetic Betterments shall be applied to bridges at the following locations:
  - NC 7 (McAdenville Road / Main Street) and I-85 (Exit 23)
  - SR 2093 (Belmont Mt Holly Road / Main Street) and I-85 (Exit 26)

**Mid-Grade Bridge Aesthetic Betterments**

Mid-Grade Aesthetic Betterments shall, at a minimum, include the following elements:

- Vertical abutments (MSE), turned-back retaining walls (where used), or parallel wing walls (where used) shall have a brick veneer.
- Interior bent columns and caps shall be square or rectangular.
- Medallions on the ends of bent caps – Gaston County logo without name at SR 2000 (Hickory Grove Road)
- Debossed street / name identification on each side of the bridge
- Black protected coated two-bar rail system
- Mid-Grade Bridge Aesthetic Betterments shall be applied to bridges at the following locations:
  - SR 2000 (Hickory Grove Road) and I-85

**South Fork Catawba River Bridge**

The Design-Build Team shall not provide aesthetics betterments.

**Piedmont and Northern Railway (P & N) Spur Line Bridge**

The Design-Build Team shall, at a minimum, include the following elements:

- Medallions on the ends of bent caps, P& N logo without name.
- Debossed name identification, Piedmont and Northern Railway, on each side of the bridge.
- Railings, shall be either aluminum or galvanized steel, see the Preliminary Concept Drawing – Typical Section
  - Eastern side four bar metal rail
  - Median / center parapet four bar metal rail
  - Western side two bar metal rail
- Steel girders

- Interior bent columns and caps shall be square or rectangular and closely match the existing columns and caps in appearance.
- Shoulder bent columns and caps shall be square or rectangular and closely match the existing columns and caps in appearance.
- Spill through bents shall be constructed

**NC 273 (Beatty Drive) (Exit 27)**

Upon completion of rehabilitation work the Design-Build Team shall pressure wash all existing concrete parapets, slope protection, barriers, and bents (shoulder and center) and apply tinted anti-graffiti coating to the bents and parapets.

The Design-Build Team shall, at a minimum, include the following elements:

- Medallions on the ends of bent caps, City of Belmont logo without name.
- Remove the existing three-bar rail system and replace it with black protected coated three-bar rail system.

Vertical abutments shall at a minimum include concrete bridge quoins, cheek walls, emblems, and wall caps. Any necessary pedestrian railings and decorative fencing shall match all other railings and decorative fencing within the project.

Unless otherwise noted in this RFP, concrete girders are preferred for all new bridges over any roadway. In the event that steel girders are used for these bridges, the steel shall be AASHTO M270 Grade 50 and painted in accordance with the *Standard Specifications*. All steel girders on new bridges on the Project shall be painted the same color as the concrete girders.

Barrier rail or parapet on the bridges shall extend to the end of the MSE turned-back retaining wall before transitioning to guardrail.

Except for the bridge at I-85 over South Fork Catawba River and the bridge for the P & N Spur Line over I-85 all proposed bridge barrier rails on roadways over I-85 shall have black protective coated metal rails.

**Debossed Street / Name Identification on Bridge**

Street / Name Identification signage will be located on the bridge parapet above the outer travel lane, facing the flow of traffic, centered horizontally and vertically. The letter size shall be the same height, legible at 70 MPH, and lengthy crossroad names may use multiple barrier segments.

A reverse mold casting or other accepted means shall be made to accurately create the new identification.

**Medallions**

The proposed medallions on the bents end caps and cheek walls shall match. The Emblems at interior bent(s) shall be placed on the exterior faces where multiple substructure units are used for a single bent line.

**Railings**

The Design-Build Team shall provide railings in accordance with the following requirements:

- Railing shall be continuous from end post to end post of bridge. Each joint in rail length shall be spliced as detailed. Panel lengths of rail shall be attached to a minimum of three posts.
- The end of rail to clear face of concrete end post dimension.
- Cap screws shall be ASTM F593 alloy 305 stainless steel. Washers shall meet the requirements of ASTM F844 except they shall be made from alloy 304 stainless steel.
- Certified mill reports are required for rails and posts. Shop inspection is not required.
- Metal rail posts shall be set normal to curb grade.
- To insure future identification of the fabricator, a permanent identifying mark shall be placed on each post. The method of marking and location shall be such that it does not detract from the appearance of the post, but remains visible after rail placement.
- Shims shall be used as necessary for post alignment.
- Alloy 6351-T5 may be substituted for alloy 6061-T6 where applicable.
- Minor variations in details of metal rail will be considered. Details of such variations, if desired, shall be submitted for approval.

**Aluminum Rails**

The Design-Build Team shall provide aluminum rails in accordance with the following requirements:

- Material for posts, bases and rails, expansion bars and clamp bars shall be ASTM B-221 alloy 6061-T6
- Material for rivets shall be ASTM B316 alloy 6061-T6. Rivets shall be standard button head and cone point cold driven as per drawing.
- The base of rail posts, or any other aluminum surface in contact with concrete shall be thoroughly coated with an aluminum impregnated caulking compound of approved quality
- Material for shims to be ASTM B209 alloy 6061-T6.

### **Galvanized Steel Rails**

The Design-Build Team shall provide materials and galvanizing for galvanized steel rails to conform to the following specifications:

- Post, post bases, rails, expansion bars and clamp bars: ASTM A36 Grade 36 structural steel galvanized to ASTM A123.
- Rivets shall meet the requirements of ASTM A502 for Grade 1 rivets.
- The cut ends of galvanized steel railing, after grinding smooth shall be given two coats of zinc rich paint meeting the requirements of federal specification MIL-P-26915 USAF Type 1, or of Federal Specifications TT-P-641.
- Shims shall meet the requirements of ASTM A1011 for Grade 36, 40, 45 or ASTM A1008 for Grade C and shall be galvanized in accordance with ASTM A123.
- Rail caps shall meet the requirements of ASTM A1011 for Grade 36, 40, 45 or ASTM A1008 for Grade C and shall be galvanized in accordance with ASTM A123

### **SOUND BARRIER WALLS**

Reference the *Sound Barrier Wall – Ground Mounted* Project Special Provision, the *Sound Barrier Wall – Bridge Mounted* Project Special Provision, the *Architectural Concrete Surface Treatment* Project Special Provision, and the Structures Scope of Work found elsewhere in this RFP.

### **RETAINING WALLS AND VERTICAL ABUTMENT WALLS**

Unless otherwise noted elsewhere in this RFP, the traffic face of all retaining walls and vertical abutment walls, including retaining walls in front of roadway bridge end bents, shall be designed and constructed as noted below:

- The Design-Build Team shall design and construct walls with a minimum eight-foot panel width.
- The Design-Build Team shall design and construct all walls visible from I-85 that are 10.5' tall or higher in accordance with the requirements noted below:
  - From the bottom of the single-faced concrete barrier in front of the wall to a minimum six-foot height / maximum seven-foot height, the wall shall be standard smooth finish concrete. The Design-Build Team shall step the top of the aforementioned smooth finish concrete at one-foot vertical per horizontal panel(s).
  - The top of all walls shall have concrete coping of a uniform height. The coping height shall be 18 inches, unless the overall wall height will not accommodate an

additional row of bricks in one or more panels. In which case the coping height shall be uniformly increased.

- From the top of the aforementioned smooth finish concrete portion of the wall to the bottom of the aforementioned concrete coping, all visible sections of the wall shall be brick veneer that provide a traditional brick wall appearance with running bond and header courses. The brick shall match the appearance of the brick used on project bridges and shall be approved by the Engineer prior to installation. If the Design-Build Team designs and constructs a wall behind the aforementioned brick veneer, the Design-Build Team shall provide panel anchor details for the Department's review and approval.
- Throughout all sections of the brick veneer, the Design-Build Team shall design and construct continuous two-foot wide, smoothly finished, concrete vertical dividers in accordance with the requirements noted below:
  - The Design-Build Team will not be required to space the concrete vertical dividers uniformly.
  - Excluding the sections of brick embedded concrete panels directly beneath a bridge, all concrete vertical dividers shall be spaced between 24.0' and 64.0' apart.
  - The Design-Build Team shall design and construct a concrete bridge quoins or vertical divider at all bridge edges.
  - The Design-Build Team shall design and construct a concrete vertical divider at the end of all brick sections.

The Design-Build Team will not be required to include the aforementioned concrete vertical dividers in the Technical Proposal aesthetic renderings.

- The Design-Build Team shall design and construct all walls visible from I-85 that are less than 10.5' tall with standard smooth finish concrete.
- All retaining walls visible to I-85 traffic shall have a brick veneer. The Design-Build Team may utilize full size (2 2/3" x 8" nominal or 2 2/3" x 12" nominal) clay brick. The brick pattern of the retaining walls shall extend a minimum of two feet below the final grade.
- The Design-Build Team shall design and construct all MSE walls that are not visible from I-85 with panels that are rectangular, smoothly finished concrete, and oriented in a horizontal running bond or stacked pattern.
- Unless noted otherwise elsewhere in this RFP, the top of all retaining walls shall be stepped at two-foot vertical per horizontal panel(s).
- The top of retaining walls located between a ramp and the -L- Line shall be sloped to match the ramp profile.
- The top of retaining walls in front of sloped bridge end bents shall be sloped to match the end bent slope.
- The Design-Build Team shall consistently step the top of wingwalls at either two or three-foot vertical per horizontal panel.

**ANTI-GRAFFITI COATING**

The Design-Build Team shall apply anti-graffiti coating that is compatible with the concrete color system / stain on all noise walls. 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 coating shall be clear after full cure. The Design-Build Team shall provide specifications for the anti-graffiti coating and 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.

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 or as required by the manufacture. 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.

Anti-graffiti coating is also required on other elements as required by the Structures Scope of Work found elsewhere in this RFP.

**BRICK VENEER**

The Design-Build Team shall utilize full size (2 2/3" x 8" nominal or 2 2/3" x 12" nominal) clay brick. The full brick along vertical abutments, turned-back retaining walls (where used), parallel wing walls (where used), and retaining walls shall extend a minimum of two-foot below the final grade.

The brick veneer shall be a tricolor brick and one of the following types:

CHEROKEE BRICK  
Windsor

TRIANGLE BRICK COMPANY  
Boylan Heights

PINE HALL BRICK COMPANY, INC.  
Spektra Wire Cut Full Range

OLD CAROLINA BRICK CO.  
Old Post Office

The Design-Build Team has the option of supplying an alternative type of tricolor brick, as long as the tricolor brick selected is approved, in writing, as an equal or approved alternative by the Engineer and the Local Governments.

## ROUNDABOUTS

The Design-Build Team shall design and construct all roundabouts with the following elements:

### **Concrete Collar**

The center island shall have a four-inch thick, ten-foot wide concrete collar from the back of the 9" x 14" concrete curb towards the center of the island. The concrete cap shall be dyed red to match the Federal Standard 10115 or 10233 found in the *AMS Standard 595 Color*.

### **Irrigation System**

The Design-Build Team shall provide the Engineer with a professionally designed irrigation system plan and installation details. Upon Department acceptance of the irrigation system plan and installation details, the Design-Build Team shall install the irrigation system.

Basic installation details for this project include: the system shall be constructed using new pipe, elbows, connectors, controller components, etc. No used, or secondary-market components will be permitted. At a minimum the irrigation system design shall include the location of a backflow preventer / device, shutoff(s) and a drain(s) for winterization, and schedule 40 primed and glued PVC piping appropriately sized to deliver adequate water pressure and flow to pop-up, fully adjustable irrigation heads. Note: the application of PVC approved cleaner / primer and the subsequent application of glue (PVC approved) shall be two-separate applications. The system shall be an electric system with an onsite control box - zoned to deliver uniform, head-to-head coverage of entire planter box surface. No stream-rotors shall be included in the design.

Prior to the start of any work, the Contractor shall verify available static water pressure (PSI) and gallons per minute (GPM) at point of connection to water service. Any replacement, relocation or additional materials required as a failure to check (PSI) and (GPM) shall be done at the Contractor's expense.

The irrigation contractor shall, in the presence of Cities of Belmont and Lowell employees responsible for maintenance of the system, meet the following obligations:

- Explain the complete operation of the system,
- Be available to answer any questions of system operators during the first year of operation,
- Winterize the system, during November of the first year of operation,
- Reenergize the irrigation system in April the following year and check the system for full operation.



Control wire must meet the following installation specifications:

- Wire shall be insulated single strand copper designed for twenty (20) to fifty (50) volts and UL approved as Type U.F. (Underground Feeder),
- Copper conductor must meet or exceed ASTM B-3 requirements,
- Red and white colors shall be available for common and lead-in wires,
- Yellow color shall be provided for spare wires,
- All pipe shall be trenched to a minimum of 12 inches and backfilled with the engineered soil or irrigation may be installed prior to the last 12 inches of engineered soil is installed. The irrigation pipe shall be installed so as to not interfere with plant placement. Control wire and PVC pipe shall be installed in the same trench.

Other irrigation specifications:

- Electrical tape shall be black plastic, three-quarters (3/4) inch wide and a minimum of 0.007 inches thick and the all-weather type,
- All flexible nipples or pipe joints shall be "Toro Funny Pipe"; "Rainbird Swing Pipe"; "Triple Swing Joint Assembly" or approved equal,
- All electrical wire splices must be made watertight with sealing 3M Direct Burial Splice Kit or approved equal,
- Thrust blocking shall be on three (3) inch and larger mainline piping only.

## **FENCING**

The Design-Build Team shall construct all fencing with the following betterments:

### **Control of Access Fence**

All control of access fencing shall be four-foot high and shall consist of the following types of fencing:

- Chain Link fencing shall be Vinyl Coated Chain Link fencing with anodized rails and post. The Vinyl Coated Chain Link fencing, rails, and posts shall be black.
- Woven Wire fencing shall be as listed in the *Standard Specifications*.

### **Permanent Retaining Wall Structures Fence**

All Permanent Retaining Wall Structures fencing shall be Vinyl Coated Chain Link fencing with anodized rails and post. The Vinyl Coated Chain Link fencing, rails, and posts shall be black.

**Ornamental Fencing between the P & N Spur Line and Belmont Rail Trail**

The Design-Build Team shall install four-foot high ornamental fencing between the P & N Spur Line and Belmont Rail Trail, excluding the bridge median / center parapet. The ornamental fencing shall begin approximately 25 feet north of the proposed back of curb of the northeast quadrant of the NC 7 (N. Main Street) / US 29 / 74 (Wilkinson Boulevard) intersection and extend northward to approximately 20 feet of the eastern right of way limits for the proposed SR 2093 (Belmont Mt Holly Road) and P & N crossing. The ornamental fencing shall consist of the following types of decorative fencing:

Ornamental Fence with metal pickets and three rails with a smooth top rail. Ornamental Fence shall be black and one of the following types:

SPECRAIL  
Specrail Commercial (SC)

SPECRAIL  
Saybrook (S4)

AMERISTAR  
AEGIS Plus Majestic 3-Rail

Ultra Aluminum Mfg., Inc.  
UAF 200 Flat Top

The Design-Build Team has the option of supplying an alternative type of ornamental fence, as long as the ornamental fence selected is approved, in writing, as an equal or approved alternative by the Engineer and the City of Belmont.

**SIDEWALKS**

The Design-Build Team shall design and construct all concrete sidewalks with scored joints at five-foot on center. Where used, joint sealant shall be light gray, to match concrete surface.

**CROSSWALKS**

At all crosswalks the Design-Build Teams shall provide the following:

- Curb ramps and ADA Detectable Warning Mats according to ADA and 2024 NCDOT *Roadway Standard Drawing* No. 848.05. Detectable Warning Mats shall be black.
- Where medians are present and a minimum of six-foot in width, provide refuge islands for pedestrians.

## **LIGHTING**

### **Pedestrian Lighting**

The Design-Build Team shall design and install pedestrian lighting requirements noted in the Lighting Scope of Work found elsewhere in this RFP and the requirements noted below:

#### **MUP Lighting on the P&N Spur Bridge**

The Design-Build Team shall design and construct Pedestrian Lighting of the MUP on the P&N Spur Bridge – Interior Wall Lighting in the Parapet (anticipated 12-foot spacing at an anticipated height of 28 inches above the walking surface).

The lighting system for the MUP on the P&N Spur Bridge shall include, at a minimum of one 1-inch conduit, junction box(s) (sized per NEC requirements), luminaire boxes, and fixtures. All lighting shall be LED.

For pedestrian safety and visibility, the Design-Build Team shall provide fixtures to be mounted in the interior concrete parapet at a height a spacing shown on the plans developed by the Design-Build Team. These fixtures shall be small enough to be unobtrusive yet provide ample lighting for users. All pedestrian lighting shall be full cut off / Dark Sky Compliant. Pedestrian light fixtures shall be black, chosen from one of the following types:

FC Lighting  
FCSL2008

FC Lighting  
FCSL2040 (4 Watt)

VISTA Commercial Outdoor Lighting  
1505-L

VISTA Commercial Outdoor Lighting  
1503-L

- Fixture, and other hardware shall be matte black to match the fencing.

The Design-Build Team has the option of supplying an alternative type of fixture(s), as long as the fixture(s) selected is approved, in writing, as an equal or approved alternative by the Engineer and the City of Belmont.

### **Bridge Lighting**

The Design-Build Team shall, at a minimum, install two 3-inch conduits and a single 2-inch conduit with 24" (h) x 36" (w) x 9" (d) formed opening with double plate on the following

bridges within the municipal limits of the Cities of Lowell, McAdenville and Belmont and in Gaston County the Design-Build Team for future lighting, see the Lighting Scope of Work found elsewhere in this RFP:

- NC 7 (McAdenville Road/Main Street) (Exit 23)
- SR 2000 (Hickory Grove Road) – Overpass
- SR 2093 (Belmont Mt Holly Road/Main Street) (Exit 26)

## **DESIGN REQUIREMENTS**

The Design-Build Team shall ensure that the aesthetic details incorporated into the plans developed by the Design-Build Team will meet the appropriate engineering standards and the RFP requirements.

### **Preliminary Design**

After contract award, the Design-Build Team shall clearly present, with appropriate visual aids, the design intent, their aesthetic theme, general plan, color scheme(s) and preliminary details for each design element. The Design-Build Team shall allow 30 days for review of the aesthetic details.

### **Final Design**

The Design-Build Team shall include the accepted aesthetics details with the appropriate submittal of preliminary and final designs plans for each element (bridge, roadway, structure, lighting, etc.)

The Design-Build Team shall develop and submit for review any specifications, material requirements or construction processes needed to accomplish the aesthetic work along with the final design submittal for each element.

### **RFC Design**

The Design-Build Team shall include the accepted aesthetics details with the appropriate submittal of preliminary and final designs plans for each element (bridge, roadway, structure, lighting, etc.)

### **Materials, Construction, and Fabrication**

The Design-Build Team shall demonstrate the long-term durability of any color application (staining, anodizing, painting, etc.) on any feature proposed. Provide a minimum of three test panels, produced in different batches, of each product to demonstrate the consistency of color.

Proposers shall demonstrate in their aesthetics detail show joints will be eliminated or otherwise masked from affecting the overall appearance and continuity of the wall.

Three full size mockup panels will be required for each type of colored concrete / textured element on the project, including but not limited to features that are anodized and / or painted, emblems and embossed street / name identification. At their own risk, the Design-Build Team may elect to use production elements as the test panels.

**ENVIRONMENTAL PERMITS SCOPE OF WORK** (12-19-24)**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 and the NC Department of Environmental Quality (DEQ) Division of Water Resources (NCDWR) Section 401 Water Quality Certification, and Catawba Riparian Buffer Authorization (if applicable).

The Design-Build Team shall not begin ground-disturbing activities, including utility relocations, within the project until NCDOT has performed updated surveys for the Schweinitz's sunflower (*Helianthus schweinitzii*), Dwarf-flowered heartleaf (*Hexastylis naniflora*), and Tricolored bat (*Perimyotis subflavus*) within the project study area during the appropriate survey windows and have received concurrence 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.

The Design-Build Team is advised that the U.S. Fish and Wildlife has issued a tree cutting moratorium for the Tricolored bats from April 1 to October 15. No tree cutting shall be allowed during this period. The tree cutting moratorium may change subject to the conditions of the concurrence from the U.S. Fish and Wildlife Service. The Design-Build Team shall not cut trees prior to the Department receiving concurrence from the U.S. Fish and Wildlife Service.

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:

- The Design-Build Team shall coordinate with the Alternative Delivery 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 Alternative Delivery 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.

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; (3) the Design-Build Team coordinates with the Department to ensure federally-protected species surveys have been performed and resolved, and that the Department

has received concurrence 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, and (4) 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 Alternative Delivery Unit shall be included on all correspondence.

The Department has reached Concurrence Point 4A for I-5719 / U-5800 in the Merger Process used by the environmental agencies and the Department to obtain environmental permits. The Design-Build Team shall participate and present information for Concurrence Point 4B and Concurrence Point 4C that are necessary to complete the Merger Process. 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 Concurrence Point 4B Meeting and Concurrence Point 4C Meeting for January 2026 and April 2026, 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 Concurrence Point obtained or decision 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 / concurrence 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**

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 Merger Process, 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 Concurrence Point 4B Meeting and the Concurrence Point 4C Meeting
- Stormwater Management Plan
- Permit drawings with and without contours and, if necessary, utility drawings with and without contours.
- Wetland Permit 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 303(d) (impaired) streams.

Excluding the Nationwide Permit No. 6 for geotechnical investigations, 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 Concurrence Point 4B Meeting and the Concurrence Point 4C 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 Concurrence Point 4B Meeting and the Concurrence Point 4C 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 Alternative Delivery 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 Alternative Delivery Unit, Resident Engineer, DEO, Hydraulics Unit and EAU for review and approval. The Design-Build Team shall allow 20 working days for the Department to review and approve the draft permit application. If a revised draft permit application is necessary, allow an additional 10 working days for review and approval of the draft permit application. 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.

### **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 and streams due to the I-5719B / U-5800 project construction from the NC Division of Mitigation Services. The amount of mitigation acquired will be based on impacts, as identified in the I-5719 / U-5800 Concurrence Points 2A, 3 and 4A Concurrence Meeting Package.

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 and / or streams 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, avoidance and minimization in jurisdictional areas, compensatory mitigation, FEMA compliance, 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 and stream impacts; and to provide full compensatory mitigation of all remaining wetland and stream impacts. Avoidance measures were taken during the planning and NEPA Process 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 Concurrence Point 4B Meeting and the Concurrence Point 4C Meeting, into the design and / or construction methods at no additional cost or contract time extension. Descriptions of the avoidance and minimization features incorporated into the development and design of the project shall be listed in the appropriate section of the Stormwater Management Plan.

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 I-5719 / U-5800 Categorical Exclusion, all permits, all interagency meetings, and all site visits.

## **Cultural Resources**

Based on the Department's preliminary design, FHWA, NCDOT and SHPO signed a Memorandum of Agreement under Section 106 of the National Historic Preservation Act for this Undertaking. (Reference the May 2024 I-5719 / U-3608 / U-5800 Memorandum of Agreement and the Historic Architectural and Landscapes Assessment of Effects Form \*\*\* Amended\*\*\* dated December 18, 2023 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), and FHWA, 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 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.

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 Alternative Delivery Unit, the NCDOT Historic Architecture Team Leader, the NCDOT Archaeology Team Leader and the NCDOT 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 Nora McCann, NCDOT Project Manager at (919) 707-6043.

**EROSION AND SEDIMENTATION CONTROL SCOPE OF WORK** (8-2-24)

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.

To ensure adherence with the current version of the 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 Alternative Delivery 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 current version of the 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 shall be delineated with a 50-foot from top of bank Environmentally Sensitive Area (ESA) on 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/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/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 (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 Flocculant and / or TRSC-As with Matting and Flocculant 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 (e.g. 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 flocculant 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 eight 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/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/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 eight 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 Flocculant and / or TRSC-As with matting and flocculant 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 (e.g. 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 flocculant 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 (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.
  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 flocculant, 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 and Legend Sheet

- A. Show correct notes: NCG-01, HQW, ESA, clearing and grubbing, etc.
- B. Show correct standards for the 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.
- 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/SoilWaterDocuments2024/Concrete%20Washout%20Structure%20Detail.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 Alternative Delivery Unit and the Resident Engineer. For Reclamation Procedures, see:

**<https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/Contract%20Reclamation%20Procedures.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. In accordance with Division One found elsewhere in this RFP, all additional efforts to maintain environmental compliance shall be considered maintenance of the project and shall not be considered additional work.
- 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. In accordance with Division One found elsewhere in this RFP, the work necessary to recover and repair areas affected by sediment losses shall be considered maintenance of the project and shall not be considered additional work.
- K. Any Erosion Control Design revisions made during construction of the project shall be submitted to the NCDOT Roadside Environmental Unit, via the Alternative Delivery 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 Design-Build Team, and any other pertinent NCDOT personnel before any Erosion and Sedimentation Control Designs are submitted to the NCDOT Roadside Environmental Unit. Erosion and Sedimentation Control Plan submittals shall only be reviewed and accepted by the NCDOT Roadside Environmental Unit 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, the NCDOT may conduct separate field inspections of the project conditions and the erosion control devices throughout the entire project limits. 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 field inspections for the Department'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 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 Alternative Delivery 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.
- 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 current version 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. Ground Cover Stabilization Requirements - NCG010000 (7 - 14 Days)**

Ground cover stabilization shall comply with the timeframe guidelines specified by the current version of the North Carolina Department of Environmental Quality, Division of Water Resources NCG-010000 General Construction Permit. 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 current version of the NCG-010000 General Construction Permit.

#### AA. 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:

###### **August 1 - June 1**

50# Rye Grain  
500# Fertilizer  
4000# Limestone

###### **May 1 - September 1**

50# German or Browntop Millet  
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.

Upon obtaining written approval from the Engineer, the Design-Build Team may use wood mulch and / or ground clearing and grubbing debris as an option for Mid-Term Stabilization. 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 shall be stabilized utilizing the following stabilization protocol:

**All Roadway Areas****August 1 – June 1**

20# Kentucky Bluegrass Cultivars \*  
 75# Hard Fescue Cultivars \*\*  
 35# Bermuda (unhulled)  
 25# Rye Grain  
 500# Fertilizer  
 4000# Limestone

**May 1 – September 1**

20# Kentucky Bluegrass Cultivars \*  
 75# Hard Fescue Cultivars \*\*  
 25# Bermuda (hulled)  
 10# German or Browntop Millet  
 500# Fertilizer  
 4000# Limestone

**Riparian and Wetland Locations****August 1 – June 1**

18# Creeping Red Fescue Cultivars \*\*\*  
 6# Indiangrass  
 8# Big Bluestem  
 4# Switchgrass  
 35# Rye Grain  
 500# Fertilizer  
 4000# Limestone

**May 1 – September 1**

18# Creeping Red Fescue Cultivars \*\*\*  
 6# Indiangrass  
 8# Big Bluestem  
 4# Switchgrass  
 25# German or Browntop Millet  
 500# Fertilizer  
 4000# Limestone

**Areas Beyond the Mowing Pattern, Waste and Borrow Areas****August 1 – June 1**

100# Tall Fescue Cultivars \*\*\*\*  
 15# Kentucky Bluegrass Cultivars \*  
 30# Hard Fescue Cultivars \*\*  
 35# Bermuda (unhulled)  
 25# Rye Grain  
 500# Fertilizer  
 4000# Limestone

**May 1 – September 1**

100# Tall Fescue Cultivars \*\*\*\*  
 15# Kentucky Bluegrass Cultivars \*  
 30# Hard Fescue Cultivars \*\*  
 25# Bermuda (hulled)  
 10# German or Browntop Millet  
 500# Fertilizer  
 4000# Limestone



**\* Approved Kentucky Bluegrass Cultivars**

|               |             |               |               |
|---------------|-------------|---------------|---------------|
| 4-Season      | Blue Velvet | Gladstone     | Quantum Leap  |
| Alexa II      | Blueberry   | Granite       | Rambo         |
| America       | Boomerang   | Hampton       | Rhapsody      |
| Apollo        | Brilliant   | Harmonie      | Rhythm        |
| Arcadia       | Cabernet    | Impact        | Rita          |
| Aries         | Champagne   | Jefferson     | Royce         |
| Armada        | Champlain   | Juliet        | Rubicon       |
| Arrow         | Chicago II  | Jump Start    | Rugby II      |
| Arrowhead     | Corsair     | Keeneland     | Shiraz        |
| Aura          | Courtyard   | Langara       | Showcase      |
| Avid          | Delight     | Liberator     | Skye          |
| Award         | Diva        | Madison       | Solar Eclipse |
| Awesome       | Dynamo      | Mercury       | Sonoma        |
| Bandera       | Eagleton    | Midnight      | Sorbonne      |
| Barduke       | Emblem      | Midnight II   | Starburst     |
| Barnique      | Empire      | Moon Shadow   | Sudden Impact |
| Baroness      | Envicta     | Moonlight SLT | Total Eclipse |
| Barrister     | Everest     | Mystere       | Touche        |
| Barvette HGT  | Everglade   | Nu Destiny    | Tsunami       |
| Bedazzled     | Excursion   | NuChicago     | Unique        |
| Belissimo     | Freedom II  | NuGlade       | Valor         |
| Bewitched     | Freedom III | Odyssey       | Voyager II    |
| Beyond        | Front Page  | Perfection    | Washington    |
| Blacksburg II | Futurity    | Pinot         | Zinfandel     |
| Blackstone    | Gaelic      | Princeton 105 |               |
| Blue Note     | Ginney II   | Prosperity    |               |

**\*\* Approved Hard Fescue Cultivars**

|             |           |            |            |
|-------------|-----------|------------|------------|
| Aurora II   | Eureka II | Oxford     | Scaldis II |
| Aurora Gold | Firefly   | Reliant II | Spartan II |
| Berkshire   | Granite   | Reliant IV | Stonehenge |
| Bighorn GT  | Heron     | Rescue 911 |            |
| Chariot     | Nordic    | Rhino      |            |

**\*\*\* Approved Creeping Red Fescue Cultivars**

Aberdeen      Boreal Epic      Cindy Lou

**\*\*\*\* 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        |                    |

From January 1 – December 31, the Design-Build Team shall apply an additional 20# of Sericea Lespedeza on cut and fill slopes 2:1 or steeper.

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.

### **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.

### **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.

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.

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.

### **Supplemental Seeding**

For all supplemental seeding, the kinds of seed and proportions shall be the same as specified above for *Long Term Stabilization*. 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**

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.

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 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 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*.

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** (08/16/24)**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 March 20, 2023, *Geotechnical Pre-Scoping Comments* for I-5719. 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, Alternative Delivery Unit, and key Design-Build Team members.

Sites of concern within the proposed right of way that are noted in the March 20, 2023, *Geotechnical Pre-Scoping Comments* for I-5719 (including U-5800), plus any other sites identified during the right of way consultation with the Design-Build Team, will be investigated by the Department. The Department shall 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 Alternative Delivery 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 the 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 *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 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**

- Geotechnical Pre-Scoping Comments, I-5719 / U-5800, March 20, 2023
- MicroStation file for sites of concern (I-5719 / U-5800, 64 sites)

### **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 *Standard Specifications*.

**GEOTECHNICAL ENGINEERING SCOPE OF WORK** (12-27-24)**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 prequalified geotechnical firm shall utilize foundations and retaining wall types and systems in the submitted recommendations that have current NCDOT Geotechnical Engineering Unit Standard or Special Provisions, NCDOT *Standard Specifications*, and / or are included on the NCDOT Approved Products List with an “Approved” or “Approved for Provisional Use” product status.

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 Alternative Delivery 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 and Policies, 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 2 standard penetration test (SPT) / rock core borings shall be required per bent for all bent lengths of 50 feet or less. Additional SPT / rock core borings shall be required across the roadway typical section for each bent more than 50 feet long and the borings shall be spaced no greater than 50 feet apart. All borings for pile-supported bents shall be located within 25 feet of the centerline of each bent location to be counted for these minimum requirements. All borings for bents with spread footing or drilled pier foundations shall be performed at opposite ends of each bent, but not greater than 50 feet apart along the bent line as required by bent length noted above, to be counted for these minimum requirements. For structure sites with multiple bridges, borings may be performed between bridges along the bent projection provided the distance between any two borings does not exceed 50 feet. The Design-Build Team shall extend all borings to a depth of 15 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.

Bridge embankments shall be defined as those sections of embankment within 100 feet of a bridge end bent. Roadway embankments shall be defined as all other sections of existing or future embankment associated with the project.

## II. ADDITIONAL DESIGN REQUIREMENTS

### A. Structure Foundations

- Key in spread footings of structures crossing streams a minimum of full depth below the 100-year scour elevation and provide scour protection in accordance with the scour protection detail in the NCDOT *Structures Management Unit Manual*.
- 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”.
- In accordance with Section 7.3.6 of FHWA Publication No. FHWA-NHI-16-009 (Geotechnical Engineering Circular No. 12) dated July 2016, compute and mitigate downdrag loads on piles.
- When the weathered rock or rock elevation is below the 100-year hydraulic scour elevation, the 100-year and 500-year design scour elevations are equal to the 100-year and 500-year hydraulic scour elevations from the structure survey report developed by the Design-Build Team and accepted by the NCDOT Hydraulics Unit. When the weathered rock or rock elevation is above the 100-year hydraulic scour elevation, the 100-year design scour elevation may be considered equal to the top of the weathered rock or rock elevation, whichever is higher, and the 500-year design scour elevation may be set two feet below the 100-year design scour elevation.
- End slopes are required for bridges crossing water (streams, rivers, lakes, etc.) Do not use abutment walls or retaining walls for bridges crossing water.
- End bent fill slopes up to 35 feet in height (defined as the difference between grade point elevation and finished grade at toe of slope) shall be 1.5:1 (H:V) or flatter. End bent fill slopes with heights greater than 35 feet shall be 2:1 (H:V) or flatter. All end bent cut slopes shall be 2:1 or flatter. For 1.5:1 fill slopes, extend end bent slope protection from the toe of slope to berm and to 1.75:1 (H:V) slope or to the limits of the superstructure. For end bent cut slopes and for 2:1 or flatter end bent fill slopes, extend end bent slope protection from the toe of slope to berm and to the limits of the superstructure.
- For box culverts, the Design-Build Team shall provide the following to the Geotechnical Unit, via the Alternative Delivery 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.
- Calculate and report the estimated total settlement and the rate of settlement for the full embankment height for bridge embankments. Add waiting periods, settlement monitoring, and soil improvement techniques to keep long term settlement equal to or less than ½ inch 15 years after reaching final grade. 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.

## **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 *Standard Specifications* use Select Material, Class IV to backfill undercut areas. For undercut backfilling in water, use Select Material, Class III.
- At each location of new embankment, whether full section or partial widening or whether partially or completely new embankment, that is at least ten feet high and 200 feet long, the Design-Build Team shall add a high strength geotextile to the pavement structure design in accordance with the *Geotextile for Subgrade Stabilization* Project Special Provision found elsewhere in this RFP. The aforementioned ten-foot height shall be measured vertically from the toe of the embankment to the top of the outer edge of pavement.
- Unless noted otherwise herein, all unreinforced proposed fill slopes, except bridge end bent slopes (Reference Section A – Structure Foundations), shall be 2:1 (H:V) or flatter. Unless the slopes are designed with adequate reinforcement to provide the required stability, all proposed soil cut slopes shall be 2:1 (H:V) or flatter. Except as allowed below, rock cuts shall be 1:1 (H:V) or flatter. Rock cuts steeper than 1:1 (H:V) and reinforced soil slopes shall only be used if detailed design calculations and a slope stability analysis are submitted to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit, for review and acceptance prior to construction.
- Reinforced soil slopes shall only be used to minimize impacts to existing 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.

- Subsurface / pipe underdrains and shoulder drains shall use coarse aggregate (No. 57 stone).
- 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 the estimated total settlement and the rate of settlement for embankment fill heights equal to roadway finished grade for roadway embankments. Add waiting periods, settlement monitoring, and soil improvement techniques that keep long term settlements equal to or less than one inch 15 years after reaching final grade.
- 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 *Standard Specifications*. A minimum load capacity of 48 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*.
- Geofoam design and construction shall be in accordance with the *Geofoam 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 Geofoam Applications in Highway Embankments, NCHRP Report 529, Transportation Research Board of the National Academies, 2004*.
- Submit soil improvement design recommendations and calculations to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery 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 and calculations. 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 – ultralightweight and lightweight aggregate
- Lightweight fill - foamed (cellular) lightweight concrete
- Lightweight fill - expanded polystyrene (EPS Geofoam Blocks)
- High strength geosynthetics
- 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. Permanent Retaining Wall Structures**

- Roadway retaining walls will not be allowed at any location with more than five feet of scour without the aid of scour countermeasures calculated at the base of the wall.
- For design and construction of mechanically stabilized earth (MSE) retaining walls, refer to FHWA GEC 011 and 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>**

The Design Build Team may substitute lightweight aggregate or other lightweight material for the fine or coarse aggregate required in the reinforced zone of MSE retaining walls. All lightweight aggregate and other lightweight material shall adhere to the aggregate pH and aggregate electrochemical requirements for coarse aggregate noted in the NCDOT Geotechnical Engineering Unit's Standard MSE Wall Provision. Prior to incorporation, 1) the Design-Build Team shall provide documentation that supports the lightweight aggregate and other lightweight material parameter assumptions to the Department for review, and 2) the aforementioned parameter assumptions shall be accepted by the Department.

To accommodate wall settlement, the Design Build Team may stage construct MSE retaining walls.

- 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, unless noted otherwise elsewhere in this RFP. The NCDOT Geotechnical Engineering Unit Project Special Provisions 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, 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 or project commitments. The Design-Build Team shall submit global stability calculations for slopes at retaining walls and obtain acceptance from the NCDOT prior to construction. All fill slopes behind walls shall be 2:1 (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 or within a permanent construction easement.
- 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:
  - 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 drive, re-drive, and / or re-strike all bridge end bent piles within the concurrent construction stage/phase prior to beginning construction of an associated abutment wall or portion thereof.
- 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.
- The Design-Build Team shall use a cohesion value of zero pounds per square foot (psf) for retained materials for all analyses.

#### **E. 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 2024 NCDOT *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 recommended remedial measures shall be accepted by the NCDOT Geotechnical Engineering Unit 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.
- Bridge embankment and roadway embankment settlement monitoring shall be required when the calculated total settlement is greater than or equal to 2 inches. When embankment monitoring is required, construct the roadway embankment and/or bridge embankment to the proposed roadway finished grade prior to monitoring. A minimum of two embankment settlement gages shall be required at each end bent and one embankment settlement gage shall be required every 100' along the roadway embankment when a waiting period of more than one month is recommended in the foundation design recommendation reports developed by the Design-Build Team. Install settlement plates at least one foot below original grade and begin monitoring prior to placing first lift of the embankment. Survey the settlement gage elevations every 2 weeks. The prequalified geotechnical firm that prepares the foundation designs shall review the settlement monitoring data a minimum of every 2 weeks and issue a letter for review prior to releasing the embankment or approach fill from monitoring. Monitoring may not be ended until less than 0.10 inch of settlement is measured over a period of four weeks. The settlement monitoring data shall be submitted to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit, for review and acceptance prior to issuing the release letter.
- When bridge embankment and / or roadway embankment settlement monitoring is not required in accordance with the criterion above, bridge approach fill settlement monitoring shall be performed by the Design-Build Team. After constructing the entire embankment to proposed roadway finished grade within 100 feet of the bridge end bent and prior to construction of the approach slab, the Design-Build Team shall use an appropriate method to monitor settlement across the width of the embankment (from toe to toe) weekly, such as surveyed stakes on finished subgrade or other methods. Submit documentation describing the method and procedures used to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit, for review and acceptance prior to construction of the embankment. Monitoring shall not end until the change in elevation is less than 0.10 inch over a period of four weeks. The prequalified geotechnical firm which prepared the

foundation design recommendation reports shall review settlement monitoring data at least weekly and provide weekly updates to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit. This same firm shall issue a release letter ending the waiting 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 Alternative Delivery Unit, for review and be accepted prior to issuing a release letter.

- The Design-Build Team shall perform settlement monitoring at any bridge site where the foundation design recommendations include a waiting period prior to pile driving to mitigate downdrag loading. After constructing the entire embankment to the elevation stated in the foundation recommendations within 100 feet of the bridge end bent, the Design-Build Team shall use an appropriate method to monitor settlement across the width of the embankment (from toe to toe) weekly, such as surveyed stakes on finished subgrade or other methods. Submit documentation describing the method and procedures used to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit, for review and acceptance prior to construction of the embankment. Monitoring shall not end until the change in elevation is less than 0.10 inch over a period of four weeks. The prequalified geotechnical firm which prepared the foundation design recommendation reports shall review settlement monitoring data at least weekly and provide weekly updates to the NCDOT Geotechnical Engineering Unit, via the Alternative Delivery Unit. This same firm shall issue a release letter ending the waiting 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 Alternative Delivery 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 *Standard Specifications*). 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.
- Perform Dynamic Pile Testing on a minimum of one production pile for each pile size and type for each bridge with driven piles using the approved hammer driving system for the pile. When multiple tests are required by design or during construction, the test piles shall not be located at the same bent, unless approved by

the NCDOT Geotechnical Engineering Unit. Each tested pile shall be driven to the maximum RDR for the end bent / bent(s) the PDA tested pile covers. The spacing between tested piles shall not exceed 400 feet and at least one tested pile shall be located at an end bent. Additional dynamic pile 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 testing. Additional testing may be warranted based on AASHTO LFRD Bridge Design Specifications, variable subsurface conditions, etc. as determined by the NCDOT Geotechnical Engineering Unit. Dual bridges shall be considered as a single bridge when determining the amount and location of required dynamic pile testing.

- A prequalified dynamic pile testing consultant shall perform the required testing, provide reports, and develop pile driving criteria. All dynamic pile testing 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/Contractor%20Prequalification%20Requirements.pdf>**

- Dynamic Pile Testing 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 Dynamic Pile Testing Engineer in responsible charge of the report. In addition, the recommendations within the report shall address the cause of any Integrity Factor (BTA) values less than 100 and clarify the condition of the pile. Dynamic Pile Testing reports with driving criteria recommendations shall be reviewed and accepted by NCDOT prior to driving any production piles at the end bents / bents the tested pile covers. Dynamic Pile Testing reports for miscellaneous piles tested to confirm factored 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 *Standard Specifications* 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) 329-4220.

- 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 Alternative Delivery 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.

**IV. PROJECT CLOSE OUT REQUIREMENTS**

- The Design-Build Team shall submit to NCDOT, via the Alternative Delivery Unit, the following items prior to the close out of the project:
  - One Half-size Plan set of all submissions.
  - Digital files of all submissions [PDF format].
  - Boring files [gINT format]

**HYDRAULICS SCOPE OF WORK** (2-19-25)**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 Alternative Delivery Unit and Hydraulics Review Engineer after acceptance of the Preliminary Roadway Plans developed by the Design-Build Team.

**Design Freeboard for Box Culverts and Pipes**

- For all existing and proposed box culverts and pipes (including all extensions) under routes functionally classified as Major Arterials (interstates and primary routes), including all ramps and loops, a minimum 1.5-foot freeboard shall be required below the shoulder point during the design storm. For all other facilities, including greenways and multi-use trails, the design year water surface elevation shall not exceed the lowest upstream shoulder point elevation of the roadway.
- 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 or Open Roads Drainage and Utilities, including but not limited to incorporating discharges from allowable routing programs.
- Raised median island cuts will not be allowed.
- Unless noted otherwise elsewhere in this RFP, slotted concrete median barrier will not be allowed for permanent installations.
- Slotted concrete barrier will be allowed separating vehicular travel lanes from non-vehicular areas, such as multi-use paths and sidewalks. Slotted barrier discharge shall not drain towards any vehicular travel lanes after passing through the barrier. Slotted concrete barrier will not be allowed for use as an outside bridge rail in permanent conditions or where such use results in direct discharge into waterways or onto any existing / future greenway, railway right of way, travel lane or paved shoulder.
- 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
  - Inside a roundabout or within 50 feet of a roundabout
- Existing and proposed longitudinal pipe (trunkline) shall not be located beneath the proposed roadway travel lanes or beneath proposed barrier rails.
- At all pipe outlets with a ten-year partial flow velocity greater than 15 fps, the Design-Build Team shall provide additional outlet protection that mitigates erosive velocities to receiving downstream channels.
- All storm drainage within any railroad right-of-way shall be designed to Norfolk Southern Railway (NSR) standards. This includes railroad right-of-way owned by railroads other than Norfolk Southern Railway. The Design-Build Team shall use a 100 year design event and a 1.5 maximum HW/D. The Design-Build Team shall provide a minimum of 36-inch diameter for all pipes under track with a minimum cover 4.5 feet from the base of rail to the top of pipe. The Design-Build Team shall provide headwalls at inlets and outlets of all pipes that are greater than 60 inches in diameter.

## 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 exceed 10 feet, shall not encroach into an operational 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 10-1 of the current *North Carolina Department of Transportation Guidelines for Drainage Studies and Hydraulics Design*.
  - Unless allowed otherwise elsewhere in this RFP, for bridges, the hydraulic spread shall not encroach into an operational permanent through lane or an operational temporary through

lane. The hydraulic spread shall not encroach more than a distance that equals half the lane width or six feet, whichever is less, into an operational permanent exclusive turn lane or an operational temporary exclusive turn lane.

- For bridges in urban curb and gutter section roadways and that are classified as a minor arterial, collector, or local road, spread may be allowed into the travel lane consistent with that allowed along the approaches to the bridge.
- For existing bridges with no alteration to the travel lanes or shoulders (location and / or widths), hydraulic spread will be allowed to encroach into an operational travel lane to an extent equal to that present in the existing (pre-project) conditions.
- 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 requirements noted above. If required, the Design-Build Team shall adhere to the bridge drainage system requirements noted below:
  - Unless allowed otherwise elsewhere in this RFP, 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 will be allowed to use closed / suspended drainage systems on bridges carrying railroads when required by Norfolk Southern Railway. Closed / suspended drainage systems on bridges carrying railroads shall be designed to Norfolk Southern Railway (NSR) standards including on bridges carrying railroads not owned by Norfolk Southern Railway.
  - The Design-Build Team shall use 4-inch deck drains adjacent to pedestrian facilities.
  - Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall provide bridge drainage features that prevent direct discharge into waterways or onto any existing / future greenway, railway right of way, travel lane or paved shoulder.
  - The Design-Build Team will be allowed to retain existing deck drains with direct discharge into a waterway for temporary conditions during construction. The Design-Build Team will be allowed to retain existing deck drains with direct discharge into a waterway for permanent conditions where: (1) such deck drains don't require modification for proposed permanent conditions, (2) the total direct discharge to the waterway in the permanent condition is no more than the total direct discharge to the waterway under existing conditions, and (3) the discharge from the drain will not drain directly onto any bridge structure element.
  - The maximum allowable deck drain spacing shall be 12-foot on center.



## **Hydroplaning Analysis**

- 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.
- Mitigation strategies may include optimization of geometric design and pavement surface improvements. Mitigation strategies must meet all other requirements of this RFP. The Design-Build Team shall not use signage or public education as hydroplaning mitigation strategies.
- The Design-Build Team shall include a brief summary of the mainline hydroplaning risk assessment in the Technical Proposal.
- For all interstate facilities, the Design-Build Team shall use a 70-mph speed or the design speed, whichever is greater, for the 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 Design Hydroplaning Risk Assessment Report that shall be included with the Preliminary Roadway Plans submittal for the Department's review and acceptance.
- In addition to Final Design Hydroplaning Risk Assessment Report, 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 May 2022.

- 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 will 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.
- Direct connections from impervious surfaces to the receiving waters shall be minimized to the maximum extent practicable.
- The post-project 100-year frequency peak discharge rate to the railroad right of way shall not be higher than the pre-project 100-year frequency peak discharge rate 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.

## 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 that are less than 48 inches and all metal pipes 48 inches or larger within the project limits, including mill and fill operations or resurfacing in accordance with the *Drainage Pipe Project Special Provision* found elsewhere in this RFP.
- The Design-Build Team shall remove and replace any existing drainage box except for drainage boxes where an existing pipe connection is being retained and no more than one pipe connection is being removed or replaced.

- The Design-Build Team shall remove or fill with flowable fill all existing pipes not retained for drainage.
- The Design-Build Team shall not install permanent elliptical pipe. Elliptical pipe will only be allowed in temporary conditions and all elliptical pipe 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 25% 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.
- On I-85 grass medians that are 26 feet or less in width shall be treated as paved surfaces for impervious surface calculations. Grass medians that exceed 26 feet in width shall be treated as a 13-foot width adjacent to the proposed pavement along each side of the median as paved surfaces for impervious surface calculations. This requirement applies to proposed design calculations and does not apply to outlet analyses comparing pre-project and post-project conditions.
- Revise the *Guidelines for Drainage Studies and Hydraulic Design as follows*:
  - Chapter 7 Table 1, Design Frequency
    - Along I-85, replace the 50-year frequency for Bridges, Culverts, and Cross Pipes with a 100-year frequency
    - Along I-85, replace the 50-year frequency for Storm Drain Systems at Sags (without relief) with a 100-year frequency
    - Design frequency for Temporary / Detours, Storm Drain System on Grade shall be ten years.
    - Design frequency for Temporary / Detours, Storm Drain Systems at Sags (without relief) shall be 25 years.
  - Chapter 7 Table 2, Peak Discharge Method Selection
    - Delete the NCDOT Hwy. Hydrologic Charts column
  - Delete Section 7.4.4 NCDOT Highway Hydrologic Charts
  - Delete Section 7.7, Additional Documentation

- Section 15.6 Temporary Encroachment in Regulatory Floodway
    - Section 15.6 is not applicable on this project. The Design-Build Team shall assume all liability for any flood damages resulting from the temporary encroachment.
  - Unless allowed otherwise elsewhere in this RFP, a maximum HW/D = 1.2 shall not be exceeded for all existing and proposed box culverts and pipes during the design storm.
  - Revise the NCDOT *Pipe Material Selection Guide* as follows:
    - For the Open End Cross Pipes, delete the No. 5 superscript from “Interstate” and “Primary” and add a No. 5 superscript to “Open End Cross Pipes”.
    - Delete Note No. 5 and replace with the following:
      - All open-end cross pipes on interstates and primary routes (US and NC routes), 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 open-end cross pipes on secondary routes 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.
- \*\*NOTE\*\*** Deleted upsizing requirements not applicable for pipes to supplement existing box culverts bullet.
- 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 *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)

- FEMA Crossing (Yes / No)
  - Water Surface Elevation Natural Condition
  - Water Surface Elevation with Drainage Structure
  - HW/D for Build-out Discharges
  - Hydraulic Freeboard for Build-out Discharges
  - Comments
- Unless allowed otherwise elsewhere in this RFP, all proposed drainage boxes, including but not limited to catch basins, drop inlets and junction boxes, shall have a grate or manhole access.
  - The Design-Build Team is not required to provide manhole access to junction boxes that can be accessed through an open-ended pipe inlet or outlet that is 48-inches or greater.
  - All proposed drainage boxes that are greater than 20-foot in depth, including but not limited to catch basins, drop inlets, grated inlets, and junction boxes, the Design-Build Team shall install a minimum 6-foot by 6-foot inside dimension or a 6-foot inside diameter box.

**\*\*NOTE\*\*** Deleted requirements for *NCDOT Design Guidelines For Storm Drainage Pipes Within Walled Roadway Sections*.

- Walled Roadway Sections are any section of roadway where a retaining wall is located on one or both sides of the roadway. A retaining wall (wall) is a structure that holds soil or other material in place. The Wall Zone is the area within a Walled Roadway Section behind the wall for a width equal to twice the wall height and for the full length of the retaining wall. The height of the wall shall be measured as the difference in elevation between the bottom of the deepest retaining wall component and the top of the highest wall component. When a Walled Roadway Section includes walls on both sides of the roadway that are coincidental to a range of project centerline survey stations, the Wall Zone shall be expanded to include the entire roadway section between the walls. Areas beneath a bridge substructure element (foundation), beneath an approach slab, and under a retaining wall shall be considered a Wall Zone and shall meet the Wall Zone requirements. The depth of Wall Zones shall not be limited and are considered to extend to the center of the earth. Median barriers shall not be considered retaining walls for the purpose of determining the Wall Zone when the height of the barrier, measured as the vertical distance from the proposed surface on one side of the barrier to the proposed surface on the other side of the barrier, is less than 4 feet.

The Design Build Team should try to avoid the design of drainage systems within walled roadway sections and Wall Zones. When such systems are unavoidable, storm drainage systems within the wall zone, beneath a retaining wall, or beneath a bridge substructure element shall be sealed/closed systems meeting the following requirements:

**\*\*NOTE\*\*** Deleted Volatile Organic Compound area bullet.

- Storm drainage pipe classified as cross drainage or located under travel lanes, gore areas, paved shoulders, or a retaining wall shall be welded steel pipe with wall thickness as stated in the Hydraulics Guidelines or a minimum wall thickness of 0.5 inches, whichever is

greater. Pipe considered cross drainage shall be welded steel pipe across the entire walled roadway section.

- Within the Volatile Organic Compound area of potential contamination, sealed ductile iron pipe or welded steel pipe shall be used for all storm drainage pipe not classified as cross drainage or located under travel lanes, gore areas, paved shoulders, or a retaining wall.
- Outside the Volatile Organic Compound area of potential contamination, polypropylene or welded steel pipe shall be used for all storm drainage pipe not classified as cross drainage or located under travel lanes, gore areas, paved shoulders, or a retaining wall. Polypropylene pipe must have watertight joints that conform to ASTM D3212.
- Storm drainage pipes shall not pass through a retaining wall.
- The sealed/closed system requirements and pipe connection requirements apply to the full length of any pipe that passes through a wall zone. For example, a pipe that passes through a wall zone and then exits the wall zone before connecting to a drainage structure, must meet sealed system requirements for the full length of the pipe and meet the pipe connection to drainage structures requirements at the drainage structure even if the drainage structure is outside of the wall zone.
- **\*\*NOTE\*\*** Deleted 6-inch pipe extension into drainage structures bullet.
- Resilient connectors conforming to ASTM C923 or the pipe collar alternative shall be used at all pipe connections to drainage structures. A Pipe Collar Drainage Structure Detail will be provided by the Department.
- Pipes shall extend 6 inches into the drainage structure at all pipe connections to drainage structures using resilient connectors.
- Where resilient connectors are used, the Design Build Team shall design the storm drain system such that pipe connections to drainage structures are as close to 90 degrees horizontally and 0.3% vertical slope as possible to minimize the deflection angle at the connection. The deflection angle between the pipe and drainage structure shall not exceed what is specified in ASTM C923.
- Drainage structures such as inlets, manholes, and junction boxes, within the wall zone or directly connected to a pipe that passes through a wall zone shall be precast. Traffic bearing pre-cast drainage structures shall be used under travel lanes, gore areas, paved shoulders, and within four feet of a travel lane.
- Drainage structure depth shall be limited to the maximums in the 2024 NCDOT *Roadway Standard Drawings (Standard Drawings)*.
- Elbows may be used to avoid exceeding the maximum structure depth and to reduce deflection where a drainage pipe connects to a drainage structure using resilient connectors.
- An independent contractor not affiliated with the construction contractor shall perform a post-construction inspection of all drainage system components within walled roadway sections immediately upon completion of installation. Inspections shall be performed by NASSCO certified personnel using a Closed Circuit Television Video (CCTV) steerable pipe crawler/rover that is tethered to a cable reel. Other types of equipment should only be used with prior agreement of the NCDOT Construction Engineer. Equipment must be capable of capturing 360 degree views from within the pipe or storm drain system and all required data and measurements. Documentation of each inspection shall be provided to NCDOT for review and acceptance. At a minimum, the documentation shall include a video inspection and a corresponding report.

The camera must be centered in the pipe during video inspections and must show the entire circumference of the pipe. Video inspections should provide accurate distance measurements of features in the pipe or network and footage measurements shall be displayed and documented in the video. Video should be continuously metered. A maximum video size of 1.5GB is recommended. Acceptable file formats are .avi, .mkv, mp4, mpeg, .mpg, or .wmv with .mp4 being the preferred format.

The inspection report shall identify the following:

- Structural integrity of each pipe joint connector, including welded steel pipe joints, and each pipe connection to a drainage structure including, but not limited to, joint or connector damage, failure, separation, and offsets.
- Length between the end of the pipe and the internal wall of the drainage structure at each pipe connection to a drainage structure
- Longitudinal, transverse, circumferential, and multidirectional cracking or deflection
- Seepage and infiltration into the pipe
- Pipe or connection failures including, but not limited to, differential settlement, material deformation, and puncture holes.
- The location of each item noted as measured from the outlet of the pipe.

Prior to inspection, pipes should be clean enough to ensure all defects, features and observations are seen and logged. Any pipe cleanout required prior to inspections governed by this guidance shall be considered incidental and will not be paid for as extra work. The contractor shall get approval from the NCDOT Construction Engineer prior to performing any necessary cleanout.

- Throughout the project limits, the Design-Build Team shall analyze all drainage structures that are located within the existing / proposed right of way for hydraulic and structural deficiencies, unless allowed otherwise elsewhere in this RFP. Within -Y- Line construction limits, the Design-Build Team will not be required to analyze existing cross pipes that will not be lengthened if no additional discharge from the project is being generated. Using the hydraulic discharges required in this Scope of Work, drainage structures that do not adhere to the requirements in Sections 9.6.1.4 and 9.6.2.3 of the Guidelines for Drainage Studies and Hydraulic Design, including all addenda, memos and revisions, and / or the freeboard and HW/D requirements noted above, shall be deemed hydraulically deficient. Based on these analyses, the following shall be adhered to:
  - The Design-Build Team shall provide the appropriate hydraulic mitigation for 1) all hydraulically deficient drainage structures and 2) all hydraulically and structurally deficient drainage structures, including but not limited to replacement. For major hydraulic crossings (crossings requiring a hydraulically effective waterway opening of thirty (30) square feet or more, excluding any area that is buried below the streambed and any area provided solely for upsizing requirement), the Design-Build Team shall 1) remove all hydraulically, or hydraulically and structurally, deficient box culvert(s) and / or pipe(s), unless allowed otherwise elsewhere in this RFP, and 2) replace the aforementioned box culvert(s) and / or pipe(s) with a box culvert or pipe(s). Inlet improvements outside the

right of way shall not be allowed to mitigate for hydraulically deficient box culverts and / or pipes. Based on build-out discharges, the Design-Build Team shall identify all hydraulically deficient drainage structures and note their proposed mitigation in the Technical Proposal. At a minimum, in the Technical Proposal, Volume II, the Design-Build Team shall 1) identify all hydraulically deficient storm drainage systems and the proposed mitigation on the plans, and 2) provide a Box Culverts and Cross Pipes Hydraulic Deficiency Assessment and Proposed Mitigation Table that contains the box culvert and cross pipe attributes noted below:

- Station
  - Existing Box Culvert / Cross Pipe Details
  - Drainage Area
  - Percent impervious or “C” value used
  - Discharge method used
  - Build-out Discharges (Design Year and 100 year)
  - Hydraulically Deficient (Yes / No) for Build-out Discharges\
  - Proposed Mitigation Structure(s) Details
  - HW/D for Build-out Discharges at Existing Structure without Mitigation
  - HW/D for Build-out Discharges at Existing Structure with Mitigation
  - Hydraulic Freeboard at Sag for Build-out Discharges at Mitigation Structure(s)
  - Comments
- Pipes within storm drainage systems that intercept and / or convey any offsite water from one side of a roadway to the other shall be considered a cross pipe if any of the following inlet conditions apply:
- Open end
  - Berm Drainage Outlet (BDO)
  - Open Throat Catch Basin (OTCB)
- The cross pipe designation shall apply to all pipes in the storm drainage system that convey the offsite water flow from the aforementioned inlet to the outlet.
- Excluding welded steel pipes installed using trenchless construction methods, the maximum pipe diameter shall be 72 inches.
- For all proposed cross structures requiring a hydraulically effective waterway opening of thirty square feet or more, excluding any area that is buried below the streambed and any area provided solely for upsizing requirements, 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) or single drainage structures in series. More than one line of pipe and / or three (3) box culvert barrels serving the same watershed shall not be allowed.



- To ensure that all pipes and box culverts retained for drainage purposes are structurally sound, the Design-Build Team shall provide appropriate documentation, in the Department's sole discretion, for the Department's review and approval prior to any hydraulic design submittal. At a minimum, the aforementioned documentation shall include a video inspection of each pipe and box culvert retained for drainage purposes, and a corresponding inspection report. The video inspection shall be performed with a Closed Circuit Television Video (CCTV) steerable pipe crawler / rover that is tethered to a cable reel and capable of capturing 360° views from within the pipe or box culvert. The inspection report shall identify the elements noted below for each pipe and box culvert retained for drainage purposes:
  - Structural integrity of each joint, in its entirety, including but not limited to joint failure, joint separation and joint offsets
  - Longitudinal, transverse circumferential and multi-direction cracking
  - Spalling
  - Seepage and infiltration into the pipe
  - Pipe failures, including but not limited to differential settlement, material deformation and puncture holes

The Design-Build Team shall also provide the location of each item noted above, as measured from the outlet end of the pipe. If, for any reason, the video inspection or report is incomplete or inconclusive, the Design-Build Team shall perform another inspection and develop another report at no additional cost to the Department. Prior to performing any storm drain clean-out required for the aforementioned video inspections, the Design-Build Team shall obtain approval from the Engineer. In accordance with Subarticle 104-8(A) of the 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*, required storm drain clean-out will be paid for as extra work.

As directed by the Engineer, the Design-Build Team shall provide the appropriate structural mitigation for all structurally deficient box culverts and / or pipes. Structural mitigation, for structural deficiencies in box culverts and / or pipes, including but not limited to all design and repair costs, will be paid for as extra work in accordance with Subarticle 104-8(A) of the *Standard Specifications*.

### **Roundabout Design**

- The Design-Build Team shall design roundabouts such that storm drainage is intercepted upstream and downstream of the roundabout and vertical profiles and cross slopes facilitate drainage passing through the roundabout without the need for drainage inlets within the inscribed circle of the roundabout. The inscribed circle diameter is the distance across the circle inscribed by the outer curb (or edge) of the circulatory roadway.
- The Design-Build Team shall keep drainage inlets 50-feet or more from the roundabout inscribed circle diameter to the maximum extent practical.

- The Design-Build Team shall create approaches with normal crowns and rotate the pavement as necessary to meet the roundabout profile in as short a distance as possible and avoid placing drainage structures in splitter islands to the maximum extent practical.
- In cases where storm drainage trunk lines must follow the road through the roundabout, the Design-Build Team shall chord the pipe around the exterior perimeter of the roundabout. The Design-Build Team shall not run storm drainage systems under the roundabout and shall not place pipes under the curb line of the inscribed circle. The Design-Build Team shall use grated inlets or junction boxes with manhole covers at deflection points in the trunk line.
- If drainage structures must be placed within the roundabout, the Design-Build Team shall not use catch basins within the roundabout. If drainage structures within the roundabout are unavoidable, the Design-Build Team shall use *Standard Drawing* No. 840.39 Steel Grate and Frame - Bicycle Safe.
- The Design-Build Team shall include in the Technical Proposal a brief summary of the roundabout design noting how the above requirements will be met.

### **Permit Coordination**

- The Design-Build Team shall conduct a Concurrence Point 4B Meeting and a Concurrence Point 4C Meeting for I-5719B / U-5800 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 Concurrence Point 4B Meeting and Concurrence Point 4C Meeting for I-5719B / U-5800 shall be the Design-Build Team's responsibility. A minimum of five weeks prior to the appropriate Concurrence Point 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 to the Alternative Delivery Unit. The Design-Build Team shall take minutes of the Concurrence Point 4B Meeting and the Concurrence Point 4C Meeting and provide them to the Department within three business days of the aforementioned meetings.

### **FEMA Regulated Streams**

- For all FEMA regulated streams impacted by the Design-Build Team's design and / or construction, the Design-Build Team shall adhere to the current *Guidelines for Drainage Studies* and *Hydraulics Design*, including all addenda, memos and revisions, and the following requirements:
  - The Design-Build Team shall prepare a CLOMR or MOA package for the Department's submittal to the North Carolina Floodplain Mapping Program (NCFMP). The Design-Build Team shall obtain NCFMP approval prior to performing any construction activity in a FEMA regulated floodplain.

- Where a CLOMR is required, the structure shall be designed such that no more than 0.5 feet of rise occurs between the Corrected Effective and the Revised Conditions for the 100-year water surface elevation.
- The Design-Build Team shall notify the Alternative Delivery Unit, in writing, of all structures that may require purchase due to an increase in the 100-year water surface elevation. The Department will be responsible for all surveys to ascertain insurable structures within the impacted area of the floodplain(s). The Design-Build Team shall discuss the extent and limits of the rise in water elevation in the floodplain(s), identify potentially impacted structures, specify areas anticipated to require additional surveys and estimate the anticipated additional right of way impacts outside the project construction limits in the Technical Proposal. (Reference the Right of Way Scope of Work found elsewhere in this RFP.)
- The Department will be responsible for all fees associated with the CLOMR(s) and / or MOA(s).
- The Design-Build Team shall ensure that construction and / or removal of all structures in FEMA regulated floodplains adheres to the approved CLOMR(s) and / or MOA(s). Within three months of completion of work in a FEMA-regulated floodplain, the Design-Build Team shall provide As-Built Plans of the site, and a completed As-Built Certification Review Form that verifies construction and / or removal adheres to the approved CLOMR(s) and / or MOA(s).
- The Design-Build Team shall prepare a new FEMA model and / or package and be responsible for all associated costs resulting from any construction variation from the approved CLOMR(s) and / or MOA(s).
- The Department will allow no direct contact between the Design-Build Team and the NCFMP representatives. No contact between the Design-Build Team, the NCFMP and / or personnel under contract with NCFMP shall be allowed by phone, e-mail, or in person, without Department representatives present. A representative from the Alternative Delivery Unit shall be included on all correspondence.
- Temporary impacts due to construction and / or on-site detour traffic that 1) last longer than one year and / or 2) encroach into the floodway, shall be reviewed by the Design-Build Team for changes in the water surface elevations that could impact structures or have adverse impacts to the surrounding property. The results of the review shall be submitted to the Hydraulics Unit in a report format for the Department's coordination with NCFMP. The report shall include the effects of the temporary impact on the floodplain under a 1% chance flood (100-year flood) and identify all insurable structures affected by any increase in Base Flood Elevation (BFE) during a 1% chance flood event. State Floodplain Compliance (SFC) or Conditional Letters of Map Revision (CLOMR) approvals are not required for the temporary encroachment into the FEMA-regulated floodway, provided there is no permanent modifications, and the site of the temporary encroachment is returned to pre-project conditions.

**Right of Way / 60% Roadway Plans**

- To ensure that all NCDOT hydraulic comments have been addressed, the Design-Build Team shall concurrently submit a copy of the Right of Way / 60% Roadway Plans and revised 100% Hydraulics Design Plans to the Hydraulics Unit for review and acceptance with the Right of Way / 60% Roadway Plans submittal.

**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 North Carolina Division of Highways *Guidelines for Drainage Studies and Hydraulics Design*, including all addenda, memos and revisions, excepted as may be amended herein
  - The 2024 NCDOT *Roadway Standard Drawings (Standard Drawing)*
  - 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 *Guidelines for Drainage Studies and Hydraulics Design*, including all addenda, memos and revisions, unless noted otherwise elsewhere in this RFP.

**ITS SCOPE OF WORK** (4-9-25)**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 Alternative Delivery 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 I-5719A / U-6044 and I-5719C Design-Build Teams and the Broadband Fiber OMC Contractor throughout the project duration.

The Design-Build Team shall design, furnish, and install fiber-optic communications, new Closed-Circuit Television (CCTV) cameras and new Dynamic Message Signs (DMS) within the project limits. The Design-Build Team shall integrate the new CCTV cameras and DMS into the “Statewide ITS Network”. Major items of work include, but are not limited to, the following:

- Install new and/or Relocate fiber optic communications infrastructure, Drop Cables, and / or ITS devices as required to maintain connectivity.
- Install Six (6) CCTV cameras on metal poles.
- Install Two (2) DMS on pedestal structures.
- Dynamic Trailblazer Signs

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 Regional ITS 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. The Design-Build Team shall be responsible for repairs at no additional cost to the Department. The Design-Build Team shall be required to have locate personnel on site, dedicated to locating and preventing damage to the existing/relocated NCDOT and OMC infrastructure any time they are working within fifty feet of said infrastructure.

Perform all work in accordance with the ITS Project Special Provisions found elsewhere in this RFP, the 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*, the 2024 NCDOT *Roadway Standard Drawings (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/TSMO-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 device that is integrated with the "Statewide ITS Network" at, or within one quarter of a mile of, all permanent ITS device locations in active construction areas that are proposed or existing until a final permanent ITS device is installed and integrated with the "Statewide ITS Network". The portable ITS devices shall be installed and integrated with the "Statewide ITS Network" prior to beginning any activity that will impede the traffic on I-85. All portable ITS devices shall communicate with the "Statewide ITS Network" by means of a Department supplied cell modem. Portable ITS device 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 ITS devices used at proposed locations shall be in addition to the portable ITS device and/or CMS required for work zone traffic control and incident management during construction. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

**The existing NCDOT ITS Fiber and OMC Fiber throughout the project shall remain operational at all times throughout the project construction.**

### **Intermediate Contract Time #1 & #2 for Failure to Report a Damaged NCDOT Communications Infrastructure and / or Damaged OMC Communications Infrastructure**

A Broadband Fiber Compensation Event (BFCE) is defined as any damage to existing communication infrastructure that actually disrupts the service provided by such infrastructure. The Design-Build Team shall report damage to existing communication infrastructure caused by the Design-Build Team to the Engineer, Regional ITS Engineer, OMC Contractor and the STOC within one hour of the damage occurring. The OMC Contractor shall repair all damage to the communications infrastructure. The Design-Build Team shall be responsible for all costs associated with these repairs as well as any costs associated with a Broadband Fiber Compensation Event (BFCE) caused by an unplanned cut or damage up to the limits defined below. Communications infrastructure includes but is not limited to, Fiber-optic cable, underground conduit, micro-duct conduit, junction boxes, tracer wire, electrical service conductors, grounding arrays, equipment cabinets and electrical services.

**Liquidated Damages for Intermediate Contract Time #1 for failure to report a damaged NCDOT fiber optic communications cable and / or a damaged OMC fiber optic communications cable within one hour are \$1,000.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #2 for a Broadband Fiber Compensation Event (BCFE) are \$5,600.00 per hour or any portion thereof up to a maximum of \$135,000 per event.**

**Intermediate Contract Times #3 and #4 for Failure to Reestablish NCDOT Fiber Optic Communications and / or OMC Fiber Optic Communications After a Planned Disruption**

During construction, the Design-Build Team shall coordinate any planned disruption in NCDOT fiber optic communications and / or planned disruption in OMC fiber optic communications with the Engineer, the NCDOT Division Traffic Engineer, the OMC Contractor and the STOC. The Design-Build Team shall notify the Engineer, the NCDOT Division Traffic Engineer, the OMC Contractor and the STOC a minimum of fourteen (14) days prior to all planned disruptions in fiber optic communications. The Design-Build Team shall reestablish the NCDOT fiber optic communication within eight hours of a planned disruption. The OMC contractor shall cut, splice, and reestablish the OMC fiber communications.

A minimum of 30 calendar days prior to any planned disruption in NCDOT fiber optic communications and / or OMC fiber optic communications, the Design-Build Team shall develop and provide a plan for the Department's approval that defines 1) an anticipated planned disruption timeframe, 2) a plan of action for reestablishing NCDOT communications within eight hours of the planned disruption and 3) the coordinated plan from the OMC contractor to perform their portion of the work.

**Liquidated Damages for Intermediate Contract Time #3 for failure to reestablish NCDOT fiber optic communications within eight hours of a planned disruption are \$1,000.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #4 for failure to provide a plan 30 calendar days prior to work that defines 1) an anticipated planned disruption timeframe, 2) a plan of action for reestablishing NCDOT communications within eight hours of the planned disruption and 3) the coordinated plan from the OMC contractor to perform their portion of the work. are \$10,000.00 per failure.**

**Intermediate Contract Time #5 for Failure to Restore Operation to ITS Device after an unplanned disruption**

The Design-Build Team shall maintain the operation of all permanent and temporary ITS devices integrated with the "Statewide ITS Network" that have not been turned over to the OMC Contractor for maintenance. If device operation is disrupted, the Design-Build Team shall restore operation within 24 hours or provide a replacement/portable ITS 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 #5 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.**

**Intermediate Contract Time #6 and #7 for Failure to Reestablish Dynamic Message Sign Operation after a Planned Disruption**

During construction, the Design-Build Team shall coordinate any planned disruption in Dynamic Message Sign (DMS) operation with the Engineer, the Division Traffic Engineer, the OMC Contractor and the STOC. The Design-Build Team shall notify the Engineer, the Division Traffic Engineer, the OMC Contractor and the STOC a minimum of seven calendar days prior to all planned disruptions in DMS operation. The Design-Build Team shall reestablish DMS operation within 72 hours of a planned disruption, including full access and control from the STOC and the Regional TMC via fiber optic cable or cellular modem. This ICT only applies when a temporary Connected CMS is not in place.

A minimum of 21 calendar days prior to any planned disruption in the DMS operation, 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 DMS operation, including full access and control from the STOC and the Regional TMC via fiber optic cable or cellular modem, within seventy-two (72) hours.

**Liquidated Damages for Intermediate Contract Time #6 for failure to reestablish DMS operation within 72 hours of a planned disruption are \$500.00 per hour or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #7 for failure to provide a plan that defines 1) an anticipated DMS planned disruption timeframe and 2) a plan of action for reestablishing DMS operation a minimum of 21 calendar days prior to a planned disruption are \$10,000.00 per failure.**

**Intermediate Contract Time #8 and #9 for Failure to Reestablish CCTV Operation after a Planned Disruption**

During construction, the Design-Build Team shall coordinate any planned disruption in CCTV operation with the Engineer, the Division Traffic Engineer, the OMC Contractor and the STOC Supervisor. The Design-Build Team shall notify the Engineer, the Division Traffic Engineer, the OMC Contractor and the STOC a minimum of seven calendar days prior to all planned disruptions in CCTV operation. The Design-Build Team shall reestablish CCTV operation within 24 hours of a planned disruption, including full access and control from the STOC and the Regional TMC via fiber optic cable. This ICT only applies when a Portable CCTV is not in place.

A minimum of 21 calendar days prior to a planned disruption in CCTV Operation, 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 CCTV operation, including full access and control from the STOC and the Regional TMC via fiber optic cable, within 24 hours.

**Liquidated Damages for Intermediate Contract Time #8 for failure to reestablish CCTV operation within 24 hours of a planned disruption are \$500.00 per hour or any portion thereof.**



**Liquidated Damages for Intermediate Contract Time #9 for failure to provide a plan that defines 1) an anticipated CCTV planned disruption timeframe and 2) a plan of action for reestablishing CCTV operation a minimum of 21 calendar days prior to a planned disruption are \$10,000.00 per failure.**

## **DESIGN REQUIREMENTS**

The Design-Build Team shall furnish and install all new ITS field equipment for this project.

### **Communications**

If any sections of the Existing NCDOT Broadband conduit system and / or fiber conflict with the I-5719B / U-5800 Project and require relocation, the Design-Build Team shall relocate the conduit and / or fiber prior to beginning any ground disturbing construction activities in proximity to the existing conduit and / or fiber.

Before cutting or splicing the NCDOT Broadband conduit and / or fiber, the Design-Build Team shall install new conduit, fiber-optic cable, junction boxes, and all other required ITS infrastructure devices. These components must be fully compatible with those installed under the NCDOT Broadband project, and the type, number, and color of the relocated ITS infrastructure and devices shall match the existing system.

The Design-Build Team shall maintain the full operation of the Broadband / ITS fiber during construction for the full duration of the project. During the phasing of construction, the Design-Build Team may perform planned cuts and relocations of the Broadband conduit and fiber. Proper coordination and planning shall be conducted for each planned interruption (Reference the ITS Project Special Provisions and in the applicable ITS Intermediate Contract Times found elsewhere in this RFP).

Before project completion, no fiber-optic cable within the project limits shall have more than four (4) reel-to-reel splices and shall be located in an underground conduit system matching the requirements described elsewhere in this RFP. The Design-Build Team shall replace any necessary lengths of fiber-optic cable and / or conduit to meet this requirement before project acceptance.

A reel-to-reel splice is defined as a splice enclosure containing two (2) fiber-optic cables that have been spliced together one-to-one after being intentionally or unintentionally cut, installed, or relocated.

If the NCDOT Broadband fiber is not installed when I-5719B / U-5800 construction starts the Design-Build Team shall coordinate designs and construction with the Broadband project Design-Build Team to ensure there is no delay in installing the Broadband Fiber through the project limits. This coordination may include the use of temporary pole lines or temporary conduit runs to allow the installation of the Broadband fiber during the I-5719B / U-5800 construction. Final conduit and fiber layout shall be all underground and will match the conduit and fiber template used on the rest of the Broadband Fiber Project.

**The NCDOT Broadband fiber network, which includes the NCDOT fiber and OMC fiber, shall remain operational through the duration of the project.**

In conjunction with the cut-over and splicing of a relocated fiber-optic communications cable, the Design-Build Team shall perform OTDR testing to allow for minimum downtime and faster acceptance time. The aforementioned OTDR testing shall be performed in accordance with the *Standard Specifications* requirements. (Reference the Maintenance and Repair Section below) Downtime for any relocated fiber-optic cable shall not exceed eight hours. (Reference ICT Nos. 2 and 3)

In each junction box, the Design-Build Team shall label all relocated fiber cables as follows:

- Label 96-fiber cable “NCDOT ITS TRUNK LINE”
- Label 144-fiber cable “NCDOT DEVICE LINE”
- Reference the OMC Conduit and Fiber Optic Section below for OMC conduit and fiber requirements

ITS devices shall be spliced into the 144-fiber device line, **NOT** into the 96-fiber ITS trunk line.

➤ **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”. The Design-Build Team shall store 20 feet of spare drop cable in each device cabinet.

➤ **OMC Conduit and Fiber Optic Cable**

The OMC Contractor’s conduit and OMC fiber optic cable runs through the green commercialization conduit. Prior to performing any work on the OMC conduit or 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 and label the fiber as required by the OMC Contractor.

## **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. All new Ethernet edge switches shall be approved for use on the Statewide ITS network by NCDIT. The NCDIT will provide configuration information

for the new Ethernet edge switches. The Design-Build Team shall coordinate the installation and configuration of the new Ethernet edge switches with NCDIT for integration into the Statewide ITS network.

### **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 design, furnish and install six (6) new CCTV cameras at the locations listed below. The Design-Build team shall relocate any existing CCTV that conflicts with the I-5719B / U-5800 construction. The Design-Build Team shall install new CCTVs with all new equipment on new 70-foot metal poles with lowering devices at locations that provide optimum viewing of I-85 and any arterial routes. All CCTV camera installations, including equipment cabinets and metal poles, shall comply with the requirements of the Project Special Provisions found on the NCDOT ITS and Signals Unit Design Resources website.

- Existing CCTV I-85 Exit 23
- Existing CCTV I-85SB MM 24 (relocate to west side of Hickory Grove Rd.)
- Existing CCTV I-85 Exit 26
- Existing CCTV I-85 Exit 27
- New CCTV I-85 MM 24 – East side of South Fork River Bridge
- New CCTV I-85 SB MM 25

Determine the exact location of each CCTV camera, obtain the Regional ITS 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 and relocated CCTV camera locations. The Design-Build Team shall use step-up and/or step-down transformers if necessary to provide power. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the *Standard Specification*, the project special provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

### **DMS Locations**

The Design-Build Team shall install two (2) new DMS assemblies at the locations listed below. The Design-Build Team shall install new DMS assemblies on new pedestal structures. The design-build team shall confirm structure type with the Regional ITS Engineer and the STOC. DMS locations shall be coordinated with static signing plans. Any DMS sign on a gantry structure spanning the roadway shall have full length catwalks and access ladders on the shoulder end of the structure. All DMS assembly installations, including DMS structures, shall comply with the

requirements of the applicable Project Special Provisions found on the NCDOT ITS and Signals Unit Design Resources website as well as the *Standard Specifications*.

- Existing DMS I-85 SB MM 27.5
- Existing DMS I-85 NB MM 28

The Design-Build team shall not remove existing DMS until it becomes necessary due to construction conflicts and until a portable CMS is ready to be deployed in its place or the replacement permanent DMS is installed and operational.

The Design-Build Team shall deploy a full matrix Connected CMS that is connected to the State ITS network via department supplied cellular modem at the new DMS locations at the start of construction until the final DMS is installed and operational. These Connected CMS are separate and in addition to any CMS used for traffic control or incident management. Connected CMS signs are listed on the ITS & Signals Qualified Products List (QPL) and may also be submitted for review and approval but the NCDOT ITS Design Unit.

Determine the exact location of each DMS, obtain the Regional ITS Engineer's written approval of the locations, and install the DMS.

Install new electrical service equipment at all new and relocated DMS locations. The Design-Build Team shall use step-up and/or step-down transformers if necessary to provide power. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the *Standard Specification*, the project special provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

### **Dynamic Trailblazer Signs**

The Design-Build Team shall maintain the operation of, relocate, or replace as needed the three Dynamic Trailblazer Sign (DTB) locations listed below as they are impacted by construction activities. DTB locations that cannot remain operational during construction shall have a Connected CMS sign with a Department supplied cell modem in place before the DTB location is taken down. DTB locations that are removed or replaced shall be re-installed in a manner that is

identical to the existing setup and complies with all applicable NCDOT standards and project special provisions.

- US 29-74 at NC 273 – 12-0562 - Two DTB Sign locations
  - US 29-74 Eastbound
  - US 29-74 Westbound
- US 29-74 at NC 7 – 12-0561 – One DTB Sign location
  - US 29-74 Westbound

Once all DTB signs are in their final locations the Design-Build Team shall design, furnish and install 12-fiber Drop Cables from the ITS Device line on I-85 to the DTB locations listed above.

## **MATERIALS & CONSTRUCTION**

Furnish and install new materials and hardware unless stated otherwise elsewhere in this RFP. Adhere to the requirements of the *Standard Specifications* and the *Standard Drawings* and the ITS & Signals Project Special Provisions effective on the Technical Proposal submittal date.

### **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 *Standard Specifications*. 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 96-fiber ITS Trunk Line
  - One orange conduit for the 144-fiber ITS Device Line
- One (1) - 1.25-inch conduit for possible future commercialization (OMC conduit)
  - One green conduit
  - Match existing for relocated conduit. Note: existing conduit may contain multiple micro-duct conduits that shall also be relocated.

➤ 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 Standard Specifications. The Design-Build Team shall imbed tracer wire in the blue conduit and the white drop cable conduit. The Design-Build Team shall NOT install or imbed tracer wire in the green OMC conduit.

All communications conduits shall be installed through the sidewall of all Junction Boxes to allow for fiber jetting.

The Design-Build team may install fiber and any micro-duct conduit that is being relocated via jetting/blowing in accordance with *Conduit and Jetting Fiber* Project Special Provisions found elsewhere in this RFP.

At all interchanges, 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.

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.

Provide junction box covers with standard “Electric” logo, pull slots and stainless-steel pins.

➤ **Communications**

In accordance with the *Junction Boxes (Limited Access Facilities)* Project Special Provision found elsewhere in this RFP, the Design-Build Team shall furnish and install junction boxes (pull boxes) for communications cable with all necessary hardware.

All OMC junction boxes shall be 48” (l) x 30” (w) x 36” (d).

Install communications junction boxes within six feet of the base of each ITS device pole / 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 *Standard Specifications*, furnish and install wood poles, with all necessary grounding systems and hardware necessary. Provide wood poles sized as necessary for the intended application.

- 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 *Standard Specifications*, 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 *Standard Specifications* and the *Electrical Service for ITS Devices* Project Special Provisions found on the NCDOT ITS and Signals Unit Design Resources website, 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
- DMS = 50 AMPS

Calculations using actual equipment load amperage for CCTV or DMS shall not be allowed.

**The Desing-Build Team shall combine electrical services wherever possible.**

**The Design-Build Team shall be responsible for all costs associated with installing new or modifying existing electrical services that fall under this ITS Scope of work, regardless of what is stated in other sections of this RFP.**

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 *Standard Specifications*.

### **QUALIFIED PRODUCTS LIST**

Submit a listing of items on the NCDOT 2024 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://apps.ncdot.gov/Products/QPL/>**

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 detailed in this RFP, 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, NCDOT fiber-optic cable, OMC fiber-optic cable and all related ITS components that are impacted by construction. The Design-Build Team shall be responsible for the aforementioned maintenance and repair until the impacted ITS component(s) are accepted by the Department and maintenance requirements are turned back over to the OMC Contractor. Any activity that impacts the communications to an ITS device shall also qualify as impacting that ITS device. Once the Design-Build Team completes work on an ITS component, the Design-Build Team shall immediately notify the Department and the OMC Contractor. The Department will begin the inspection process, and if accepted, turn the ITS component over to the OMC Contractor for maintenance. If the Department does not accept the work, the Design-Build Team shall perform additional work until the Department accepts the work and turns the ITS component over to the OMC Contractor for maintenance. The aforementioned inspection and acceptance shall include review of the OTDR testing performed by the Design-Build Team. The Department's acceptance of ITS components shall be separate from the Department's final acceptance of the project. After final 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 PDF and Excel format as well as hard copy format for Department approval. Provide electronic plans in MicroStation (latest release in use by the Department) format as well. 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. See Standard Specifications section 1716-3 for additional details. 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 ITS POR documentation described above shall be provided to the Engineer and the NCDOT ITS & Signals Management Section, via the Alternative Delivery 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.

### **ITS Device Inspection**

The Design-Build team shall coordinate and schedule the ITS device inspection after all ITS device installations on the project are complete. It shall be the responsibility of the Design-Build team to

ensure that an approved representative of the manufacturer is present for the ITS device inspection to demonstrate functionality and troubleshoot issues in the field.

**The ITS device inspection shall not occur until OTDR results and POR documentation has been received, reviewed and accepted by the ITS & Signals Management Section.**

## **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 Release for Construction (RFC) / 100% Plans, set of sealed plans and specifications, to the Department. No construction of the ITS devices shall begin until the Department has accepted the RFC / 100% sealed plans and specifications.

**LIGHTING SCOPE OF WORK** (8-12-24)**NEW LIGHTING SYSTEMS**

The Design-Build Team shall provide and install roadway lighting equipment and materials, in accordance with the Final Lighting Plans provided by the Department, Division 14 of the *Standard Specifications*, and the *Roadway Standard Drawings*, except as amended below. Prior to the Technical Proposal submittal date, the NCDOT will provide the Preliminary Lighting Plans. The Department will finalize the lighting design based upon the Design-Build Team's Release for Construction (RFC) Roadway Plans.

The Design-Build Team shall include all costs required to construct the new roadway lighting systems shown in the aforementioned Preliminary Lighting Plans provided by the Department in their lump sum price bid for the entire project. The Department shall only compensate the Design-Build Team for additional lighting construction costs that result from design revisions incorporated at the Department's discretion and / or that result from errors or omissions in the Department's Preliminary Lighting Plans. The Design-Build Team shall be solely responsible for all additional lighting construction costs that result from design revisions incorporated at the Design-Build Team's discretion.

If any design revision, including but not limited to those incorporated at the Department's discretion, those incorporated at the Design-Build Team's discretion and / or those incorporated due to errors or omissions in the Department's preliminary lighting design, results in the removal and / or reduction of lighting equipment from the Preliminary Lighting Plans provided by the Department, all costs associated with the removal and / or reduction of lighting equipment shall be deducted from monies due the Design-Build Team.

After the RFC Roadway Plans have been accepted by the Department, the Design-Build Team shall submit MicroStation files of the RFC Roadway Plans for the Department to complete the lighting design. The Design-Build Team shall allow the Department 15 days after this submittal to update and finalize the lighting design.

The Design-Build Team shall allow ten days for Department review of each submittal for all materials including poles and foundation designs. An additional ten days shall be required for pole submittals from vendors that do not commonly do business with the Department.

Reference the Transportation Management Scope of Work found elsewhere in this RFP for time restrictions and lane closure requirements.

Reference the Lighting Project Special Provisions found elsewhere in this RFP for additional requirements.

**PIEDMONT AND NORTHERN RAILWAY SPUR LINE BRIDGE FOOT LIGHTING SYSTEM**

The Design-Build Team shall design, provide, and install a lighting system in the interior barrier between the railway and greenway to aid visibility of pedestrians using the greenway during nighttime hours. The lighting system shall utilize step light luminaires that are integral to the interior barrier. Refer to the Lighting Special Provisions for additional details.

Pedestrian lighting for the Piedmont and Northern Railway Bridge shall be owned and operated by the City of Belmont (Reference the Aesthetics Scope of Work found elsewhere in this RFP). The Design-Build Team shall establish a separate electrical service in the City's name for the pedestrian lighting system.

## **BRIDGE LIGHTING CONDUIT SYSTEMS**

The Design-Build Team shall design, provide, and install a complete conduit system for future lighting on all Y-line bridges located within the limits of the project (Reference the Aesthetics Scope of Work found elsewhere in this RFP). The conduit system shall consist of conduit, in ground junction boxes, formed openings within the bridge rails, metal covers for formed openings and light supports for attaching light poles. The light poles, fixtures and conductors will be installed by others at a later date. Refer to the Lighting Special Provisions for additional details.

## **MAINTENANCE**

Assume responsibility for routine maintenance of the newly installed lighting system(s) for the duration of the contract in accordance with Division 14 of the *Standard Specifications*, except as amended below.

NCDOT will assume maintenance responsibility for the completed lighting systems after the project is accepted, and there is no chance of construction-related damage.

The Design-Build Team shall replace any newly installed non-functional lighting system components within the project limits. All luminaires must be fully operational at project acceptance.

**PAVEMENT MANAGEMENT SCOPE OF WORK** (02-25-25)**I-85 REQUIREMENTS**

The pavement design for the I-85 travel lanes, the I-85 median paved shoulders and the I-85 outside paved shoulders shall consist of one of the alternates throughout the project limits. The Design-Build Team shall specify the pavement alternate chosen in the Technical Proposal.

**ALTERNATE 1 - ASPHALT PAVEMENT (FULL-DEPTH ASPHALT)****I-85 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design  
(new construction and widening locations)**

The pavement design for the I-85 travel lanes, I-85 median paved shoulder and I-85 outside paved shoulder shall consist of the following:

5/8" Ultra-Thin Bonded Wearing Course (UTBWC)  
3.0" S9.5D  
4.0" I19.0C  
12.5" B25.0C  
Subgrade Stabilization

The UTBWC shall only extend 6.0" onto the median and outside shoulders.

**ALTERNATE 2 - ASPHALT PAVEMENT (AGGREGATE BASE COURSE)****I-85 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design  
(new construction and widening locations)**

The pavement design for the I-85 travel lanes, I-85 median paved shoulder and I-85 outside paved shoulder shall consist of the following:

5/8" UTBWC  
3.0" S9.5D  
4.0" I19.0C  
9.0" B25.0C  
8.0" ABC  
Subgrade Stabilization

The UTBWC shall only extend 6.0" onto the median and outside shoulders.

**ALTERNATE 3 - ASPHALT PAVEMENT (CEMENT TREATED AGGREGATE  
BASE COURSE)****I-85 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design  
(new construction and widening locations)**

The pavement design for the I-85 travel lanes, I-85 median paved shoulder and I-85 outside paved shoulder shall consist of the following:

5/8" UTBWC  
3.0" S9.5D  
4.0" I19.0C  
6.5" B25C  
8.0" CTBC  
Subgrade Stabilization

The UTBWC shall only extend 6.0" onto the median and outside shoulders.

**ALTERNATE 4 – I-85 CONCRETE PAVEMENT (UNBONDED CONCRETE  
OVERLAY FOR EXISTING LANES AND NEW FULL-DEPTH CONCRETE  
PAVEMENT FOR WIDENING WITH CONCRETE SHOULDERS)**

The pavement design for the existing I-85 travel lanes shall consist of the following:

Unbonded concrete overlay consisting of 12.0" doweled jointed concrete  
Nonwoven Geotextile Interlayer  
1.5" S9.5B

The pavement design for the widened mainline travel lanes adjacent to the unbonded concrete overlay shall consist of:

14.5" Doweled Jointed Concrete  
Nonwoven Geotextile Interlayer  
1.5" S9.5B  
Subgrade Stabilization

**I-85 Full-Depth Median Shoulder and I-85  
Full-Depth Outside Shoulder Pavement Design**

The concrete shoulder that will be constructed next to the unbonded concrete pavement, shall consist of the following design.

12.0" Undoweled Jointed Concrete<sup>1</sup>  
Nonwoven Geotextile Drainage Interlayer<sup>2</sup>  
1.5" S9.5B  
Subgrade Stabilization

The concrete shoulder that will be constructed next to the new full-depth concrete pavement, shall consist of the following design.

14.5" Undoweled Jointed Concrete<sup>1</sup>  
Nonwoven Geotextile Drainage Interlayer<sup>2</sup>

1.5" S9.5B  
Subgrade Stabilization

<sup>1</sup> If the outside concrete shoulder pavement cross slope is 0.04 the joint will be undoweled. Outside concrete shoulder pavement cross slope that are less than 0.04 shall require coordination with the Pavement Design regarding doweling.

<sup>2</sup> The Nonwoven Geotextile Drainage Layer shall be in accordance with Section 724 of the *Standard Specifications*. The Nonwoven Geotextile Drainage Interlayer and the S9.5B layer shall extend to the shoulder drains.

**ALTERNATE 5 – (UNBONDED CONCRETE OVERLAY FOR EXISTING  
LANES AND NEW FULL-DEPTH CONCRETE PAVEMENT FOR WIDENING  
WITH ASPHALT SHOULDERS)**

The pavement design for the existing I-85 travel lanes shall consist of the following:

Unbonded concrete overlay consisting of 12.0" doweled jointed concrete  
Nonwoven Geotextile Interlayer  
1.5" S9.5B

The pavement design for the widened mainline travel lanes adjacent to the unbonded concrete overlay shall consist of:

14.5" Doweled Jointed Concrete  
Nonwoven Geotextile Drainage Interlayer<sup>2</sup>  
1.5" S9.5B  
Subgrade Stabilization

**I-85 Full-Depth Median Shoulder and I-85 Full-Depth Outside Shoulder Pavement  
Design**

The full-depth asphalt shoulder that will be constructed next to the unbonded concrete pavement, shall consist of the following design.

3.0" S9.5C  
4.0" I19.0C  
6.5" B25.0C  
Subgrade Stabilization

The full-depth asphalt shoulder that will be constructed next to the new full-depth concrete pavement, shall consist of the following design.

3.0" S9.5C  
4.0" I19.0C  
9.0" B25.0C  
Subgrade Stabilization

<sup>2</sup> The Nonwoven Geotextile Drainage Layer shall be in accordance with Section 724 of the *Standard Specifications*. The Nonwoven Geotextile Drainage Interlayer and the S9.5B layer shall extend to the shoulder drains.

### **I-85 Shoulder Reconstruction**

At a minimum, the Design-Build Team shall remove and dispose of / recycle the existing I-85 paved median and outside shoulders, from the beginning of the project to Sta. 594+00  $\pm$  -L-, and replace with the chosen pavement design alternate (Reference the Roadway Scope of Work found elsewhere in this RFP).

Within the aforementioned limits, the Design-Build Team shall remove and dispose of / recycle the I-85 shoulder 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, and replace with the alternate pavement design chosen, as defined above.

### **Potential I-85 Travel Lane Reconstruction**

- The Design-Build Team may elect to reconstruct the I-85 pavement structure in lieu of resurfacing the existing 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, median shoulder and outside shoulder 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 I-85 pavement design chosen, as defined above. If the Design-Build Team does not elect to reconstruct the I-85 pavement structure within these sections, the Design-Build Team shall perform resurfacing as required elsewhere in the RFP, with any remaining elevation difference made up using asphalt concrete wedging.

### **I-85 Pavement Uniform Overlay**

Excluding the I-85 sections below, the Design-Build Team shall overlay the I-85 pavement that remains in place (travel lanes and 6.0" onto shoulders with a minimum 3.0" of S9.5D and 5/8" UTBWC).

- Sections of I-85 where the existing pavement structure is removed and reconstructed as described in **Potential I-85 Travel Lane** section above.
- I-85 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 followed by 5/8" UTBWC on travel lanes and 6.0" onto shoulders, as defined above.



### **I-85 Full-Depth Pavement Repair**

In accordance with Section 654 of the *Standard Specifications*, the Design-Build Team shall repair (remove, dispose of / recycle and reconstruct) the I-85 pavement structure at locations identified by the Engineer that are outside the limits defined in the **Potential I-85 Travel Lane Reconstruction** section 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 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** I-85 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 I-85 full-depth pavement repair, the Design-Build Team shall install the pavement design shown below.

5/8" UTBWC  
3.0" S9.5D  
4.0" I19.0C  
16.0" B25.0C

The I-85 full-depth pavement repairs that are 1) outside the limits defined in the **Potential I-85 Travel Lane Reconstruction** section 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 *Standard Specifications* at the unit price of \$200.00 per square yard. All work tasks required for the I-85 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**

For concrete alternates, unless noted otherwise elsewhere in this RFP, all longitudinal joints shall be located on a lane line or lane midpoint. Solely to shift a longitudinal joint to one of the aforementioned locations, a maximum 840-foot transition, that locates the longitudinal joint elsewhere, will be allowed. The Design-Build Team shall indicate in the Technical Proposal how longitudinal joints will be located on a lane line or lane midpoint.

In accordance with the requirements noted below, the I-85 and Y-lines that require subgrade stabilization shall consist of chemical stabilization or Aggregate Subgrade, Type 2. The Design-Build Team shall specify the proposed I-85 subgrade stabilization, or combination, with approximate limits of each type clearly noted in the Technical Proposal. However, only one

subgrade stabilization alternate shall be used across the full typical section width, in a given direction, and shall be used for a minimum 1000-foot length.

- Chemical stabilization shall be to a minimum depth of 8 inches for lime and 7 inches for cement. The type of subgrade stabilization and the amount of stabilizing agent shall be determined in accordance with the *Cement and Lime Stabilization of Sub-grade Soils* Project Special Provision found elsewhere in this RFP.
- Aggregate Subgrade, Type 2 shall be in accordance with Section 505 of the *Standard Specifications*.

Other pavement designs for this project are listed in **Table 1** below:

**Table 1**

| <b>Lines</b>  | <b>Surface</b> | <b>Intermediate</b> | <b>Base</b> | <b>ABC</b> | <b>Stab</b> |
|---|----------------|---------------------|-------------|------------|-------------|
| Y6 NC 7   | 3.0" S9.5C     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y6RPA, Y6RPB,<br>Y6RPC, Y6RPD   | 3.0" S9.5D     | 4.0" I19.0C         | 3.0" B25.0C | -          | Yes         |
| POWERDR   | 3.0" S9.5B     | -                   | 5.0" B25.0C | -          | -           |
| Y14 Hickory Grove Rd.   | 3.0" S9.5B     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Cemetery Rd   | 3.0" S9.5B     | -                   | 4.0" B25.0C | -          | -           |
| Y7 Belmont Mt. Holly Rd.  | 3.0" S9.5C     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y7RPA, Y7RPB,<br>Y7RPC, Y7RPD, Y7LPD                                      | 3.0" S9.5D     | 4.0" I19.0C         | 3.0" B25.0C | -          | Yes         |
| Y7B NC 7,<br>Y7D Caldwell Farm Rd.  | 3.0" S9.5C     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y7A US 74 Wilkinson Blvd,<br>Y7C Main St.,<br>Y7F Woodlawn Rd.            | 3.0" S9.5C     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y7E Wimmer Cir. (South),<br>Y7H Wimmer Cir. (North),<br>Y7G Monastery Ln. | 3.0" S9.5C     | -                   | 4.0" B25.0C | -          | -           |
| Y7RAB1**, Y7RAB2**  | 3.0" S9.5C     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y7DRWY1 Bi Lo Entrance,<br>Y7DRWY2 Aldi Entrance                          | 3.0" S9.5B     | 4.0" I19.0C         | 4.0" B25.0C | -          | -           |
| Y7TRAIL   | 1.5" S9.5B*    | -                   | -           | 6.0"       | -           |
| Y8RPA, Y8RPB,<br>Y8RPC, Y8RPD   | 3.0" S9.5D     | 4.0" I19.0C         | 3.0" B25.0C | -          | Yes         |

\* Use prime coat at normal application rate.

\*\* Roundabouts shall include a 10.0" jointed concrete truck apron (to match the 1'-6" mountable curb and gutter with a curb height of 3 inches between the roundabout lane and the concrete truck apron) that includes a 4x4 W5.5 x W5.5 or 6x6 W8.5 x W8.5 wire mesh reinforcement. Either 6.0" ABC or 4.0" B25.0C shall be used beneath the concrete. A maximum 15' radial and longitudinal joint spacing shall be used

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 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 of all -Y- Lines and ramps with a minimum depth that equals the full thickness of the surface course as provided in the table above. (Reference the Roadway Scope of Work found elsewhere in this RFP).

Excluding multi-use paths located on berms adjacent to curb and gutter, the pavement design for all multi-use paths shall consist of either 1) 2.0" S9.5B and 8.0" ABC, or 2) 2.0 inches S9.5B, 6.0 inches ABC, and a Soil Stabilization Geotextile Fabric or 3) 4.0" of concrete with welded wire mesh. Construction of all multi-use paths shall be consistent with the *Greenways and Multi-Use Paths* Project Special Provision found elsewhere in this RFP. (Reference the Roadway Scope of Work found elsewhere in this RFP)

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.

As required by the Transportation Management Scope of Work found elsewhere in this RFP to conceal pavement markings, the Design-Build Team has the option to uniformly overlay areas of I-85, including all ramps and loops, with 1.5" S9.5C or S9.5D. If S9.5C is utilized, prior to placing any subsequent layer of the final pavement design, the Design-Build Team shall mill the aforementioned uniform overlay. (Reference the Transportation Management Scope of Work found elsewhere in this RFP). The Design-Build Team is cautioned that the milling required to remove the temporary surface course layers installed to conceal pavement markings shall be in addition to all other milling requirements found elsewhere in this RFP.

On all interchange ramps and loops, the adjacent through lane pavement design shall extend to the back of the gore (12-foot width).

Longitudinal joints of all surface course layers shall not be located in the final traffic pattern wheel path. 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, service road or ramp 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 Alternative Delivery 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 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. Along I-85, within the elevated sections, the Design-Build Team shall use the adjacent travel lane pavement design for paving the shoulders to the face of the aforementioned features. 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 of 6" ABC or 4" B25.0C under all single face barrier, expressway / shoulder berm gutter, curb and gutter, and concrete truck aprons.

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 10% grade 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. Unless approved by the Engineer, new pavements for -Y-lines, service roads, and ramps / loops, either completely built or partially built as part of this project, are not considered "existing pavement" and are not allowed for the use of detouring traffic from I-85.

The rate of application and the maximum and minimum thickness per application and layer shall be in accordance with the latest NCDOT Roadway Design Manual and the latest Asphalt QMS manual.

Shoulder drains will be required in areas of new median and outside shoulder construction.

Excluding the high side of superelevated sections, the Design-Build Team shall design and construct continuous median and outside shoulder drains and outlets for the I-85 concrete pavement alternates.

Excluding the high side of superelevated sections, the Design-Build Team shall design and construct median and outside shoulder drains and outlets at the locations noted below for the mainline asphalt pavement alternates:

- Throughout crest vertical curves located in cut sections
- Throughout all sag vertical curves
- Where the grade is less than 1%.

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. All outlets shall be located at drainage structures when available. Shoulder drains shall be placed to drain the entire pavement structure. The shoulder drain design and outlet locations shall be submitted to the Alternative Delivery Unit for review and acceptance.

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 (ATC) that provide an alternate I-5719B / U-5800 pavement design will be considered subject to the following restrictions:

- ATCs on pavement design will be permitted on the mainline travel lanes, mainline shoulders, -Y- Lines, ramps, loops roundabouts, and service roads; and shall not be submitted until after issuance of the Second Industry Draft Request for Proposals.
- Unless noted otherwise elsewhere in this RFP, the pavement design in the ATC shall be determined using the method in the NCDOT *Pavement Design Procedure - AASHTO 1993 Method* dated January 4, 2019.
- The pavement design in the ATC (permanent and temporary) shall be signed and sealed by a professional engineer registered in the State of North Carolina that has experience in pavement design. The ATC submittal shall include a brief resume or description of the designer's pavement design experience.
- For all incorporated permanent mainline travel lane, mainline shoulder, ramp and loop ATC pavement designs, the Design-Build Team shall include in the Technical Proposal a minimum three-year extension of the 12-month guarantee. (Reference the *Twelve Month Guarantee* Project Special Provision found elsewhere in this RFP)
- The permanent mainline travel lane pavement design in the ATC shall adhere to the design parameters noted below.
  - In accordance with the requirements noted below, all asphalt pavement designs shall include subgrade stabilization that consists of chemical stabilization or Aggregate Subgrade, Type 2 as noted below:
    - Chemical stabilization shall be to a minimum depth of 8 inches for lime and 7 inches for cement. The type of subgrade stabilization and amount of stabilizing agent shall be determined in accordance with the *Cement and*

*Lime Stabilization of Sub-grade Soils* Project Special Provision found elsewhere in this RFP.

- Aggregate Subgrade, Type 2 shall be in accordance with Section 505 of the *Standard Specifications*.
- Only one subgrade stabilization alternate shall be used across the full typical section width, in a given direction, and shall be used for a minimum 1000-foot length.
- Full Depth Asphalt
  - Minimum 19.5” thickness
- Asphalt on ABC
  - Minimum 16.0” asphalt thickness
  - Minimum 8.0” ABC thickness
- Asphalt on CTBC
  - Minimum 13.5” asphalt thickness
  - 8” CTBC thickness - Cement treated base course shall be in accordance with the *Cement Treated Base Course* Project Special Provision found elsewhere in this RFP.
- The permanent mainline shoulder, -Y- Line, ramp, and service road pavement designs in the ATC shall adhere to the design parameters noted below:
  - Mainline shoulders and ramps
    - Pavement design shall provide a minimum pavement depth that equals the full thickness of the pavement designs presented elsewhere in this Scope of Work.
  - -Y- Lines
    - Pavement design shall provide a minimum pavement depth that equals the full thickness of the -Y- Line pavement design listed in **Table 1** above.
  - Service Roads

- Pavement design shall provide a minimum pavement depth that equals the full thickness of the service road pavement design listed in **Table 1** above.
- Roundabouts
  - Pavement design shall provide a minimum pavement depth that equals the full thickness of the roundabout travel lane and truck apron design listed in **Table 1** above.

ATCs complying with the above restrictions will be evaluated by a technical review panel in accordance with the usual ATC process with the exception that the NCDOT reserves the right to engage a recognized pavement design expert to assist with the ATC evaluations. (Reference the *Alternative Technical Concepts and Confidential Questions* Project Special Provision found elsewhere in this RFP)



**PAVEMENT MARKINGS SCOPE OF WORK** (4-11-25)**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>**

- FHWA *Manual on Uniform Traffic Control Devices* (MUTCD) 11<sup>th</sup> Edition

**[https://mutcd.fhwa.dot.gov/kno\\_11th\\_Edition.htm](https://mutcd.fhwa.dot.gov/kno_11th_Edition.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>**

- 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*
- 2024 NCDOT *Roadway Standard Drawings (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 list projects in the Technical Proposal, including description and similarity to the subject project, for which the PEF developed Pavement Marking Plans.

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 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 *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 coordinate with the Transportation Management Plans for necessary traffic control devices that will remain at the completion of the project.

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 *Standard Specifications*, and in accordance with the manufacturer's procedures and specifications.

In accordance with the *Standard Drawing* No. 1205.08, Sheet 1 of 9, 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>Polycarbonate H-shaped Markers for all roadways</li> </ul> <b>Bridge Decks</b> <ul style="list-style-type: none"> <li>Raised markers on all bridge decks</li> </ul> |
| Concrete Surfaces | <ul style="list-style-type: none"> <li>Cold Applied Plastic Type 3 - Skip lines, Contrast Marking Lines</li> <li>Polyurea - All other roadway line (lane lines, edge lines, and gore lines, etc.)</li> </ul> |  |

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. If used, Type 3 will be paid for as Type 2.

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.

Prior to placing pavement marking material on concrete surfaces that are diamond ground, the Design-Build Team shall use an acceptable method to grind ridges smooth where pavement markings will be installed.

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 *Standard Specifications*, 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** (7-5-24)**General**

The Department will lead the public involvement and information efforts in collaboration with the Design-Build Team, NCDOT Division 12 (Division), NCDOT Public Involvement Team (Public Involvement Team), NCDOT Division 10 and Division 12 Communications Officers (Communications Officers), and the Public Involvement Technician (PI Technician). The Design-Build Team shall designate a single contact for public involvement and information inquiries / coordination.

Within eight weeks after the project Award date, the selected Design-Build Team shall hold an initial project coordination meeting with the Division, Communications Officers, Public Involvement Team, PI Technician, and the Alternative Delivery Unit to discuss project impacts to the public. This information will be used by the PI Technician to create a Public Involvement Plan (PIP). The Design-Build Team shall meet with the Division, Communications Officers, Public Involvement Team, PI Technician, and the Alternative Delivery Unit at least six to eight weeks prior to the start of construction to discuss project impacts to the public. This information will be used by the PI Technician to amend / refine the Public Involvement Plan (PIP).

The Design-Build Team shall prepare all required corridor and design maps as needed by the PI Technician for the PIP. The Design-Build Team shall prepare any / all 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 PI Technician shall develop, with assistance from the Design-Build Team, the specific list of target audiences for this project. At a minimum the following groups are identified as typical target audiences to receive informational materials:

- Governmental agencies;
- Municipalities directly affected by construction;
- Transportation services;
- Emergency services;
- Hospitals;
- Neighborhood groups and private homes;
- Industry and businesses;
- Chamber of Commerce(s);
- Individual schools affected by the project;
- County / City school systems, and;
- Any other organization as deemed necessary by the Department.

The PI Technician will be responsible for, maintaining and updating a project website. However, throughout the project duration, the Design-Build Team shall coordinate public involvement activities with the PI Technician and the Public Involvement Officer assigned to the project; and

provide weekly updates, photos and other needed announcements to the Communications Officers to ensure the accuracy of the aforementioned project website.

The Design-Build Team shall discuss in the Technical Proposal 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 PI Technician will be responsible for the activities noted below:

- Shall maintain the stakeholder list and public database using NCDOT's subscription to PublicInput.com.
- Distributing e-blasts, tracking public inquiries via phone and email, responding to citizen inquiries.
- Organizing public meetings, including venue selection, reservation and fee
- Developing and producing informational print materials for all meetings and workshops
- Project webpage and social media updates
- Project Videos
- If necessary, developing and producing informational print materials for Limited English Proficiency (LEP) outreach

To ensure consistency with the Department's policy and standards, the activities above shall be coordinated with the Communication Officers, and the Public Involvement Officer assigned to the project.

The Design-Build Team shall also coordinate with the PI Technician 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:

- Assisting the Department in the development of the target audience area;
- Providing information requested by the PI Technician to develop and produce informational printed and digital materials for all meetings;
- Developing and providing corridor and / or design public hearing maps for presentation at all public meetings;
- Providing details surrounding the impacts to the public;
- At a minimum, the Design-Build Team shall provide monthly operational updates to the Division, Communications Officers, Public Involvement Team, PI Technician, and the Alternative Delivery Unit. The Department will use the monthly operational updates for posting to the webpage and dissemination to subscriber lists by email; and to the Communications Officers for dissemination to the project area residents via press release

or social media as deemed appropriate, during construction, to update stakeholders on the status of the project and upcoming construction activities;

- Providing advance notice to the Department of upcoming project impacts;
- Provide initial, prior to construction, drone footage of the project and monthly drone coverage once construction begins;
- Attending and / or speaking at public meetings, and;
- Hand delivery of time sensitive informational materials.

The minimum public involvement requirements for the Design-Build Team solely associated with the Transportation Management Plans shall include, but are not limited to the following:

- Public Meetings – Attend and speak at a Beginning of Construction meeting for area businesses and residents.
- 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 to 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 Communications Officers will be responsible for the activities noted below:

- Providing and / or reviewing and approving media announcements, including social media;
- Scheduling interviews, as needed, and;
- 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.

## **Coordination**

Prior to construction the Design-Build Team shall provide monthly updates to the PI Technician. Throughout construction, the Design-Build Team contact shall provide weekly updates to the PI Technician, including, but not limited to, traffic control phasing, graphic illustrations, project pictures.

**RAILROAD COORDINATION AND CONSTRUCTION SCOPE OF WORK** (4-9-25)

**\*\* NOTE \*\* Within 45 days of contract execution, the Design-Build Team shall meet with representatives of the North Carolina Department of Transportation (NCDOT) Rail Division and the appropriate NCDOT Alternative Delivery personnel.**

The Design-Build Team shall be responsible for coordinating with the NCDOT Rail Division (Piedmont & Northern Railway rail corridor (P&N) Owners / Maintainers), referred to as the "Railroad", to secure the railroad agreements necessary for the design and construction of the new railroad permanent bridge over I-85, including the permanent railroad track(s), and on-site roadways including temporary and permanent at-grade crossings, based on their design and / or construction methods. The Design-Build Team shall be responsible for coordination of all design and construction details on NCDOT Rail Division rights of ways and / or easements and shall secure any necessary agreements required by the NCDOT.

The Design-Build Team shall not enter into or onto NCDOT rail corridors until the appropriate Agreements are executed, insurance requirements are met, and / or construction observer / inspection services have been procured, and all required written authorizations have been received from the Railroad.

**AGREEMENTS**

The Design-Build Team shall be responsible for coordinating with the Railroad to secure all railroad agreements necessary for the construction of replacement rail structure crossing of I-85 and associated rail tracks carrying the railroad traffic over I-85 including, but not limited to, the following agreements:

**Partial Executed**

The Design-Build Team shall be responsible for all coordination necessary with the Railroad and the Department to obtain partial execution of the agreements by the Railroad including, but not limited to, all required modifications. Upon receipt of comments from the Railroad for each submittal, the Design-Build Team shall schedule a meeting, through the NCDOT Alternative Delivery Unit, with the NCDOT Rail Division, Structures Management Unit, and other NCDOT staff as appropriate, to discuss the Railroad's comments.

The Department will handle all negotiations with the Railroad.

**Final Executed**

After all negotiations between the Department and the Railroad 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 and Structures Management Unit, through the Alternative Delivery 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 and Structures Management Unit, the agreements will be distributed by the Structures Management Unit to the Railroad with copies provided to the Alternative Delivery Unit and the Design-Build Team. The Department will execute and distribute the agreement modifications within 14 calendar days of Board of Transportation approval. The Design-Build Team or the Railroad shall not begin any construction work that impacts the Railroad prior to obtaining the final executed agreements.

### Modifications

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 Railroad's right of way and / or easement and shall secure any necessary agreements required by the NCDOT and / or the Railroad. The Department will review all agreement modifications prior to submittal to the Railroad within 14 calendar days of receipt.

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.

### Payment

The railroad agreements state that the Department will be responsible for payment of the Railroad's Force Account work, the Railroad's expenses, and the Railroad's fees. In this instance only, however, because the P&N corridor as it relates to the I-5719B project is owned / maintained by the Railroad, those costs will be billed directly by the Railroad to the Department and the Design-Build Team will not be required to reimburse the Department for these costs, including any overruns.

### **INSURANCE**

The Design-Build Team shall not commence any work on any of the Railroad's rights of way and / or easements until all agreements have been executed, certificate of insurance acquired and approved in accordance with the Railroad's policies and procedures, protective and / or construction observer / inspection services have been procured, and all construction plans have been approved by NCDOT and the Railroad. The Railroad shall make any necessary arrangements with the protective and / or construction observer / inspection services firm (as part of the Force Account work) that are required to protect against property damage that may result

in loss of service, expense, or loss of life. The Design-Build Team shall be responsible for all damage to the Railroad resulting from their operations and the Railroad may issue a stop order until all dangerous situations are remedied.

The existing temporary derail on the Spur Line shall be relocated by the Railroad and / or Jaguar Transport Holdings (P&N lessee / rail operators) north to a point accepted by the Department. The inactive portion of the Spur Line will be from the relocated temporary derail southward. The Design-Build Team will not be required to provide Railroad Protective Liability Insurance (RRPL) on the inactive limits of the P&N Belmont Spur. A permanent double-switch-point derail, as shown on the plans, shall be installed prior to commencement of construction to prevent railroad equipment access onto the inactive portion of the Belmont Spur. Cost of the double-switch-point derail will be paid for by the Design-Build Team.

## **RAILROAD RELATED COSTS**

The Design-Build Team will not be responsible for all the Railroad's costs associated with this project including, but not limited to, plan reviews, materials furnished by the Railroad, signals and communications work, track and related construction by the Railroad and / or their representative(s), and construction engineering that will be included in the Force Account Estimate.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be responsible for all Railroad construction costs. The Railroad will not incur any cost.

The Railroad has sole authority to determine the need for protective and / or construction observer / inspection services required to protect its operations and property.

## **RIGHT OF ENTRY**

Prior to any on-site work, including but not limited to, field / site visits, surveys, supplemental surveys, drainage investigation, utility investigations, soil sampling and investigations, and / or construction activities, the Design-Build Team shall submit all requirements to obtain all required executed Right of Entry Agreements from the Railroad prior to entry onto the land controlled by the Railroad.

## **UTILITIES**

Prior to any utility installation, removal, or relocation across the Railroad's 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 Railroad and private utility owners. At a minimum, the Design-Build Team shall assist the private utility owners in obtaining the necessary permits and securing the appropriate Wireline / Pipeline Occupancy Agreements in the private utility owner's name. In accordance with the requirements noted herein and the Railroad specifications, the private utility owner(s) will be responsible for all associated fees and providing the necessary insurance coverage.

The Design-Build Team shall acquire all necessary Railroad Agreements and / or Letters of Acknowledgement on the Department's behalf to cross the property owned and / or leased by NCDOT Rail Division. The Department will sign the Railroad Agreements once they are approved by NCDOT Rail Division. The Design-Build Team shall be responsible for all applicable fees associated with obtaining the Railroad Agreements and/or Letters of Acknowledgement; and shall provide the General Contractor's Liability Insurance. To initiate this process, the Design-Build Team shall fully complete the application process as described at the NCDOT Rail Division's website.

**<https://connect.ncdot.gov/resources/Rail-Division-Resources/Pages/Encroachments-Rail-Corridors.aspx>**

Do not commence cable routings under railroad-owned facilities until notification and coordination with the Engineer, and NCDOT Rail Division has occurred.

All work associated with any utility installation across the Railroad's rights of way and / or easement shall adhere to the requirements noted herein and the Railroad's specifications.

## **TRAIN DATA**

Currently, the track involved is out-of-service and does not have any train traffic. No train or pedestrian activity will be allowed for the duration of the project.

## **RAILROAD FACILITIES**

This project has one site with existing rail structure crossing over I-85 located on the NCDOT's P&N Belmont Spur Corridor approximately P&N Milepost Belmont Spur SFF 1.72 (I-85 east of Belmont/ Mt Holly Road overpass). The rail corridor is considered oriented (RR) north / south (Belmont Junction / Belmont) with mileposts increasing from north to south. The corridor currently contains one track. The railroad right of way / easement width for this area is 50 feet wide, centered 25 feet on each side of the existing track centerline. This portion of the NCDOT Rail Division P&N corridor is currently out-of-service with no rail operations except on the far north end starting at the existing Belmont / Mt Holly Road at-grade crossing northward. The limits of the out-of-service track will be extended northward beyond the new realigned Belmont/Mt Holly Road at-grade crossing prior to commencement of construction. There is a future rail trail (constructed as a part of the I-5719B project as noted elsewhere in this RFP) and future trolley operation on this portion of the P&N Spur corridor.

## **COORDINATION**

With NCDOT Rail Division (Piedmont and Northern Railway Belmont Spur)

The Design-Build Team shall coordinate with Jeff Cole, NCDOT Rail Division, Facilities & Properties Manager, (919) 707-4721, [jpcole@ncdot.gov](mailto:jpcole@ncdot.gov), to obtain plan

review / approval and execution of the legal agreements for the southern portion of the P&N **Belmont** Spur.

The Department shall provide Preliminary / 30% Plans, Preliminary General Drawings, and Right of Way / 60% Plans for the design of the new structure and track. Prior to the distribution of Plans the Design-Build Team shall meet with the Department and the Department's PEF to discuss design requirements, methodology and constraints regarding the design, a maximum of three meetings are anticipated. The Design-Build Team will be responsible for determining the accuracy of the provided Right of Way / 60% Plans and shall obtain plan approval based on multiple submittals including, but not limited to, Final / 90% Plans, Bridge Final / 90% Plans submittal, and Release for Construction (RFC) / 100% Plans Bridge RFC / 100% Plans submittals. The plan submittals to the NCDOT Rail Division shall, at a minimum, include the same information required for submission to Norfolk Southern Railway (NSR).

All review plans and associated data shall be submitted through the Alternative Delivery Unit to the NCDOT Rail Division electronically, in PDF format.

All Rail RFC / 100% Plans, Roadway RFC / 100% Plans, and Bridge RFC / 100% Plans pertaining to the Railroad shall be submitted through the Alternative Delivery Unit to, and accepted by, the NCDOT Rail Division before construction that impacts the Railroad begins. The Rail RFC / 100% Plans, Roadway RFC / 100% Plans, and Bridge RFC / 100% Plans shall be submitted to NCDOT Rail Division electronically, in PDF format. All plans, specifications and contract documents shall be accepted by the NCDOT Rail Division, in writing, prior to the start of any work on the NCDOT Rail Division corridor.

All Working Drawings affecting the NCDOT Rail Division right of way and easements shall follow the submittal process as outlined in the 2024 NCDOT *Standard Specifications for Roads and Structures* or Special Provisions.

The Design-Build Team shall allow 60 days for review of the initial railroad submittal and 45 days for each subsequent submittal.

The Design-Build Team shall be responsible for coordinating all construction with NCDOT Rail Division, including any force account work to be performed by the NCDOT Rail Division.

With The NCDOT Rail Division And Structures Management Unit

The Design-Build Team shall be responsible for all permanent bridge designs. (Reference the Structure Management Scope of Work found elsewhere in this RFP)

All plans submitted to the NCDOT Rail Division, as required above, shall be submitted to the NCDOT Rail Division and Structures Management Unit through the Alternative Delivery Unit including, but not limited to, initial plan submittals, plan resubmittals and

requests for information. The Design-Build Team shall copy the NCDOT Rail Division, Structures Management Unit and Alternative Delivery Unit on all correspondence.

#### With Alternative Delivery Unit

The Design-Build Team shall hold, at a minimum, monthly meetings with the Railroad and the Alternative Delivery Unit during the design and plan submittal phase of the rail work.

The Design-Build Team shall hold, at a minimum, bi-weekly meetings with the Railroad and the Alternative Delivery Unit during the construction phase of the rail work.

### **DESIGN REQUIREMENTS**

#### NCDOT Rail Division (P&N)

In addition to NSR and American Railway Engineering and Maintenance-of-Way Association (AREMA) track design requirements, the proposed permanent spur track alignment shall also meet the following requirements, unless a design exception is approved by the NCDOT Rail Division, as well as the NCDOT via the NCDOT's Alternative Delivery Unit. Should the Design-Build Team deviate from the Preliminary / 30% Plans and Right of Way / 60% Plans provided by the Department, the Design-Build Team shall submit revised Preliminary / 30% Plans and revised Right of Way / 60% Plans that follow the criteria below. The Design-Build Team is encouraged to improve the plans provided by the Department, particularly in regard to the track profile, for the project bridge site.

- Horizontal curvature shall be designed to maintain 15 mph freight on the P&N Belmont Spur with appropriate required maximum unbalanced superelevation, with a two mph buffer.
- Desirable track centers, as given in NSR Plan 7-2C, shall be maintained throughout the body of all horizontal curves.
- Spiral lengths shall meet AREMA minimum standards for 15 mph freight on the P&N Belmont Spur, or NSR Plan 7-2, whichever produces the longer length of spiral.
- The minimum length of tangent track between reverse curves shall be 100 feet unless otherwise approved by the NCDOT Rail Division.
- The maximum actual superelevation shall comply with NSR Plan 7-2 for permanent tracks.

- Vertical alignment shall meet AREMA minimum standards for 15 mph freight on the P&N Belmont Spur.
- The P&N permanent Spur Roadbed Section shall comply with the typical provided by the Department **except as noted on the plans.**
- The Design-Build Team shall design and install minimum 132 lb. rail on the P&N Belmont Spur tracks. The Design-Build Team may elect to use at a minimum 132 lb. RE Class 2 relay jointed rail, refer to the Rail Grading Standards in the *Materials Provided* folder. All joints in at-grade crossings shall be welded to eliminate the joint in the rail seal material.
- The Design-Build Team shall design and construct a double-switch-point derail as per the plans provided by the Department.
- The Design-Build Team shall design and construct the replacement bridge at the same skew as the existing bridge **and to loadings noted on the plans provided by the Department.**
- The Design-Build Team shall design and construct the replacement spur line at grades equal to or less than existing grades.

## PLAN SUBMISSION

Plan approval for I-5719B / U-5800 shall be based on multiple submittals to NCDOT and the Railroad. At a minimum, plans shall be submitted at the following levels of completion: Final / 90% Plans, and Release for Construction (RFC) / 100% Plans. More submittals may be required if deemed necessary by NCDOT or the Railroad. What each submittal must contain is described as follows.

At a minimum the Design-Build Team shall submit the following plans to the Department for review and approval after verification of the design information provided on the 60% plans:

- Final / 90% Plan submittal shall include, but is not limited to, response to Right of Way / 60% Plan Comments, Final / 90% Plans, Project Specifications, Project Special Provisions, and applicable design reports.
- RFC / 100% Plan submittals shall include, but is not limited to, response to Final / 90% Plan Comments, Revised Final Design Plans, Project Specifications, Project Special Provisions, and applicable design reports. The RFC / 100% Plan submittal and RFC / 100% Bridge Plan submittal shall be signed and sealed by the engineer.

All plan sets shall be submitted electronically (pdf format) to the Alternative Delivery Unit for forwarding to the Railroad. For RFC Plans, an electronic copy of the plans (pdf format) shall be submitted to the Alternative Delivery Unit for forwarding to the Railroad. If any re-submittals of plans, RFC plans, and / or any additional information is required, an electronic copy shall be submitted by the Design-Build Team to the Alternative Delivery Unit for forwarding to the Railroad. RFC plans must be submitted and accepted by the Alternative Delivery Unit and acceptance by the Railroad before construction can begin in the respective rights of way / easements.

Working Drawings, Shop Drawings, and other submittals affecting the Railroad's rights of way / easements shall follow the submittal process as outlined in the Norfolk Southern Special Provisions for Protection of Railway Interests. The Design-Build Team shall allow 60 days for review of the initial railroad submittal and 45 days for each subsequent submittal.

## **CROSSINGS**

All required temporary and permanent (existing and proposed) crossings shall be designed and constructed based on an engineering study, see Part 8 of the MUTCD, conducted by the Design-Build Team for the Department with the Diagnostic Team (Reference the Traffic Signals and Signal Communications and Signing Scopes of Work found elsewhere in this RFP).

The Design-Build Team's design for all construction at the temporary and permanent (existing and proposed) crossings of the inactive spur line shall not preclude the installation of the required traffic control system at each proposed crossing for the future trolley.

### Temporary

The Design-Build Team shall make the necessary arrangements with the Railroad 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, and railroad force account estimates and agreements. The temporary grade crossing surface shall conform to NCDOT Rail Division 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 Railroad, or their representative, at the Design-Build Team's expense.

### Permanent

The Design-Build Team shall prepare and submit to the NCDOT Rail Division through the Alternative Delivery Unit completed highway-rail crossing signalization planimetrics and Right of Way / 60% Plans for the proposed roadway work for review and acceptance.

- Crossing Signals: The Department will review the planimetric within ten days, per crossing, of its receipt. The Design-Build Team will address all comments received and

- obtain acceptance of the planimetric from the NCDOT Rail Division. The Design-Build Team shall submit the planimetrics to the Railroad requesting railroad-prepared design, engineering, materials list, and cost estimate of the highway / rail grade crossing signalization including required authorizations for construction and preliminary engineering. The Design-Build Team will be responsible for coordinating any comments received by the NCDOT Rail Division and addressing all comments including any necessary modifications to the Department-accepted planimetric as well as final execution of the authorizations for construction and preliminary engineering by the Department.
- Crossing Surfaces and Encroachment: Within ten days, per crossing, of receipt of the Right of Way / 60% Plans, the Department will provide the Design-Build Team with a draft encroachment agreement for the Design-Build Team's handling and coordination. The Design-Build Team shall be responsible for all coordination and negotiations necessary with the Railroad and the Department to obtain partial execution of the agreement by the Railroad. After negotiations between the Department, the Design-Build Team, and the Railroad have been finalized, the Design-Build Team shall submit partially executed agreements and plans to the NCDOT Rail Division through the Alternative Delivery Unit for final agreement execution by the Department, prior to authorizing railroad work. For informational purposes, the Design-Build Team is advised that traditionally the Railroad signs the agreement first, then the Department. After final execution of the agreement and railroad work is authorized by the NCDOT Rail Division, the agreements will be distributed by NCDOT Rail Division to the Design-Build Team and Department's Resident Engineer, prior to any construction work by the Design-Build Team or the railroad.

## APPLICABLE STANDARDS AND SPECIFICATIONS

The Design-Build Team shall comply with the following applicable documents, and any other guidelines as required by the Railroad unless noted otherwise elsewhere in this RFP and / or a design exception is received from the Railroad, via the Alternative Delivery Unit:

- *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 Construction Manual* Section 107-9.
- *2024 NCDOT Standard Specifications for Roads and Structures*, Section 107-9 (Excluding Paragraph 2)
- *North Carolina Administrative Code* Section T19A: 02B, 0150 through 0158
- *Norfolk Southern Railway Special Provisions for Railway Interests*



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- Norfolk Southern Railway – *Specifications for Pipeline Occupancy of Norfolk Southern Corporation Property (NSCE-8)*, latest edition
- Norfolk Southern Railway – *Specifications for Wireline Occupancy of Norfolk Southern Corporation Property (NSCE-4)*, latest edition
- Norfolk Southern Railway – *Work Site Safety Requirements For 3rd Party Pipe & Wireline Installation Contractors*, latest edition
- Norfolk Southern Railway - *Standard Specifications for Design and Construction*, latest edition
- Norfolk Southern Railway - *Operating Guidelines For Contractors*, latest edition
- FHWA *Manual on Uniform Traffic Control Devices (MUTCD)* 11<sup>th</sup> Edition

In case of conflicting design and construction parameters, and / or ranges, in the various resources, the proposed design and construction shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

## CONSTRUCTION

The Design-Build Team shall construct the required improvements on the P&N Spur Line as shown on the RFC Plans design by the Design-Build Team and accepted by the Railroad. The Design-Build Team shall renew the existing track subgrade.

### Railroad Protective Services

Protective services are not required on the P&N Spur Line since the line is currently inactive.

### Construction Submittal Requirements

The Design-Build Team shall submit all construction related correspondence and submittals electronically to the Railroad's Engineer and the designated General Engineering Consultant (GEC) through the Alternative Delivery Unit for review and approval. Construction submissions are required for any activities that have the potential to disturb Railroad property. All submittals will be reviewed with respect to the impacts to overall project safety. All submittals must be prepared, signed and sealed by the Design-Build Team's engineer. Note that additional submittals may be required upon request. The Design-Build Team shall refer to the Norfolk Southern Special Provisions for the Protection of Railway Interests and the NSR Guidelines for Design of Grade Separation Structures for specific submittal requirements. Work for a specific submittal shall not start until written approval in electronic format is provided by the Railroad or their GEC. The Design-Build Team requests for submittal revisions shall be coordinated with the Railroad and GEC, and acceptance before any changes are implemented by the Design-Build Team.

Authorization Letter / Email

The Design-Build Team shall not commence any work on, over, under, or adjacent to the Railroad rights of way and / or easements until the Design-Build Team has received written authorization to proceed from the Railroad and plans associated with any work has been accepted by the Department. This authorization will be provided once the items on the Railroad Checklist are completed.

Construction Monitoring

All construction work on, over, under, adjacent to, or that may in any manner affect the Railroad will be conducted by the Railroad or its GEC personnel. Monitoring includes intermittent visits to the site or full-time on-site monitoring during construction activities that could be hazardous to the public or Railroad employees and or highway operations. Construction Monitoring will also be performed to ensure that all work is being performed in accordance with approved submittals and NCDOT Special Provisions. Safety of the NCDOT or property, the Design-Build Team, and their employees is the responsibility of the NCDOT and the Design-Build Team. The Railroad and its GEC, as part of its construction monitoring, will review the work site for activities that could interfere with safe operation. The Railroad and its GEC are not responsible for monitoring the general work activities under the direction of the NCDOT for compliance with safety regulations. Any observed unsafe acts or conditions will be reported immediately to the NCDOT and Design-Build Team's representatives.

Construction Submittals

The Design-Build Team should anticipate a minimum of 45 days for the Railroad and / or their GEC to complete the review of all construction submittals. Time frames for reviews can vary significantly depending on the complexity of the project and the quality of submittals.

**PREQUALIFICATION**

The Design-Build Team shall consist of a Private Engineering Firm (PEF) and contractor / subcontractor that have experience designing and constructing rail bridges and track work on comparable projects for the North Carolina Department of Transportation (NCDOT).

The Design-Build Team shall obtain the services of a firm(s) prequalified for rail work by the NCDOT Rail Division. Prequalified disciplines and discipline codes required include, but are not limited to, the following:

- Design Consultant Prequalification Codes Required for Rail:
  - 00182 Railroad Crossing Signal and Traffic Engineering Services
  - 00394 Industrial and Yard Track Design and Layout
  - 00395 Freight Main Track Design and Layout

- Contractor Prequalification Codes Required for Rail:
  - 5010 Track Construction
  - 5050 Track Maintenance/Rehabilitation
  - 5080 At-Grade Crossing Surfaces
  - 5090 Railroad Corridor Prime Contractor

A list of prequalified firms and the Discipline Code requirements can be found at the website noted below

**<https://connect.ncdot.gov/business/Prequal/Pages/default.aspx>**

NCDOT will be responsible for railroad costs associated with these projects, such as Preliminary Engineering (PE), until award of project. After award, NCDOT will be responsible for review, acceptance, coordination, construction observers.

The Design-Build Team shall be responsible for all other railroad costs associated with this project, including all designs, materials, signals and communications work, track and related construction, and any other railroad construction performed by the Design-Build Team, required insurances, railroad flagging pursuant to the RFP.

The Design-Build Team shall be responsible for all construction costs required. The Design-Build Team shall not enter into or onto any rail corridor until a Right of Entry Agreement has been executed, and insurance requirements are met. A Right of Entry Agreement shall be required for the Railroad, at no cost to the Design-Build Team, or onto the land controlled by the Railroad.

#### **NCDOT INFORMATION SUPPLIED**

NCDOT is developing and coordinating Preliminary / 30% Plans, Preliminary General Drawings, and Right of Way / 60% plans of for the permanent railroad track geometry with the Railroad. The alignment will be provided to the Design-Build Team. The alignment identifies curvature, spiral lengths, superelevation and will include track profiles with vertical curvature for SFF 1.72: P&N Belmont Spur (includes MUP parallel to the track, realignment / shift of existing at-grade crossing, other improved crossing surfaces, no rail traffic to maintain).

The Design-Build Team is cautioned that the rail designs and electronic design files provided by the Department 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.

**RIGHT OF WAY SCOPE OF WORK** (8-16-24)

**\*\* 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 Alternative Delivery personnel.**

- 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 Mr. Charles Grady, in the NCDOT Right of Way Unit, at 919-707-4393. The Design-Build Team shall perform the services as set forth herein and 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. The Design-Build Team, acting as an agent on behalf of the State of North Carolina, shall provide right of way acquisition services for TIP I-5719B / U-5800 in Gaston County.

Acquisition services required outside of the project construction limits due solely to an allowable rise in the floodplain water elevation on insurable structures will be considered extra work and paid for in accordance with Article 104-7 of the *Standard Specifications*.

**The Design-Build Team shall carry out the responsibilities as follows:**

- 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. The Design-Build Team will be responsible for all Cross-Connection Control / Back Flow Preventer systems work in accordance with Department policy & procedure. (Reference the Utilities Coordination Scope of Work found elsewhere in this RFP)
- The relocation and / or replacement of commercial and residential backflow preventers shall not be a Cost-to-Cure item and shall not be included in any appraisal. (Reference the Utilities Scope of Work found elsewhere in this RFP)
- 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 *Right of Way Manual*, updated June 10, 2024.
- 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 Negotiator, Area Appraiser and the Assistant State Negotiator 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.
- 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). The Design-Build Team shall provide exhibits, diagrams and / or other information required to verify the aforementioned descriptions.
  - In accordance with the NCDOT *Right of Way Manual*, updated June 10, 2024, 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.
  - The Design-Build Team shall deliver all executed and recorded deeds and easements to the Department.
  - 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. At the request of the Department, the Design-Build Team’s appraiser(s) shall be compelled to testify in court and at trials in condemnation cases with their related work.
- 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 fifteen 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 Claim Reports, Transmittal Summaries and / or Narrative Appraisals for all right of way, control of access and easement acquisitions.
- All Claim reports shall be signed by a Department Right of Way Supervisor as stated in section 4.10 of the NCDOT Right of Way Manual, updated June10, 2024.
- 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 Western Assistant State Negotiator, Mr. Rodney Hatton. 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** (1-14-25)**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>**

- FHWA *Manual on Uniform Traffic Control Devices* (MUTCD) 11<sup>th</sup> Edition

**[https://mutcd.fhwa.dot.gov/kno\\_11th\\_Edition.htm](https://mutcd.fhwa.dot.gov/kno_11th_Edition.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>**

- 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*
- 2024 NCDOT *Roadway Standard Drawings (Standard Drawing)*

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 Technical Proposal shall list projects, where the Signing Plans were developed by the PEF, including description and similarity to the subject project.

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 anticipated DMS locations, all proposed overhead sign structure locations, all overhead signs, and all ground mounted Type A and B guide signs.

### **Signing Plans Submittal Requirements**

The Design-Build Team shall concurrently submit the 25% Preliminary Signing Plans to the recipients in the Design-Build Submittal Guidelines and the ITS Unit for review of the DMS locations.

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 Alternative Delivery 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 (including overhead sign structures) required through the construction limits of the mainline, as well as all -Y- Lines, all service roads, all turn-arounds / 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 turn-arounds / cul-de-sacs, all roundabouts, all ramps and all loops to ensure adequate advance signage and spacing is provided. The Design-Build Team shall coordinate with all current and future projects (if plans available) to assure proper signing has been addressed for current and future installations.

Signing for southbound I-85 at EXIT 23 (NC 7 (McAdenville Road/Main Street)) shall be signed as a lane drop onto Ramp A during this intermediate phase of the project. The proposed overhead structure shall be designed with a wind load to handle any future signs.

The Design-Build Team shall design, fabricate and install ALL signs along I-85 Southbound for EXIT 27.

**Signing for Roundabouts**

The Design-Build Team shall utilize the MUTCD and Signing and Pavement Marking Typical, located on the Signing and Delineation Unit website, for Urban and Interchange Roundabouts in developing the 25% Preliminary Signing Plans.

In addition to mandatory signage for roundabouts the Design-Build Team shall install the following signage on all legs of all proposed roundabouts:

Urban and Interchange Roundabouts:

- Optional roundabout warning signs W2-6 with W16-8P or W16-8aP.
- Optional roundabout directional signs (D1-1D, D1-2D or D1-3D).
- Optional roundabout warning sign (W3-2).
- Optional roundabout regulatory sign (R6-5P).

**Rail Crossing Signage**

The Design-Build Team shall design, fabricate and install ground mounted signs for at grade crossings in accordance with the *Standard Drawing* No. 910.10 or Part 8 of the MUTCD and the engineering study. The Design-Build Team shall work with a Diagnostic Team in completing the required engineering study for all temporary and permanent (existing and proposed) at grade crossings (Reference the Traffic Signals and Signal Communications and Railroad Coordination and Construction Scopes of Work found elsewhere in this RFP).

## **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 turnarounds / cul-de-sacs, including Type A and B overhead signs, 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 I-85 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 (edge line) elevation. Mile marker designs shall be in accordance with the Reference Location Signs (D10-2) 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 ramps or as required by the MUTCD Table 2C-4 and Figure 2C-3, the Design-Build Team shall fabricate and install all devices to be used in advance of, and / or along, a horizontal curve.

The Design-Build Team shall design, fabricate and install enhanced multi-lane crossroad signing, as shown in Figures 2D-17 through 2D-22 of the MUTCD, for all interchanges that meet the requirements per the MUTCD.

Prior to submittal of RFC Signing Plans, the Design-Build Team shall coordinate with the Signing and Delineation Unit and the Alternative Delivery Unit on destination cities and / or street names on guide signs.

### **Logo Signs (Blue Service Signs with Specific Business Panels, including but not limited to, Specific Business Panels on U-channel posts)**

The Design-Build Team will not be responsible for designing, locating or installing any additional Logo Signs not located within the project limits on the Technical Proposal submittal date. The Division Traffic Engineer shall be notified when a LOGO or TODS (Service Signs) are removed during construction and not immediately relocated.

Prior to project completion, the Design-Build Team shall relocate, reinstall and / or replace all existing Logo Signs located within the project limits on the Technical Proposal submittal date that are impacted by the Design-Build Team's design and / or construction methods.

If damage occurs to the Logo Signs and / or the business panels during construction, the Design-Build Team shall immediately notify the Division Logo Coordinator. The Design-Build Team shall replace all Logo Signs and / or business panels that are damaged during construction. If the Logo Signs are replaced, the Design-Build Team shall remove the business panels and deliver them to the Division Logo Coordinator. During project construction, the Design-Build Team shall maintain the Logo Signs order of preference in accordance with the MUTCD Section 2I-3.

### **Sign Sheeting Requirements for Overhead Signs**

The Design-Build Team shall design and fabricate all overhead signs with Grade A retro-reflective sheeting for sign legends (text), borders, and all Interstate, US and NC route shields and arrows. The Design-Build Team shall design and fabricate all overhead signs with Grade C retro-reflective sheeting for the background.

Black non-reflective sheeting shall be used for all black arrows, legends (text), and borders on overhead signs.

### **Speed Limit**

The posted speed limit for the mainline (I-85) shall be 60 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 and sign structures.

The Design-Build Team shall provide a minimum of two advanced guide signs for all freeway / expressway interchange approaches.

To avoid placing a sign or sign structure 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 sign supports in accordance with the *Standard Drawing*. 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 *Standard Drawing*. 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.

### **Proposed Overhead Sign Structures**

The Design-Build Team shall consider the proposed roadway geometry, number of lanes, and all advisory signing needs when selecting the type of overhead signing for a given location. At a minimum, the Design-Build Team shall provide overhead signing at the locations identified in the MUTCD, Section 2E.28 - Signing for Interchange Lane Drops, Section 2A.14 - Overhead Sign Installations, Items A - M, and the following locations, unless allowed otherwise elsewhere in this RFP:

- An option lane at a freeway / expressway multi-lane exit or freeway / ramp split (use Arrow Per Lane signs)
- A minimum of two (2) overhead sign structures for freeway lane ends (freeway lane drop)
- Three or more lanes on a freeway
- Full span exit directional structures will be required at EXIT 23 for both South Bound & North Bound approaches along I-85. These structures shall be designed and constructed at the locations base off the final roadway design. The wind load for the structures will need to handle the intermediate and final signs.

The wind speed for the overhead sign structure and foundation designs for this project shall be 90 mph.

The Design-Build Team shall design, fabricate and install overhead sign supports and foundations in accordance with Section 906 of the *Standard Specifications*, the *Foundations and Anchor Rod Assemblies for Metal Poles*, and *Overhead and Dynamic Message Sign Foundations* Project Special Provisions found elsewhere in this RFP.

The vertical clearance beneath all proposed overhead sign assemblies shall be no less than 17 feet and no greater than 18 feet. For all proposed overhead sign assemblies, the Design-Build Team shall submit documentation that verifies the actual vertical clearance at all critical points.

For all overhead sign assemblies mounted on concrete median barrier, the Design-Build Team shall design, fabricate and install median barrier footing and median transitional barrier in accordance with *Standard Drawing* No. 854.05.

The maximum span length for cantilever overhead sign structures shall be 52 feet.

Lighting and walkways will not be required on any overhead sign assembly.

Overhead signs shall not be attached to existing or proposed bridges.

Excluding Interchange Sequence Signs on median barrier, pedestal mounted overhead signs will not be allowed.

### **Overhead Sign Structure Inventory Numbers**

The Design-Build Team shall provide information related to the design of each overhead sign structure (full-span, cantilever, pedestal mount) to the Signing and Delineation Unit and shall be archived electronically (PDF format) within the Design-Build Submittals folder on NCDOT Connect. The design elements to be archived by the Design-Build Team are:

- Overhead Sign Structure line drawings (RFC Signing Plans)
- Overhead Sign Designs
- Plan Sheets that include Overhead Sign Assemblies



The Design-Build Team shall submit an excel spreadsheet that includes all proposed overhead sign structure locations with the overhead sign structure line drawings. This spreadsheet shall also include the type of structure (cantilever, full span, pedestal) as well as geographic coordinate information shown in the example below:

| Structure Number | Sign Structure | Type       | Station                            | Latitude (Degrees) | Longitude (Degrees) |
|------------------|----------------|------------|------------------------------------|--------------------|---------------------|
| A                |                | Cantilever | Outside Project Limits on NB US 29 | 35.929633          | -80.002204          |
| B                |                | Full Span  | -L- Sta. 12+50                     | 35.932891          | -79.995279          |
| C                |                | Cantilever | -L- Sta. 35+50                     | 35.936724          | -79.988283          |
| D                |                | Pedestal   | Outside Project Limits on SB US 29 | 35.949003          | -79.967006          |

Coordinates of the overhead sign structures shall be located within 50 feet of the center of the structure.

The Department will use the aforementioned spreadsheet, as well as the overhead sign structure line drawings, to determine Overhead Sign Structure Inventory Numbers for all overhead sign structures. Once the Overhead Sign Structure Inventory Numbers are assigned, the Department will provide the numbers to the Design-Build Team to be included on each structure line drawing in the RFC Signing Plans. The geographic coordinate information of the proposed overhead sign structure locations shall not be included in the structure line drawings in the RFC Plans. Reference the *Signing and Delineation Unit (SDU) Procedure Manual* for further guidance.

### Proposed Overhead Wind Load Area

Overhead sign structures shall be designed for proposed and future signs. The Design-Build Team shall determine wind load areas and include the wind load areas on the overhead sign structure drawings. The wind load area for the sign structures shall be determined in accordance with the following:

- **Case A, Identified Future Signs:** For sign structures that have an identified need for larger future signs, the future signs shall be designed and shown on the overhead sign structure drawings. Future sign messages, sizes, and positions shall be shown on the elevation drawings. The largest potential wind load area shall be used for the design of the overhead structure.
- **Case B, General Future Wind Load Area:** For overhead signs without identified future signs, the structure shall be designed for a larger wind load area to accommodate future signs that are not identified at the time of the structure design. General future wind load area sizes and positions shall be shown on the elevation drawings. The general future wind load area shall be computed as follows:
  - The wind load area shall be rectangular for each primary sign including secondary and supplemental signs.
  - The wind load area width shall extend two feet outside the proposed primary sign on each side of the sign. In cases where the wind load areas of two signs intersect, the taller area shall take priority. For cantilever structures, the wind load area shall be flush with the edge

of the primary sign at the cantilevered end, such that the future four-foot wind load area does not extend past the end of a cantilever sign structure.

- The wind load area height shall extend two feet below the bottom of each sign and two feet above the top of each sign, including secondary and supplemental signs as well as the spacing between signs according to *Standard Drawing* No. 904.20, and excluding temporary “all traffic exit” signs. The minimum vertical clearance shall be measured from the bottom of the lowest wind load area.
- **Case C, Exceptions from Case B:** The following are exempted from Case B, general future wind load areas:
  - Arrow Per Lane Signs
  - Interchange Sequence Signs on median barrier

### **Existing Overhead Structures**

The Design-Build Team shall perform a structural analysis of the overhead sign structure prior to modifying the existing overhead sign assembly to accommodate proposed signs that exceed the original wind load area. The Design-Build Team shall obtain Department acceptance of the structural analysis prior to construction. The Design-Build Team shall replace all existing overhead sign assemblies determined to be structurally inadequate for the proposed modifications, in the Department’s sole discretion. The Design-Build Team may modify an existing overhead sign assembly to accommodate proposed signs that do not exceed the original wind load area without performing the aforementioned structural analysis.

When the aforementioned structural analysis determines that an existing overhead sign structure is structurally adequate to be retained or the proposed wind load area does not require a structural analysis, the Design-Build Team shall remove and dispose of all the existing overhead signs. The Design-Build Team shall install new signs on the retained existing overhead sign structure that adhere to the requirements herein. The Design-Build Team shall prepare Structure Line Drawings that depict 1) the existing signs to be removed, 2) the existing sign sizes, 3) the new sign designs, 4), the vertical clearance of all new signs, 5) the new signs positioning over travel lanes, 6) the lateral placement from supports, 7) the original wind load area, and 8) confirmation that the proposed wind load area does not exceed the original wind load area.

The Design-Build Team shall remove and dispose of lighting systems and walkways on all existing overhead sign structures that are retained.

If the Department cannot provide existing overhead structure line drawings or shop drawings of the existing overhead sign structure, the Design-Build Team shall design and install new overhead sign structures.

The minimum vertical clearance beneath all existing overhead sign assemblies that are retained shall be 17 feet. For all existing overhead sign assemblies retained, the Design-Build Team shall submit documentation that verifies the actual vertical clearance at all critical points.

### **Shop Drawings for Overhead Sign Structures**

The Design-Build Team shall prepare a shop drawing for each proposed and modified overhead sign structure for the Department's review and acceptance. For shop drawing design and submittal requirements, see *Guidelines for Preparation of Signing and Final Pavement Marking Plans for Design-Build Projects* and the *Standard Specifications*.

### **Guardrail or other Positive Protection for Overhead Sign Supports**

Except as allowed otherwise below, overhead sign supports shall be located a minimum of 40 feet from the edge of the outside travel lane to the center of the sign supports. To minimize right of way, utility, drainage and / or jurisdictional impacts, or to allow a cantilever overhead sign assembly in lieu of a full-span overhead sign assembly, the minimum 40-foot offset may be reduced, at the Department's sole discretion. All overhead sign supports that are not located a minimum of 40 feet from the edge of the outside travel lane to the center of the sign support shall be protected by guardrail or other NCDOT approved positive protection. When an overhead sign support is protected by guardrail, the face of the guardrail shall be located a minimum of eight feet from the center of the sign support.

The Design-Build Team shall review the protection for all existing overhead structure supports that are retained to determine if the existing positive protection meets current requirements. If the positive protection does not meet current requirements, the Design-Build Team shall design and construct new positive protection that adheres to the current requirements.

Cable-guide rail shall not be used as positive protection for overhead sign supports.

### **Verification of Theoretical Information shown on Structure Line Drawings**

The Design-Build Team shall verify the information on the Structure Line Drawings prior to submittal of shop drawings for the Department's review and acceptance. At a minimum, the aforementioned verification shall include confirmation of the sign(s) positioning over lanes, span length, sign offsets, "s" drops, and the slopes at the center line of the support / upright. When theoretical dimensions or slopes are revised during construction, the Design-Build Team shall submit a revised Structure Line Drawing with the shop drawing.

### **Removal and Disposal of Existing Signs**

The Design-Build Team shall determine which existing signs, sign supports, overhead signs, and / or overhead 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 all Logo 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 *Standard Specifications*) All signs and supports remaining / existing at the completion of this project shall be plumb, oriented correctly and adhere to AASHTO requirements.

Unless approved by the Division Logo Coordinator, in writing, all Logo and TOD signs shall be immediately relocated to a temporary or permanent location. If a temporary removal is granted, the Design-Build Team shall notify the Division Logo Coordinator in writing at least seven days prior to removal and deliver the business panels to the Division Logo Coordinator once removed.

**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. The Design-Build Team shall provide an updated excel spreadsheet with all construction revisions that modify an overhead sign structure's geographic coordinate information. (Reference the Overhead Sign Structures Inventory Numbers section above)

**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 and overhead structures. These Signing Plans shall be provided in .pdf and MicroStation format.

**STRUCTURES SCOPE OF WORK** (4-8-25)**Project Details**

The Design-Build Team shall design and construct the structures necessary to complete the project, including but not limited to, the following:

- Replace Bridge No. 350073 on NC 7 (McAdenville Road/Main Street) over I-85
- Widen and rehabilitate Bridge No. 350143 on I-85 over South Fork Catawba River
- Replace Bridge No. 350146 on SR 2000 (Hickory Grove Road) over I-85
- Replace Bridge No. 350149 on SR 2093 (Belmont Mt Holly Road/Main Street) over I-85
- Replace Bridge No. 350150 on P&N (Belmont Spur MP SFF 1.72) east of Belmont Mt Holly Road over I-85
- Rehabilitate Bridge No. 350034 on NC 273 (Beaty Drive) over I-85
- 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 / reinforced concrete box culvert extensions required by the Design-Build Team's design

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 over all local and collector roads shall be 15'-6". The minimum vertical clearance for bridges over I-85 shall be 17'-0". The minimum vertical clearance for bridges over all multiuse paths and greenways shall be 10'-0".

The Design-Build Team shall be responsible for all required railroad coordination, including but not limited to securing Railroad Agreements. (Reference the Railroad Coordination and Construction Scope of Work found elsewhere in this RFP) The P&N bridge shall include all new structural components and adhere to the following requirements:

- The replacement for Bridge No. 350150 on P&N (Belmont Spur MP SFF 1.72) east of Belmont Mt Holly Road over I-85 shall be designed and constructed as two separate superstructures with a common Substructure (rail on the west side, pedestrian on the east). Conduit and lighting shall be provided on the pedestrian bridge per the lighting plans. Bridge railing shall be as shown in the typical section "401\_007\_I5719\_SMU\_PGD\_004\_35XXXX.pdf" provided by the Department. (Reference the Aesthetics Scope of Work found elsewhere in this RFP) Bridge deck shall be concrete.
- Bridge No. 350150 (excluding the pedestrian portion) shall be designed for E-60 live load.
- Shoulder bents will be allowed for the replacement of Bridge No. 350150.

•  
Bridge No. 350143 on I-85 over South Fork Catawba River shall be widened to accommodate a typical section that includes a 12-foot median shoulder, four 12-foot travel lanes and a 12-foot outside shoulder in both the southbound and northbound directions of I-85. The Design-Build Team shall maintain the existing access to Coats North America (Pharr HP) via Dickson Road Extension and Carolina Thread Trail / South Fork Trail during construction. A PPC overlay shall be applied to the widened deck.

On all bridges with Multi-Use Paths, rails separating traffic from multi-use paths shall be per the most current version of Structure Standard Drawing CBR2 unless otherwise directed.

Bridge barrier rails on vehicular bridges over I-85 shall be per the most current version of Structure Drawing BMR3.

Railing shall provide conduit and support for future lighting as shown on the I-5719B Preliminary Lighting plans. (Reference the Lighting Scope of Work found elsewhere in this RFP)

Bridge barrier rails on vehicular bridges on I-85 shall be per the most current version of Structure Drawing CBR1.

The minimum horizontal setbacks from the closest edge of travel lane to face of barrier in front of walls shall be 14'-0" for bridges over interstates, freeways, and arterials.

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.

Diaphragms for integral end bents shall extend the full length of the end bent cap.

End bents and end slopes at each end of a bridge shall have the same appearance.

The Design-Build Team shall design and construct aesthetics betterments per the Aesthetics Scope of Work found elsewhere in the RFP.

Unless noted otherwise elsewhere in this RFP, the following will not be allowed on the project:

- Cored slab, box beam, nonredundant steel tension members, 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 or railroad 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 (excluding lighting conduit where required by lighting plans)

- For new 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
- Integral End Bents on Shallow foundations behind MSE abutment walls
- Bridges with less than four (4) girder lines (excluding pedestrian side of 350150)
- For new bridges, multiple girder depths on an individual bridge
- For bridge widenings, girder types and span lengths that are different from the existing bridge
- Sound barrier walls constructed on top of retaining walls

### **Structure Removal**

Bridge No. 350143 and 350150 have lead-based paint systems.

### **Rehabilitation of Existing Structures**

The Design-Build Team shall rehabilitate bridges in accordance with the requirements noted below, and the special provisions found elsewhere in this RFP and on the Structures Management Unit website. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall perform all rehabilitation work for the entire bridge.

Bridge 350143 on I-85 over South Fork Catawba River

- Repair/rehabilitate in accordance with the Revised Preservation Plan Sheets provided to the teams and referenced Structures Project Special Provisions found elsewhere in this RFP and Structures Management Unit website.
- The Design-Build Team shall provide signed and sealed Preservation Plans for Bridge 350143.
- Unless an overlay is necessary for crown and / or grade revision, the Design-Build Team shall remove and / or replace the existing bridge deck overlay only where deck repairs are required, as identified in the Revised Preservation Plans developed by the Design-Build Team.
- The Department has completed an analysis of the existing structure for additional overlay thickness. Except for Span No. 3 on the southbound side of the bridge, the capacity of the existing girders will accommodate an average deck thickness, for existing and proposed, of 18 inches. The Design-Build Team shall perform all required analysis, including fatigue evaluation, for any average deck total thickness in excess of 18 inches and provide the analysis to the Department for review and approval prior to Final Bridge Plan submittal. The Revised Preservation Plans provided to the teams includes additional beams and bearings for Span No. 3 on the Southbound side of the bridge that will allow this span to accommodate an average deck thickness of 18 inches as described above.
- The Design-Build Team shall produce the LRFR rating sheet for the full width of the bridge in the final widened condition.

- The Design-Build Team shall include painting of all structural steel with required containment as identified in the Preservation Plans developed by the Design-Build Team.
- The Design-Build Team shall replace all existing bearings with new bearing assemblies, except at end bents. New bearing assemblies should include composite elastomeric bearing pads with designs in accordance with the current governing AASHTO LRFD Bridge Design Specifications.
  - Prior to commencing bearing replacement designs, the Design-Build Team shall perform a thorough survey (including photos and measurements) at all bearing to be replaced. This report should detail bearing plan dimensions, fixity, total thickness, and any needs of the replacement bearing assemblies. The Design-Build Team's Engineer of Record shall prepare a report documenting the findings of this survey, as well as provide concept replacement bearing assemblies to be applied throughout the bridge. The Bearing Survey report shall be submitted and accepted prior to the approval of Preliminary General Drawings.
  - The Design-Build Team shall provide an as-built bearing report once all bearings have been replaced. This report shall include photos of each replaced bearing along with an inventory of the size plates / pads and devices installed at each bearing location.
  - The Design-Build Team is required to include the replacement of all bearings (not at end bents) on Bridge 350143 in its bid.

Bridge No. 350034 on NC 273 (Beaty Drive) over I-85

- Properly prepare concrete deck with scarification and hydro-demolition and apply minimum 1 1/4" Latex Modified Concrete (LMC) overlay
- Place elastomeric concrete bridge deck joint headers and place new foam deck joint seals.
- Clean and Paint weathering steel beam ends and bearing plates
- Repair concrete spalls, delaminations, and cracking with shotcrete and concrete epoxy injection.

All Class II and Class III Surface Preparation repairs, anchor bolt replacement, concrete / shotcrete repairs, joint seal preservation / repair, and crack injections underneath bridge decks, including slope protection repairs and injections, for Bridge No. 350034 will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*.

**\*\*Note\*\* Deleted Unit Prices for Surface Preparation Repairs**

Prior to performing Class II and Class III Surface Preparation repairs, anchor bolt replacement, concrete / shotcrete repairs, joint seal preservation / repair, and crack injections underneath bridge decks, including slope protection repairs and injections, the Design-Build Team shall obtain approval from the Engineer, in writing. All work tasks required to complete the rehabilitation activities, including but not limited to traffic control, surveys and portable lighting, shall be incidental.



## **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 lengthen or replace all existing reinforced concrete box culverts. Reinforced concrete box culvert designs shall be in accordance with 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**

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.

## **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.

The Design-Build Team shall only submit a single structure per submittal. Multiple structures in a submittal will not be accepted for review.

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 *NCDOT Roadway Design Manual, Chapter 5*.

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 *Standard Specifications*, *NCDOT Structures Management Unit Project Special Provisions* and *NCDOT Structures Management Unit Standard Drawings*. Reference the Structures Management Unit website 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.

The Design Build team shall be responsible for assuring that material deliveries do not exceed weight limits of bridges on the delivery routes.

**TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS SCOPE OF WORK** (2-18-25)**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, permanent traffic signal installations, traffic signal revisions, and signal communication plans for connection to the existing NCDOT maintained D12-09 Belmont Signal System, a New NCDOT maintained McAdenville Signal System along NC 7 (McAdenville Road/Main Street), and the City of Gastonia Signal System. This work shall include, but not be limited to, the preparation of Traffic Signal Plans, Metal Pole Loading Diagrams, Electrical and Programming Details, Utility Make-Ready Plans, Signal Communication Fiber Optic Communication and Splicing Plans, Wireless Communication Plans, and Project Special Provisions. These plans shall be prepared in accordance with the *Design-Build Submittal Guidelines* available on the NCDOT Connect - Alternative Delivery Unit's website and the *Guidelines for the Preparation of Traffic Signal & Signal Communications Plans by Private Engineering Firms* available on the NCDOT Connect - Transportation Systems Management and Operations Unit's website.

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing Traffic Signal, Electrical Detail, and Signal Communications Plans for NCDOT on comparable projects. The PEF selected shall also have experience preparing Utility Make Ready plans. The Technical Proposal shall list projects, including description and similarity to the subject project, for which the PEF has developed Traffic Signal, Electrical Detail, and Signal Communications Plans.

A pre-design meeting shall take place between the NCDOT Transportation Systems Management & Operations Unit (TSMO), the Work Zone Traffic Control Group, the Design-Build Team, the Alternative Delivery Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Operations Center (STOC), the Metrolina Regional Traffic Management Center (Metrolina TMC), the City of Gastonia Signal System Traffic Engineer, and any other pertinent NCDOT personnel before signal submittals begin. Traffic Signal, Electrical Detail, and Signal Communications Plan submittals shall only be reviewed and accepted by the Department after this pre-design meeting. All Traffic Signal and Signal Communications Plans shall be reviewed by the TSMO. Additionally, plans shall be concurrently submitted to the appropriate authorities in which the plans are associated (e.g. City of Gastonia Signal System, Division 12 Traffic personnel, etc.) for comments. However, final approval on all Traffic Signal Plans and Signal Communications Plans submittals will ultimately be the responsibility of the NCDOT TSMO. All Traffic Signal Plans and Signal Communication Plans shall be accepted by the TSMO 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, the City of Gastonia Signal System Traffic Engineer, and the TSMO. 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 and interconnection to the Signal System, if required below.

Except as noted otherwise elsewhere in this RFP, the Design-Build Team shall maintain, monitor and adjust the traffic signals, both vehicle and pedestrian, 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 and pedestrian traffic during construction, and all final traffic signal timing plans for the final traffic configurations. If necessary, temporary traffic signal designs and implementation, shall include, but not be limited to, new local controller, signal timing, inductive loops / vehicle detection, cables, poles, signal span, controllers, cabinets, and / or signal heads. Prior to implementation, all signal timing plans shall be reviewed and accepted by the TSMOU.

Where construction activities necessitate a detour, the Design-Build Team shall evaluate the effects of that detour on all traffic 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.**

The Design-Build Team shall maintain or incorporate all traffic signals on this project into NCDOT maintained D12-09 Belmont Signal System and the Gastonia Signal System, as detailed below. To connect sidewalk networks, the Design-Build Team shall provide crosswalks and pedestrian signal heads for all approaches, as appropriate, based on field conditions. Crosswalks and pedestrian signal heads will not be required where there is no sidewalk on a quadrant. The Design-Build Team shall design the US 29 - 74 (Wilkinson Boulevard) at NC 7 (N. Main Street) and the McAdenville Road / Caldwell Farm Road at Old Main Street intersections for pedestrian and future trolley crossings.

All final signal installations shall utilize galvanized metal poles with mast arms. The Design-Build Team shall provide black protective coating for all metal poles with mast arms. The City of McAdenville utilize straight mast arms and the City of Belmont utilizes arched mast arms. All temporary signal installations may utilize wood poles for signal supports. All plans and associated design material and specifications shall be reviewed and accepted by NCDOT before installation. See Section II below for final traffic signal support requirements.

The Design-Build Team shall deliver all existing cabinets and their contents, including but not limited to fiber and cellular modems, that are not reinstalled on this project to the Division Traffic Services Office located at 1710 E. Marion St. (US 74 Business), Shelby, NC 28151. The Design-Build Team shall dispose of and / or retain ownership of all other traffic signal equipment.

Signal Inventory Numbers (SIN) will be assigned for each new signalized location by the NCDOT ITS & Signals Management Section. 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 ITS & Signals Management Section, via the Alternative Delivery Unit. 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
- Latitude and Longitude coordinates to the middle of the intersection

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 TSMOU 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 (Standard Specifications)*
- NCDOT *Standard Roadway Drawings (Standard Drawings)*
- Signals and ITS Project Special Provisions
- ITS and Signals Design Manual
- FHWA *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 TSMOU design standards and aides are available on website noted below:

**<https://connect.ncdot.gov/resources/safety/Pages/TSMO.aspx>**

## **II. TRAFFIC SIGNALS**

Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall install six (6) new traffic signal, modify seven (7) existing traffic signals, and remove two (2) existing traffic signal within the project limits. All of these signals shall be interconnected into one of two (2) systems as noted in the tables below (Reference Section III below for the system interconnection requirements). The traffic signal detection for the final traffic patterns shall be multi-zone microwave detection. The Design-Build Team shall provide multi-zone microwave detection for temporary traffic patterns during construction. The out of street detection shall be approved by the Department, in writing, prior to incorporation, and appear on the NCDOT Qualified Products List. Unless allowed otherwise elsewhere in this RFP, the required traffic signal work and signal communications for the intersections are listed below:

| NCDOT - New Signals to be Installed into existing CLS (6) |  |  |
|---|--|--|
| Signal Inventory Number                                   | Intersection Description   | Work Requirements  |
| 12-1932   | NC 7<br>(McAdenville Road) at SR 2380 (Power Drive)  | <p>The Design-Build Team shall install new traffic signals to match all temporary construction phasing and the proposed final traffic pattern. This may require, but not be limited to, additional lanes, signal phasing changes, signal head changes, system detectors, and / or system interconnection equipment.</p> <p>The Design-Build Team shall install new <b>galvanized metal poles with mast arms</b> at these locations.</p> <p>Metal poles with mast arms shall utilize black protective coating.</p> <p>The Design-Build Team shall design and install new, fully actuated traffic signals with 2070LX controllers operating MAXTIME Software in a 170 cabinet with an auxiliary output file, including base extenders.</p> <p>The Design-Build Team shall provide Flashing Yellow Arrow signal heads at all protected / permissive and permissive left turns and U-Turn movements, including time of day phasing options, as appropriate.</p> <p>The Design-Build Team shall provide Up Green Arrow signal heads with respective lane control signs at all locations where turning movement restrictions exist.</p> <p>The Design-Build Team shall provide crosswalks and pedestrian signal heads at each approach with existing or proposed sidewalk.</p> <p>The Design-Build Team shall maintain and / or provide the required system communication equipment as described in Section III.</p> |
| 12-1929   | SR 2093<br>(Belmont Mt Holly Road) at I-85 Ramp C/D  |  |
| 12-1966   | SR 2093<br>(Belmont Mt Holly Road) at I-85 Ramps A/B   |  |
| 12-1946   | US 29-74<br>(Wilkinson Boulevard) at U-Turn East of NC 7 (Main Street)                             |  |
| 12-1947   | US 29-74<br>(Wilkinson Boulevard) at U-Turn West of NC 7 (Main Street)                             |  |
| 12-1930   | NC 7<br>(McAdenville Road) / at SR 2093 (Belmont Mt Holly Road)                                    |  |
| 12-1977   | Pedestrian Hybrid Beacon on US 29-74<br>(Wilkinson Boulevard) at U-Turn East of NC 7 (Main Street) |  |

|                |   |  |
|----------------|---|--|
| <b>12-1978</b> | Pedestrian Hybrid Beacon on US 29-74 (Wilkinson Boulevard) at U-Turn West of NC 7 (Main Street) |  |
|----------------|---|--|

| <b>NCDOT - Existing Signals to be Modified and Added to Existing CLS (6)</b> |  |   |
|--|--|---|
| <b>Signal Inventory Number</b>   | <b>Intersection Description</b>  | <b>Work Requirements</b>  |
| <b>12-1083</b>   | NC 7 (McAdenville Road) at I-85 Ramps C/D                                | The Design-Build Team shall modify these traffic signals to bring displays to current standards and upgrade equipment as required to interconnect signal into a closed loop system. This may require, but not be limited to, signal phasing changes, signal head changes, new controller and / or conflict monitor, system detectors, and / or system interconnection equipment.  |
| <b>12-1082</b>   | NC 7 (McAdenville Road) at I-85 Ramps A/B                                |   |
| <b>12-0561</b>   | US 29/74 (Wilkinson Boulevard) at NC 7 (North Main Street / Main Street) | The Design-Build Team shall design and install a 2070LX controller operating MAXTIME Software in a 170 cabinet with an auxiliary output file, as well as a conflict monitor and other hardware required to support the operation of a 2070 LX controller. The existing cabinet may be retained if it will accommodate the necessary equipment required for system interconnection, in the Department's sole discretion. |
| <b>12-1734</b>   | US 29/74 (Wilkinson Boulevard) at Mercy Drive / Lowe's Entrance          | The Design-Build Team shall install new <b>galvanized metal poles with mast arms</b> at these locations.<br><br>Metal poles with mast arms shall utilize black protective coating (except at NC 7 (Main Street) at Ford Drive / Dickson Drive).   |
| <b>12-0163</b>   | McAdenville Road / Caldwell Farm Road at (Old Main Street)               | The Design-Build Team shall provide the required system communication equipment as described in Section III.  |
| <b>12-1537</b>   | NC 7 (McAdenville Rd.) at I-85 Ramp/Loop C                               |   |

| <b>NCDOT - Existing Signal to be Modified and Added to Existing CLS (1)</b> |   |  |
|---|---|--|
| <b>Signal Inventory Number</b>  | <b>Intersection Description</b>                           | <b>Work Requirements</b>   |
| <b>12-0166</b>  | NC 7<br>(Main Street) at<br>Ford Drive /<br>Dickson Drive | <p>The Design-Build Team shall modify this traffic signal to bring displays to current standards and upgrade equipment as required to interconnect signal into a closed loop system. This may require, but not be limited to, signal phasing changes, signal head changes, new controller and / or conflict monitor, system detectors, and / or system interconnection equipment.</p> <p>The Design-Build Team shall design and install a 2070LX controller operating MAXTIME Software in a 170 cabinet with an auxiliary output file, as well as a conflict monitor and other hardware required to support the operation of a 2070 LX controller. The existing cabinet may be retained if it will accommodate the necessary equipment required for system interconnection, in the Department's sole discretion.</p> <p>The Design-Build Team shall provide the required system communication equipment as described in Section III.</p> |



| <b>Existing Signals to be Removed (2)</b> |   |   |
|---|---|---|
| <b>Signal Inventory Number</b>            | <b>Intersection Description</b>                                   | <b>Work Requirements</b>  |
| <b>12-1819</b>                            | SR 2093 (Belmont Mt Holly Road) at Belmont Abbey College Entrance | The Design-Build Team shall, upon completion of the final interchange and or intersection configuration, and at a time agreed upon with the Engineer, remove this existing traffic signal. The Design-Build Team shall coordinate the removal of the traffic signals with the Division Traffic Engineer and the City of Belmont Engineer. |
| <b>12-0211</b>                            | SR 2093 (Belmont Mt Holly Road) at SR 2021 (Woodlawn Street)      | The Design-Build Team shall return the traffic signal controllers, cabinets, and signal heads to the Division 12 Traffic Services Office, unless otherwise directed. The Design-Build Team shall dispose of and / or retain ownership of all other equipment.   |

### III. SIGNAL COMMUNICATION PLANS

The Design-Build Team shall coordinate all proposed downtime and / or disruptions in service in accordance with the Project Operations Requirements Section of this Scope of Work. Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall maintain the existing communications infrastructure and communication integrity of the signals and CCTV Signal System Cameras located within the project boundaries, including but not limited to the fiber optic, wireless, and cellular modem infrastructure and equipment.

#### A. SIGNAL COMMUNICATIONS

The Design-Build Team shall design, install, and maintain / upgrade the following communications networks as noted below:

- a) Existing NCDOT Signal System D12-09 in Belmont - Signal communications fiber, MaxTime software with Ethernet communications

**b) New NCDOT Signal System in McAdenville (D12-31\_McAdenville)**

All existing main trunk line fibers shall remain the same size or larger upon completion of the project.

**B. SIGNAL SYSTEM CCTV CAMERA REPLACEMENTS**

The Design-Build Team shall design, install, and maintain / upgrade the following communications networks as noted below:

- a) Existing NCDOT Signal System D12-09 in Belmont - CCTV communications fiber, Ethernet communications and CCTV Cameras

**Signal System CCTV Cameras**

The Design-Build Team shall replace three (3) existing CCTV cameras and Equipment Cabinets on 70-foot metal poles at locations that provide optimum viewing. All CCTV camera installations, including equipment cabinets, shall comply with the requirements of the *Digital CCTV Camera Assembly* and *CCTV Field Equipment Cabinet* Project Special Provisions found elsewhere in this RFP. All CCTV camera equipment, Equipment Cabinets, and Metal Poles installed shall be new, including Grounding Systems and Electrical Services.

**NCDOT Maintained Signal System CCTV Cameras**

Replace three (3) CCTV cameras on a Metal Pole at each of the following locations:

- US 29 / 74 (Wilkinson Boulevard) at NC 7 (N. Main Street)
- NC 7 (Belmont/Mt. Holly Road) / SR 2093 (N. Main Street) at NC 7 (McAdenville Road)
- NC 273 (Beatty Drive / Park Street) at I-85 Northbound Ramps

(Reference the ITS Scope of Work found elsewhere in this RFP for additional CCTV Cameras to be replaced along I-85).

Determine the exact location of each Signal System 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 Signal System CCTV camera locations. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the 2024 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.

The Design- Build Team shall furnish and install guardrail and / or concrete barrier to protect permanent Signal System CCTV Cameras and temporary guardrail or concrete traffic barrier to protect temporary Signal System CCTV Cameras, as required.

Determine the new location of each Signal System CCTV Camera, obtain the Engineer's approval of the location, install the devices and implement test procedures, then integrate the devices into the existing computer and network hardware and software at the MRTMC.

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 Signal System CCTV Cameras and when they will be installed and operational in their permanent location in the Technical Proposal.

The Design-Build Team shall keep the existing Signal System CCTV cameras operational until a permanent device or portable replacement device is installed and integrated with the MRTMC. The Design-Build Team shall provide a portable Signal System CCTV camera at each of the new Signal System CCTV camera locations until a permanent Signal System CCTV camera is installed and integrated with the MRTMC. All portable NCDOT maintained Signal System CCTV cameras shall communicate with the MRTMC by means of a Department supplied cell modem.

For unplanned disconnections to permanent or temporary Signal System CCTV cameras, where communications cannot be restored within 24 hours, a replacement portable Signal System CCTV camera capable of communicating with the MRTMC shall be provided at no additional cost to the Department. Signal System CCTV cameras used to replace existing Signal System CCTV cameras 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 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.

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.

| <b>New NCDOT D12-31_McAdenville Signal System Communications<br/>(NC 7 Corridor)</b> |   |  |
|--|---|--|
| <b>Signal<br/>Inventory<br/>Number</b>   | <b>Intersection<br/>Description</b>                       | <b>Work Requirements</b>   |
| <b>12-1083</b>   | NC 7<br>(McAdenville<br>Road) at I-85<br>Ramps C/D        | The Design Build Team shall install a 24-fiber trunk line along NC 7 (McAdenville Road / Main Street) from Power Drive to Ford Drive.  |
| <b>12-1082</b>   | NC 7<br>(McAdenville<br>Road) at I-85<br>Ramps A/B        | The Design Build Team shall install aerial or underground fiber optic splice enclosures at or near each traffic signal and camera and install a new 12-fiber drop cable to each traffic signal and camera cabinet. |
| <b>12-1932</b>   | NC 7<br>(McAdenville<br>Road) at SR 2380<br>(Power Drive) | The Design Build Team shall install a new Ethernet switch in each new and existing signal and camera cabinet.  |
| <b>12-0166</b>   | NC 7<br>(Main Street) at<br>Ford Drive /<br>Dickson Drive | The Design Build Team shall install new fiber optic interconnect centers, fiber optic pigtails, and fiber optic jumpers in each new and existing traffic signal and camera cabinet.                                |

| <b>Existing NCDOT D12-09 in Belmont Signal System Communications<br/>(Multiple Corridors)</b> |   |  |
|---|---|--|
| <b>Signal<br/>Inventory<br/>Number</b>  | <b>Intersection<br/>Description</b>   | <b>Work Requirements</b>   |
| <b>12-1966</b>  | SR 2093<br>(Belmont Mt.<br>Holly Road) at<br>I-85 Ramps A/B<br>(Southbound)   | The Design Build Team shall replace the existing 48-fiber trunk line along US 29-74 (Wilkinson Boulevard) from Archibald Street to Mercy Drive.  |
| <b>12-1929</b>  | SR 2093<br>(Belmont-Mt.<br>Holly Road) at<br>I-85 Ramp D<br>(Northbound)  | The Design Build Team shall Install a new 48-fiber trunk line along the relocated Belmont Mt. Holly Road / NC 7 (Main Street) from US 29 - 74 (Wilkinson Boulevard) to the I-85 SB Ramps.  |
| <b>12-1930</b>  | NC 7<br>(McAdenville<br>Road) / Caldwell<br>Farm Road at SR<br>2093 (Belmont<br>Mt. Holly Road) /<br>NC 7 (N. Main<br>Street) | The Design Build Team shall remove the existing 48-fiber trunk line along the current Belmont Mt. Holly Road / NC 7 (Main Street) from US 29 - 74 (Wilkinson Boulevard) to the I-85 SB Ramps after the new 48-fiber trunk line has been installed and is ready for cut over.   |
| <b>12-0561</b>  | US 29 / 74<br>(Wilkinson<br>Boulevard) at NC<br>7 (Main Street)   | The Design Build Team shall replace the existing 48-fiber trunk line along NC 273 (Park Drive / Beatty Drive) from US 29 – 74 (Wilkinson Boulevard) to YMCA Drive.<br><br>The Design Build Team shall install aerial or underground fiber optic splice enclosures at or near each traffic signal and camera and install a new 12-fiber drop cable to each traffic signal and camera cabinet.   |
| <b>12-1946</b>  | US 29 / 74<br>(Wilkinson<br>Boulevard) at U-<br>Turn East of NC<br>7 (Main Street)  | The Design Build Team shall install a new Ethernet switch in each new and existing signal and camera cabinet.  |
| <b>12-1947</b>  | US 29 / 74<br>(Wilkinson<br>Boulevard) at U-<br>Turn West of NC<br>7 (Main Street)  | The Design Build Team shall install new fiber optic interconnect centers, fiber optic pigtails, and fiber optic jumpers in each new and existing traffic signal and camera cabinet.<br><br>The Design Build Team shall replace the existing CCTV Camera, Cabinet, and 60-foot Wood Pole at the following locations: <ul style="list-style-type: none"> <li>• US 29 - 74 (Wilkinson Boulevard) at NC 7 (N. Main Street)</li> <li>• NC 7 (Belmont Mt. Holly Road) / SR 2093 (N. Main Street) at NC 7 (McAdenville Road)</li> </ul> |

|                |  |   |
|----------------|--|---|
| <b>12-1734</b> | US 29 / 74<br>(Wilkinson<br>Boulevard) at<br>Mercy Drive /<br>Lowe's Entrance                            | <ul style="list-style-type: none"> <li>• NC 273 at I-85 Northbound Ramps</li> </ul> |
| <b>12-1688</b> | NC 273 (Beatty<br>Drive) at Gaston<br>Gateway /<br>YMCA Drive  |   |
| <b>12-0158</b> | NC 273 (Beatty<br>Drive) at I-85<br>Ramps A/B<br>(Southbound)  |   |
| <b>12-0985</b> | NC 273 (Beatty<br>Drive) at I-85<br>Ramps C/D<br>(Northbound)  |   |
| <b>12-1415</b> | NC 273 (Park<br>Street) at<br>Wendy's<br>Entrance /<br>Hawley Avenue<br>(Abbey Plaza<br>Shopping Center) |   |

### C. PLANS AND SUBMITTALS

The Signal Communications Plans shall consist of the three major items listed below:

- Signal Communications Plans, including Splice Plans
- Project Special Provisions
- Catalog Cut Sheets

The Design-Build Team shall install all traffic signal equipment, communications cables and conduit systems in such a manner that avoids conflicts with other utilities. All aerial communications cable installations shall be installed in accordance with the National Electrical Safety Code. The Design-Build Team shall be responsible for coordinating all Utility Make-Ready Work with the proper utility representatives.

Prior to construction, the Design-Build Team shall provide a detailed set of Signal Communications Plans, Project Special Provisions and Catalog Cut Sheets as required above for the Department's review and acceptance. No construction related to the installation of the

communications system shall begin until NCDOT has accepted the RFC Signal Communications Plans, Project Special Provisions and Catalog Cut Sheets.

### **Utility Make-Ready Plans**

In conjunction with the development of the Traffic Signal and Signal Communications Plans, the Design-Build Team shall also develop, if applicable, a set of Utility Make-Ready Plans.

The Design-Build Team shall coordinate with all affected utilities to make necessary utility adjustments and / or pole change outs for all new fiber optic cable to be installed aurally. The Design-Build Team shall schedule coordination meetings with each affected utility owner and pertinent NCDOT personnel.

### **Junction Boxes**

For all underground splice enclosure locations, the Design-Build Team shall furnish and install new *Special Oversized Heavy-Duty Junction Boxes* that meet the requirements of Sections 1098-6 and 1716 of the *Standard Specifications* and have minimum inside dimensions of 36" (l) x 24" (w) x 24" (d).

For all other locations, the Design-Build Team shall furnish and install new *Oversized Heavy-Duty Junction Boxes* that meet the requirements of Sections 1098-6 and 1716 of the *Standard Specifications* and have minimum inside dimensions of 30" (l) x 15" (w) x 24" (d).

Store 50 feet of spare cable, for each cable, in all junction boxes; and 20 feet of spare cable in all signal cabinets.

Furnish junction box lids with "NCDOT Fiber Optic" logo for NCDOT fiber optic cable.

## **D. MATERIALS**

When existing equipment (signal cabinets, hub cabinets, Ethernet equipment, electronic equipment, fiber, conduit, messenger cable, etc.) is replaced, the Design-Build Team shall replace existing equipment with new equipment. All material, equipment and work shall adhere to the *Standard Specifications* requirements. Materials, where applicable, shall be pre-approved on the Department's Qualified Products List (QPL). The QPL web site is:

**<https://connect.ncdot.gov/resources/safety/Pages/QPL-Introduction.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 *Standard Specifications* 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.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall return all existing electronic equipment to the Department. A minimum of one week prior to removal of electronic equipment, the Design-Build Team shall contact Kenneth Cross, Division 12 Deputy Division Traffic Engineer, 980-552-4215 to coordinate a specific day and time for the Design-Build Team to deliver the salvaged material to the Department. Prior to delivery to the Department, the Design-Build Team shall stockpile all salvaged material to prevent damage.

#### **E. 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, loops, signal heads, conduit systems, communications lines, hub cabinets, etc. After project acceptance, the Design-Build Team shall perform all system repairs resulting from faulty materials and / 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.

#### **F. PLAN OF RECORD DOCUMENTATION**

The Design-Build Team shall prepare and submit to the Department Plan of Record (POR) documentation that depicts the conduit and equipment device locations. The Design-Build Team shall submit final POR documentation in electronic and hard copy format for acceptance by the Department. At a minimum, the POR documentation shall include, but not be limited to, the following:

- Electronic plans in MicroStation (latest release in use by the Department) format on CD
- Final location and depth of conduits, wiring external to the cabinets, locations of splice closures, junction box locations, and single mode fiber optic (SMFO) cable terminations
- Real world coordinates for all devices, splice enclosures, junction boxes, and equipment cabinets installed or utilized under this project
- Coordinates in English units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83)
- 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.

#### **G. LOCAL AREA NETWORK**

For all Ethernet based systems, the Design-Build Team shall furnish and install media access control (MAC) addresses for all equipment utilized as part of this project. MAC address labels shall be affixed to each device utilized. IP addresses shall be furnished for all equipment utilized as part of this project. When replacing existing equipment or installing new equipment, IP address information shall be obtained from the equipment operator to ensure proper operations within their respective systems. Final IP address labels shall be affixed to each device utilized. LAN equipment shall be fully integrated, providing local device failover and



fault tolerance, virus protection, user authentication, and security functions to prevent unauthorized user and data from entering the LAN.

The Design-Build Team shall ensure that all plans and designs conform to the NCDOT and NC Statewide IT Policies and Standards as described at:

**<https://it.nc.gov/resources/state-it-policies>**

The Design-Build Team shall submit all architecture of the IT modules for review and approval by NCDOT IT and the NC Office of Information Technology architecture groups.

## **H. INTEGRATION & TESTING**

The Design-Build Team shall integrate each system device with its respective system, and work with the system operator to ensure that each device is functioning properly within the system.

The Design-Build Team shall develop unit and system test plans and procedures for each device and component and submit to the Engineer for review and approval. This includes, but is not limited to, signal equipment, fiber optic communications cable, local and central equipment. Upon completion of the system installation and integration, the Design-Build Team shall conduct unit and system tests according to the approved test plans and procedures. The Design-Build Team shall be responsible for providing all necessary test equipment.

In case of failures and substandard performance, the Design-Build Team shall identify the cause of failure and / or substandard performance, repair or replace the faulty parts and components and repeat the test. If the problem persists, the Design-Build Team shall replace the entire unit causing the problem prior to repeating the test at no additional cost.

After successful completion of all units and system test, the Design-Build Team shall submit the test reports, along with the record of repairs and part replacements, to the Engineer.

## **IV. PROJECT OPERATION REQUIREMENTS**

### **Intermediate Contract Time #10 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 (980-552-4200), NCDOT Regional ITS Engineer (980-287-0001), the MRTMC, and the STOC. The Design-Build Team shall repair all damages within 24 hours at no cost to the Department or the 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 #10 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 #11 and #12 for Failure to Reestablish NCDOT Fiber Optic Communications.**

During construction, the Design-Build Team shall coordinate any disruption in NCDOT fiber optic communications fiber optic communications with the Engineer, NCDOT Division Traffic Engineer, NCDOT Regional ITS Engineer, the MRTMC, the STOC, and as appropriate, the City of Gastonia Traffic Engineer. The Design-Build Team shall notify the Engineer, NCDOT Division Traffic Engineer, NCDOT Regional ITS Engineer, the TRTMC and the STOC, and as appropriate, the City of Gastonia Traffic Engineer a minimum of seven days prior to all proposed disruptions in service. A minimum of 21 days prior to any disruption in NCDOT fiber optic communications the Design-Build Team shall develop and provide a plan for the Department's and the City of Gastonia's, as appropriate, 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 #11 for failure to reestablish NCDOT fiber optic communications within 24 hours are \$ 2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #12 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 fiber optic communications a minimum of 21 calendar days prior to a proposed disruption in service are \$10,000.00 per failure.**

**Intermediate Contract Time #13 for Failure to Restore Communication**

The Design-Build Team shall maintain communications with all permanent and temporary CCTV Cameras integrated with the MRTMS. 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 and communicating with the TRTMC and the STOC within 24 hours.

**Liquidated Damages for Intermediate Contract Time #13 for failure to restore communication or provide a replacement device within 24 hours are \$500.00 per hour or any portion thereof.**

## **V. SIGNAL SYSTEM TIMING PLANS**

The Design-Build Team shall develop and implement all temporary and final coordinated signal system timing plans for the closed loop signal system (CLS) along US 29/74 and NC 7. Final signal system timing plans shall be developed for the new CLS D12-31\_McAdenville and D12-09\_Belmont. Temporary signal system timing plans shall be developed to maintain coordination while accommodating changes to signal phasing or lane configuration changes due to temporary traffic signal plans. Final signal system timing plans shall include the design, implementation and

fine-tuning of signal timing plans, and evaluation of the final operational benefits associated with work performed on the project. The signal 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 (e.g. 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 (e.g. 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 final signal system timing plans with the Division, the Signal System Timing and Operations (SSTO) Section, and the City of Gastonia Traffic Engineer, as appropriate. The Design Build Team shall collect turning movement counts at relevant intersections to inform the design of the final signal system timing plans, and submit a preliminary set of final signal system timing plans, with supporting *Tru-Traffic*, *SYNCHRO* 110, and *Translink32* database files, to the SSTO Section, Division, and the City of Gastonia, as appropriate. All Signal System Timing Plans shall be reviewed and accepted by the SSTO Section, Division, and the City of Gastonia, as appropriate, 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, Division, and the City of Gastonia'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.

The Design Build Team will use final signal plans to configure the map graphics and intersection information for all signalized intersections in Kinetic Signals (the Department's central traffic signal management system). Within Kinetic Signals, the Design Build Team will complete all pertinent information contained in the tabs labeled "Details", "Devices", "Lanes", "Maneuvers", "Crosswalks", and "Detectors". These intersections shall be set up to include the following information:

- Road and Intersection Labels, including NCDOT Asset Numbers

- Arrows for each lane, movement or phase
- Phase numbers for each lane, movement or phase, including pedestrian phases
- Detectors

Prior to Final Project Acceptance, the Design-Build Team shall submit a final report, including final implemented signal timing plans and all supporting documents in *SYNCHRO* 11.0, *Tru-Traffic* Reports and data, *Translink32* database files to the SSTO Section, Division, and the City of Gastonia, as appropriate. All intersections shall be entered in Kinetic Signals and operational.

Please note, the Department is developing signal timing plans designed to prioritize I-85 traffic diverted from the freeway during incidents. These signal timing plans will be designed, implemented, maintained, and activated by the Department throughout the course of the project. These signal timing plans shall not be removed, edited, or otherwise changed by the Design-Build Team.

## **VI. RAILROAD GRADE CROSSINGS**

Within 60 days after the final executed agreements have been obtained with the NCDOT Rail Division (Piedmont & Northern Railway rail corridor (P&N) Owners / Maintainers), referred to as the “Railroad”, the Design-Build Team shall meet with representatives of the Railroad and the appropriate NCDOT Alternative Delivery personnel to schedule Diagnostic Field Meetings with the Diagnostic Team for all temporary and permanent (existing and proposed) crossings. The Diagnostic Team shall be made up of representatives from the Department (Signal Design, Signing and Delineation, Division 12, Rail Division and Alternative Delivery), City of Belmont, and future rail trolley provider (Belmont Trolley, Inc.) (Reference the Signing and Railroad Coordination and Construction Scopes of Work found elsewhere in this RFP).

The Design-Build Team shall develop plans for all proposed traffic control system(s) to be used at all grade temporary and permanent (existing and proposed) crossings (future trolley) based on an engineering study, see Part 8 of the MUTCD, conducted by the Design-Build Team for the Department with the Diagnostic Team. Factors to be considered by the Diagnostic Team as to which traffic control devices would be appropriate to install at a grade crossing, include but are not limited to, road geometrics, stopping sight distance, clearing sight distance, the proximity of nearby roadway intersections (including the traffic control devices at the intersections), adjacent driveways, traffic volume across the grade crossing, extent of queuing upstream or downstream from the grade crossing, train volume, pedestrian and bicycle volumes, operation of passenger trains, presence of nearby passenger station stops, maximum allowable train speeds, variable train speeds, accelerating and decelerating trains, multiple tracks, high-speed train operation, number of school buses or hazardous material haul vehicles, and the crash history at or near the location.

Based on the results of the engineering study the Design-Build Team shall provide the following for the P&N Spur Line in Belmont:

- Design and construct the required traffic control system at each temporary and permanent (existing and proposed) crossings of the inactive spur line.

- Design final plans for the required traffic control system at each proposed crossing for the future trolley.

The Design-Build Team's design for all construction at the temporary and permanent (existing and proposed) crossings of the inactive spur line shall not preclude the installation of the required traffic control system at each proposed crossing for the future trolley.

**TRANSPORTATION MANAGEMENT SCOPE OF WORK** (04-10-25)**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.

- 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*
- 2024 NCDOT *Roadway Standard Drawings (Standard Drawings)*
- FHWA *Manual on Uniform Traffic Control Devices (MUTCD)* 11<sup>th</sup> Edition
- 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) and maintains prequalification throughout the project duration.

**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 Alternative Delivery Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Traffic Operations Center (STOC), the Metrolina Regional Transportation Management Center (MRTMC), 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. IMP's will need to be coordinated between all I-5719 projects and between contractors. The I-5719B / U-5800 contractor will be responsible for developing an IMP, coordinating with the I-5719A / U-6044 and I-5719C projects for any changes and as construction progresses, and updating the IMP as needed per coordination activities.

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 I-85 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 / MRTMC. 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 / MRTMC, 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 I-85, 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 Metrolina Regional Traffic Management Center (MRTMC) and 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, Regional TMCs, and NCDOT administered towing contracts, 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. Gastonia, Lowell, McAdenville, Belmont, and Charlotte)
- Law enforcement
- Tow contractor
- Fire / Rescue
- 911 dispatch
- Emergency Medical Service (EMS)
- Hazardous materials
- Media
- 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 participate in 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.

The Design-Build Team shall hold regular meetings with incident management personnel and emergency responders. 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, emergency responders, and all other relevant parties following fatal and major 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 provide, install and maintain a minimum of ten (10) static trailblazer signs along the Department's Preliminary Incident Management Routes.

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 alternate Incident Management Route Plans, as necessary, to mitigate impacts to the Department's Preliminary Incident Management Routes. Prior to incorporation, the alternate

Incident Management Route Plans shall be reviewed and accepted by STOC and NCDOT. At a minimum, the alternate Incident Management Route Plans shall include:

- All incident management routes
- Changeable and / or static trailblazer sign locations
- The location (map and GPS coordinate table) of ITS devices for incident management (portable changeable message signs (PCMS) and portable Closed-Circuit Television (CCTV) cameras)
- Existing stationary and temporary alternate route signing locations
- Police traffic control during incident response plan activation (e.g. at stop-controlled intersections)
- Traffic signal locations with owners
- Median access locations available for emergency response vehicles on I-85
- Route identification using NCDOT naming convention (e.g. I85N26-27)

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 NCDOT Metrolina Regional TMC and STOC. (Reference the Traffic Signals and Signal Communications Scope of Work found elsewhere in this RFP)

## **LANE AND ROAD CLOSURE NOTIFICATION**

### **Lane Closure Notice (LCN)**

For the first instance of lane closures, the Design-Build Team shall issue a 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 shall issue a LCN to NCDOT on a weekly basis for subsequent lane closures for the duration of the project. 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, ramps, and loops shall remain open. Once proposed ramps and/or loops are opened to traffic they also shall remain open.
- The Design-Build Team shall not concurrently close -Y- Lines with overlapping detours.
- The Design-Build Team shall not permanently close any existing ramp or loop until the proposed replacement ramp or loop that provides the same traffic movement as the movement to be closed is open to traffic in the final pattern.

Unless required otherwise by this RFP, the Design-Build Team shall issue a 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 and weekly notices for a LCN, the Design-Build Team shall notify the NCDOT Metrolina Regional TMC and STOC when the process of closing a lane, ramp, loop or paved shoulder begins. The day of the lane closure, the Design-Build Team shall notify the NCDOT Metrolina Regional TMC and STOC a minimum of 30 minutes of before the lane closure to activate additional DMS/CMS messages.

Lane Opening

The Design-Build Team shall notify the NCDOT Metrolina Regional TMC and 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> |
|--|--|
| <p><b>** NOTE ** Deleted NC 7</b><br/>           SR 2093 (Belmont Mt Holly Road / Main Street),<br/>           NC 7 (Main Street),<br/>           US 29 / 74 (Wilkinson Boulevard), and NC 273<br/>           (Beatty Drive / Park Street)</p> | Basic  |
| NC 7 (McAdenville Road / Main Street),<br>SR 2000 (Hickory Grove Road)   | Absence of Need                                  |

**<https://connect.ncdot.gov/projects/WZTC/Pages/PedSafety.aspx>**

Pedestrian counts have not been conducted. The Design-Build Team shall provide level of accommodations as listed above and/or what pedestrian volumes indicate and require. The Design-Build Team can obtain pedestrian volumes from the Engineer, should they have that information. Should the pedestrian counts yield a level different from what is listed above; the Design-Build Team can have the levels of accommodation listed above adjusted.

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 NCDOT Metrolina Regional TMC and STOC to ensure proper messages are displayed on the DMSs and any PCMSs that are required to communicate with the NCDOT Metrolina Regional TMC and 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 activities that could result in school bus delays, coordinate with Gaston 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.

### **Work Zone Installer**

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 in the safe and competent set up of temporary traffic control. 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 1101-14 of the *Standard Specifications*, 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 *Standard Specifications*, 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.

The Work Zone Installer does not replace or change the requirements of the Traffic Control Supervisor described above.

### **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 Alternative Delivery 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 three 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 *Standard Specifications*.

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 for Incident Management

In addition to the PCMSs required by the *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 twenty-two (22) temporary PCMSs and two (2) 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. Tree trimming will be part of the Design-Build scope to ensure sight lines for the portable CCTV's.

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 NCDOT Metrolina Regional TMC and STOC and have the functionality to be operated locally in the field and controlled remotely from the NCDOT Metrolina Regional TMC and 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 or the NCDOT Approved Products List as of the Technical Proposal submittal date. No vendor specific or third-party software shall be allowed. PCMSs used solely by the Design-Build Team for daily traffic control operations do not need to communicate with the Metrolina Regional TMC or STOC.



The Department will provide cellular modems to establish the communications link between the portable ITS devices for incident management and the NCDOT Metrolina Regional TMC and 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 shall 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.

The Design-Build Team shall maintain all existing positive median cross-over protection for the entire I-85 project limits. 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 aforementioned standard sloped turf shoulder shall adhere to *Standard Drawing* Nos. 560.01 and 560.02.

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 *Standard Drawing* No. 1101.11, Sheet 3.

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 *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 ICTs #2, #8, #9, #10, #11, #12, #13, #14, #15, and #16.

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 *Standard Drawing* No. 1101.11, Sheet 1, 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.
- Travel lanes shall not exceed 18-feet wide at any time for the duration of the project.

For all temporary travel lanes (through lanes and exclusive turn lanes), excluding temporary traffic shift transitions and tapers, the wheel path of all design vehicles listed in Table 2-4a, *Design Vehicle Dimensions (U.S. Customary Units)* of the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* shall not be located within one-foot of a temporary or permanent longitudinal pavement joint line. The aforementioned one-foot measurements shall occur with the design vehicles centered within the temporary travel lanes.

Maintain a minimum inside and outside paved shoulder width of four feet in each direction of I-85 unless temporary traffic barrier is placed on the paved shoulder. This requirement may be reduced to two feet 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 including those occurring in neighboring projects. 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 *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 *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 *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 *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.

The Design-Build Team shall provide paved motorist pull-offs along any full control of access freeway facility 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. (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 governmental or private entity, in writing, use only state-maintained roads for off-site detour routes and / or haul roads.

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**

The Design-Build Team shall mitigate longitudinal pavement edge or terrain drop-off conditions created by construction operations in accordance with the *NCDOT Transportation Management Plans Design Manual*.

**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. Temporary or modified Type A or B guide signs may be stationary mounted on temporary supports or on a portable movable system. Temporary guide signs that are not overhead-mounted shall be installed such that the bottom of the sign is a minimum of 7 feet and no more than 10 feet above the pavement surface and shall be rigid enough to withstand 90 MPH winds. Laterally, the outer edge of the guide sign shall not be more than 60 feet from the edge of travel. 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 *Standard Specifications*, 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           |
|--|--|------------------|
| I-85, including all ramps and loops (excluding structures) | 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.
- For traffic patterns in place for at least 30 days:
  - Pavement markings on asphalt surfaces of I-85, including all ramps and loops, shall be either milled and filled, removed per the *Work Zone Blank Canvas Project Special Provision*, or concealed by applying a uniform overlay. At a minimum, the mill and fill, removal, or uniform overlay shall cover the entire width of any shifted travel lane(s) containing the conflicting markings and extend to the outside edge of any conflicting markings on shoulders.
  - Pavement markings on ultra-thin bonded wearing courses of I-85, including all ramps and loops, shall be removed by milling the existing ultra-thin bonded wearing course and overlay with an ultra-thin bonded wearing course.
- Conflicting pavement markings on all other asphalt surfaces shall be concealed (in accordance with the requirements above), removed, or milled and filled.

Unless noted otherwise elsewhere in this RFP, removal of the temporary pavement markings on asphalt surfaces (other than I-85, including all ramps and loops) 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 conceal, remove, or mill and fill, 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 Alternative Delivery 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. The Design-Build Team shall submit a request to NCDOT for retroreflectivity readings within 10 days after a minimum of 2000 feet of temporary pavement markings are installed.

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 *Standard Drawing* No. 1250.01, Sheet 1.

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 pavement surface unless the temporary markings are placed in the exact location of the final pavement markings, or an alternate approved by the Engineer

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 *Standard Specifications*.

For nighttime lane closures along I-85, furnish and install Sequential Flashing Warning Lights. (Reference Section 1140 of the *Standard Specifications for Sequential Flashing Warning Lights*)

### **Smart Work Zone Devices**

For lane closures at any time along I-85, furnish and install Connected Lane Closure System 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 *Standard Drawing* No. 1101.03, Sheet 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 article 1190 of the *Standard Specifications* 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.

### **Shoulder Sweeping**

At a minimum, the Design-Build Team shall conduct sweeping operations every two weeks, unless directed otherwise by the Engineer, on shoulders within the project and a minimum of one mile beyond the project limits in each direction on I-85.

The Design-Build Team shall perform weekly removal of debris from the shoulders that is too large to be swept.

**Work Zone Speed Limits**

All speed limits shall be ordained by the State Traffic Engineer in order to have a lawfully enforceable speed limit; therefore, 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.

**Work Zone Variable Speed Reduction and \$250 Speeding Penalty Ordinances**

A Work Zone Variable Speed Reduction is intended to temporarily reduce the speed within the work zone at spot locations of short duration (1 day up to 30 days) where the temporary traffic control is usually to be removed within the same day. A Work Zone Variable Speed Limit cannot be in operation continuously (24/7) for a period exceeding 30 calendar days.

The Design-Build Team may request a Work Zone Variable Speed Limit Reduction and a \$250 Speeding Penalty for all speed limit conditions on I-85 to include but not limited to lane closure operations. The Design-Build Team shall request these measures in writing to the State Work Zone Engineer four weeks before construction is to begin in order to provide proper time for ordaining each of these. All speed limits shall be displayed on Digital Speed Limit Signs. (Reference the Work Zone Digital Speed Limit Signs Project Special Provision found elsewhere in this RFP)

When the digital speed limit signs are installed, the Design-Build Team shall cover or remove any existing speed limit signs located within the active work area.

The speed limit shall be returned to the current posted speed limit when the Work Zone Variable Speed Limit period has expired or is removed, and traffic is returned to the existing pattern.

The Design-Build Team shall be responsible for coordinating with the Engineer when the Work Zone Variable Speed Limits are to be changed and shall obtain approval from the Engineer before the Speed Limit is changed.

For all other operations, the Transportation Management Plan shall be designed to accommodate the current posted speed limit.

**Digital Speed Limit Signs (DSLS)**

The Design-Build Team shall furnish and install Work Zone Digital Speed Limit Signs (DSLS) to continuously display the work zone speed limit. (Reference the Work Zone Digital Speed Limit Signs Project Special Provision found elsewhere in this RFP.)

**Work Zone Speed Limit Reduction Ordinance**

If, at the Department's sole discretion, the Design-Build Team can justify that the TMPs cannot be designed to adhere to the existing I-85 posted speed limit requirements, the Design-Build Team shall submit a formal Work Zone Speed Limit Reduction Ordinance request to the Design-Build

Unit for approval. The request shall state the type of ordinance requested, why the ordinance is needed and why the TMPs cannot be designed to avoid the need. The request shall also include an Engineering Study that justifies the need for a Work Zone Speed Limit Reduction Ordinance. (Reference the criteria listed in the NCDOT Work Zone Traffic Control Guidelines) Upon receipt of the formal request, the Design-Build Team shall allow six weeks for the Work Zone Speed Limit Reduction Ordinance to be approved. The Design-Build Team shall provide and install proper signing for all approved Work Zone Speed Limit Reduction Ordinances. The Design-Build Team shall identify the need for a Work Zone Speed Limit Reduction Ordinance in the Technical Proposal.

### **Project Coordination**

The Design-Build Team shall coordinate with all Contractors and NCDOT Resident Engineers in charge of any project in the vicinity of this project for any work that may affect the construction, traffic operations, and placement of temporary traffic control devices (including advance warning signs) on all roads within the project limits and associated with this project.

At a minimum, the Design-Build Team shall coordinate with the Division Traffic Engineer, Law Enforcement, Emergency Services and the Work Zone Traffic Control Section to schedule and attend Traffic Safety and Operations Meetings. These meetings shall be held to monitor and assess safety and mobility during construction. The Traffic Safety and Operations Meetings shall be held on an as needed basis during project construction. Additional Traffic Safety and Operations Meetings shall be held to address any specific issue, as directed by the Engineer.

### **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 #14, #15, #16, #17, and #18 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>                         |
|-----------------------------------|---|-----------------------|--|
| #14                               | I-85 (Single-Lane Closure), including lane closures on any multilane ramps and loops  | Monday through Friday | 5:00 a.m. to 9:00 p.m.                           |
|                                   |   | Saturday and Sunday   | 7:00 a.m. to 9:00 p.m.                           |
| #15                               | I-85 (Double-Lane Closure)  | Monday through Friday | 5:00 a.m. to midnight                            |
|                                   |   | Saturday and Sunday   | Midnight. to 1:00 a.m. and 6:00 a.m. to midnight |
| #16                               | NC 273 (Park Street / Beatty Drive) and US 29 / 74 (Wilkinson Boulevard)  | Monday through Friday | 6:00 a.m. to 6:00 p.m.                           |
|                                   |   | Saturday and Sunday   | 9:00 a.m. to 8:00 p.m.                           |
| #17                               | SR 2093 (Belmont Mt. Holly Road) (Single-Lane Closure); SR 2000 (Hickory Grove Road) Flagging Operations; and NC 7 (McAdenville Road / Main Street) Flagging Operations | Monday through Friday | 6:00 a.m. to 6:00 p.m.                           |
|                                   |   | Saturday and Sunday   | 9:00 a.m. to 8:00 p.m.                           |
| #18                               | SR 2093 (Belmont Mt. Holly Road (Flagging Operations) north of I-85   | Monday through Friday | 6:00 a.m. to 8:00 p.m.                           |
|                                   |   | Saturday and Sunday   | 8:00 a.m. to 9:00 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 9:00 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 9:00 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 9:00 p.m. Tuesday.
- For Independence Day, between the hours of 5:00 a.m. July 3rd and 9:00 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 9:00 p.m. the Tuesday after Independence Day.

- For Labor Day, between the hours of 5:00 a.m. Friday and 9:00 p.m. Tuesday.
- For Thanksgiving Day, between the hours of 5:00 a.m. Tuesday and 9:00 p.m. Monday.
- For Christmas, between the hours of 5:00 a.m. the Friday before the week of Christmas Day and 9:00 p.m. the following Tuesday after the week of Christmas Day.
- For Any Events at Bank of America Stadium, between three (3) hours before the start of the event and three (3) hours after the end of the event.
- For Any Events at Charlotte Motor Speedway, between three (3) hours before the start of the event and three (3) hours after the end of the event.

**Liquidated Damages for Intermediate Contract Time #14 for the above lane narrowing, lane closure, holiday and special event time restrictions for a single lane on I-85, including lane closures on any multilane ramps and loops, are \$1,250.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #15 for the above lane narrowing, lane closure, holiday and special event time restrictions for two or more lanes on I-85 are \$2,500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #16 for the above lane narrowing, lane closure, holiday and special event time restrictions on NC 273 (Park Street / Beatty Drive), US 29 / 74 (Wilkinson Boulevard) are \$750.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #17 for the above lane narrowing, lane closure, holiday and special event time restrictions on SR 2093 (Belmont Mt. Holly Road (Single-Lane Closure); SR 2000 (Hickory Grove Road) Flagging Operations; NC 7 (McAdenville Road / Main Street) Flagging Operations; are \$500.00 per hour.**

**Liquidated Damages for Intermediate Contract Time #18 for the above lane narrowing, lane closure, holiday and special event time restrictions on SR 2093 (Belmont Mt. Holly Road) (Flagging Operations) North of I-85 are \$250.00 per hour.**

**Intermediate Contract Times #19 and #20 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 I-85 will be allowed for the purpose of bridge demolition, and 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>                         |
|-----------------------------------|--------------------------------------|-----------------------|--|
| #19                               | I-85                                 | Monday through Friday | 5:00 a.m. to midnight                            |
|                                   |                                      | Saturday and Sunday   | Midnight. to 1:00 a.m. and 6:00 a.m. to midnight |
| #20                               | Any ramp, loop or -Y- line over I-85 | Monday through Friday | 5:00 a.m. to 9:00 p.m.                           |
|                                   |                                      | Saturday and Sunday   | 7:00 a.m. to 9:00 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:

- Bridge demolition
- Girder, overhang, and falsework installation and / or removal
- Installation overhead sign assemblies and / or work on existing overhead sign assemblies over travel lanes, or 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 #19 for the above road closure time restrictions for construction operations on I-85 are \$5,000.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #20 for the above road closure time restrictions for construction operations on any ramp, loop or -Y- line over I-85 are \$2,500.00 per 15-minute period or any portion thereof.**

**Intermediate Contract Times #21, #22, #23, #24, #25, #26, #27, and #28 for Ramp Reconstruction**

One road closure, with an approved offsite detour, will be permitted for the reconstruction of each ramp and loop, for the maximum durations listed below. The Design-Build Team shall not concurrently close both on ramps / loops and / or both off-ramps / loops at the same interchange. The Design-Build Team shall not concurrently close any ramps or loops at adjacent interchanges. The Design-Build Team shall not concurrently close any ramp or loop, and associated -L- or -Y-. The Design-Build Team shall not close any ramp or loop that creates an overlapping detour with other closures.

| <b>Intermediate Contract Time</b> | <b>Interchange</b>  | <b>Duration (Per ramp or loop)</b> |
|-----------------------------------|---|------------------------------------|
| #21                               | Any ramp or loop other than those listed in ICT #22 through ICT #28                   | 15 consecutive calendar days       |
| #22                               | I-85 SB off-ramp and NB off-ramp to NC 7 (McAdenville Road / Main Street)             | 15 consecutive calendar days       |
| #23                               | I-85 SB on-ramp and NB on-ramp from NC 7 (McAdenville Rd / Main St)                   | 21 consecutive calendar days       |
| #24                               | I-85 SB at SR 2093 (Belmont Mt Holly Road)  | 15 consecutive calendar days       |
| #25                               | I-85 NB off ramp at SR 2093 (Belmont Mt Holly Road) - relocation of the existing ramp | 15 consecutive calendar days       |

| <b>Intermediate Contract Time</b> | <b>Interchange</b>  | <b>Duration (Per ramp or loop)</b> |
|-----------------------------------|---|------------------------------------|
| #26                               | I-85 NB off ramp at SR 2093<br>(Belmont Mt Holly Road) - new ramp                               | 30 consecutive calendar days       |
| #27                               | I-85 NB on ramp at SR 2093<br>(Belmont Mt Holly Road) - relocation<br>of the existing ramp      | 15 consecutive calendar days       |
| #28                               | I-85 SB ramp and loop at SR 2093<br>(Belmont Mt Holly Road - relocation<br>of the existing ramp | 15 consecutive calendar days       |

The date of availability shall be the date the Design-Build Team elects to close the ramp / loop. The Design-Build Team shall provide the Engineer a minimum of 30 days written notice prior to the date of availability. The date of completion shall be the number of consecutive days proposed by the Design-Build Team in the Technical Proposal, and such number of consecutive days proposed shall not be greater than the days noted above.

**Liquidated Damages for Intermediate Contract Time #21 for the above road closure time restrictions for ramp reconstruction are \$1,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #22 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #23 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #24 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #25 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #26 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #27 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #28 for the above road closure time restrictions for ramp reconstruction are \$2,000.00 per calendar day or any portion thereof.**

**Intermediate Contract Times #29, #30, #31, and #32 for lane narrowing and lane closures US 29 / 74 (Wilkinson Boulevard), SR 2093 (Belmont Mt Holly Road / Main Street), SR 2093 (Belmont Mt Holly Road), and SR 2021 (Woodlawn Street).**

| <b>Intermediate Contract Time</b> | <b>Road</b>   | <b>Duration (per direction)</b> |
|-----------------------------------|---|---------------------------------|
| #29                               | SR 2093 (Belmont Mt Holly Road / Main Street) at US 29 / 74 (Wilkinson Boulevard) | 30 consecutive calendar days    |
| #30                               | US 29 / 74 (Wilkinson Boulevard)  | 45 consecutive calendar days    |
| #31                               | SR 2093 (Belmont Mt Holly Road) at SR 2021 (Woodlawn Street)                      | 10 consecutive calendar days    |
| #32                               | SR 2021 (Woodlawn Street) at SR 2093 (Belmont Mt Holly Road)                      | 10 consecutive calendar days    |

The date of availability shall be the date the Design-Build Team elects to close or narrow the lane. The Design-Build Team shall provide the Engineer a minimum of 30 days written notice prior to the date of availability. The date of completion shall be the number of consecutive days proposed by the Design-Build Team in the Technical Proposal, and such number of consecutive days proposed shall not be greater than the days noted above.

The consecutive calendar days shall not occur during any of the holiday periods noted in ICTs #14-18.

**Liquidated Damages for Intermediate Contract Time #29 for the above lane narrowing, lane closures time restrictions for a single lane on SR 2093 (Belmont Mt Holly Road/Main Street) at US 29 / 74 (Wilkinson Boulevard) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #30 for the above lane narrowing, lane closures time restrictions for a single lane on US 29 / 74 (Wilkinson Boulevard) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #31 for the above lane narrowing, lane closures time restrictions for a single lane on SR 2093 (Belmont Mt Holly Road/Main Street) at SR 2021 (Woodlawn Street) are \$2,500.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #32 for the above lane narrowing, lane closures time restrictions for a single lane on SR 2021 (Woodlawn Street) at SR 2093 (Belmont Mt Holly Road) are \$2,500.00 per calendar day or any portion thereof.**

**Intermediate Contract Times #33 and #34 for Bridge Construction**

One road closure, with an approved offsite detour, will be permitted for work on each bridge listed below for the maximum durations listed below.

| <b>Intermediate Contract Time</b> | <b>Facility</b>                                  | <b>Duration</b>              |
|-----------------------------------|--|------------------------------|
| #33                               | Bridge on NC 7 (McAdenville Road) over I-85      | 21 consecutive calendar days |
| #34                               | Bridge on SR 2000 (Hickory Grove Road) over I-85 | 10 Consecutive calendar days |

The date of availability shall be the date the Design-Build Team elects to close the bridge. The Design-Build Team shall provide the Engineer a minimum of 30 days written notice prior to the date of availability. The date of completion shall be the number of consecutive calendar days proposed by the Design-Build Team in the Technical Proposal, and such number of consecutive calendar days proposed shall not be greater than the days noted above.

**Liquidated Damages for Intermediate Contract Time #33 for the above road closure time restrictions for work on the Bridge on NC 7 (McAdenville Road) over I-85 are \$2,000.00 per calendar day or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #34 for the above road closure time restrictions for work on the Bridge on SR 2000 (Hickory Grove Road) over I-85 are \$1,000.00 per calendar day or any portion thereof.**

**Intermediate Contract Times #35 and #36 for the Christmas Lights Celebration in McAdenville**

No ramp, loop or bridge closures will be permitted from December 1 through December 26 of each year at the interchanges of I-85 and NC 7 (McAdenville Road / Main Street) (Exit 23). Additionally, no lane closures will be permitted on NC 7 (McAdenville Road / Main Street) or US 29/74 from December 1 through December 26 of each year.

**Liquidated Damages for Intermediate Contract Time #35 for the above road closure time restrictions for the interchange at I-85 and NC 7 (McAdenville Road / Main Street) (Exit 23) including any ramp, loop or bridge are \$2,500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #36 for NC 7 (McAdenville Road / Main Street) and US 29/74 lane closure time restrictions during the Christmas Lights Celebration in McAdenville are \$1,250.00 per 15-minute period or any portion thereof.**

### **Hauling Restrictions**

The Design-Build Team shall adhere to the hauling restrictions noted in the *Standard Specifications*.

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 *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 #2 - ICT #6.

Excluding hauling operations that are conducted entirely behind a temporary traffic barrier or guardrail, single and multi-vehicle hauling shall not be allowed ingress and egress from any open travel lane during the following time restrictions:

**Single Vehicle Hauling**

| <b>Facility</b>                  | <b>Days</b>           | <b>Time Restrictions</b>                                |
|----------------------------------|-----------------------|---|
| I-85, including any ramp or loop | Monday through Friday | 6:00 a.m. to 9:00 a.m.<br>and<br>3:00 p.m. to 6:00 p.m. |

**Multi-Vehicle Hauling**

| <b>Facility</b>                  | <b>Days</b>           | <b>Time Restrictions</b> |
|----------------------------------|-----------------------|--------------------------|
| I-85, including any ramp or loop | Monday through Sunday | 5:00 a.m. to 9:00 p.m.   |

The Design-Build Team shall address how hauling will be conducted in the Technical Proposal, including: identifying work area access locations; hauling of any materials to and from the site; and hauling material within the NCDOT right of way.

**NCDOT Contract Towing**

The NCDOT anticipates administering a Towing Contract in conjunction with this project. The Design-Build Team will be responsible for coordinating with the tow contractor for the Incident Management Plan. The Design-Build Team shall be responsible for the following:

- Prior to any construction activity, the Design-Build Team shall participate in towing coordination meetings with the Alternative Delivery Unit, Division, STOC, towing contractor(s), State Highway Patrol (SHP), and local law enforcement. The meeting shall finalize the locations where vehicles will be towed, the process by which specific towing information will be conveyed to the appropriate personnel and confirm the towing requirements. Potential recovery vehicle staging and safety tow locations shall also be identified

**UTILITIES SCOPE OF WORK** (02-28-25)

**\*\* NOTE \*\* Within 45 days of contract execution, the Design-Build Team shall meet with representatives of all the utility companies and the appropriate NCDOT Utility and Alternative Delivery personnel.**

**GENERAL**

The Design-Build Team Utilities work shall include, but is not limited to, the following:

- Utilities Coordination for the relocation, removal, and protection of all utilities in conflict with the project.
- Designing, permitting, and constructing all water and sewer facilities that conflict with the project.
- Preparing all utility agreements as required for review and execution by NCDOT.

The Design-Build Team shall obtain the services of a Professional Services Firm (PSF) that has performed utility coordination on at least two similarly sized projects for NCDOT and is prequalified through NCDOT for Utility Coordination (discipline code 00270).

The Design-Build Team shall obtain the services of a Professional Engineering Firm (PEF) that has performed water and sewer engineering design on at least two similarly sized projects for NCDOT and is prequalified through NCDOT for Public Water Distribution Systems (discipline code 00173), Public Water Transmission Systems (discipline code 00174), Sanitary Sewer Collection Systems (discipline code 00173), and Sanitary Sewer Outfall Systems (discipline code 00173).

The prequalified utility coordination PSF shall provide a qualified representative to act as the Utilities Coordinator for the project.

The prequalified water and sewer engineering design PEF shall provide a qualified representative to act as the Utilities Design Engineer for the project.

**Project Roles**

The Utilities Coordinator shall coordinate the relocation activities of all utilities on the project and act as the primary contact for the Design Build Team when coordinating with the utility owners and NCDOT for all utility relocation activities.

The Utilities Design Engineer shall be responsible for all engineering design and permitting of relocations for water and sewer facilities for the project.

**General Utility Requirements**

During the procurement phase and throughout the project duration, the Design-Build Team shall only be allowed direct contact with the utility owners when the Utilities Coordinator is present.

In accordance with the requirements herein, the Design-Build Team shall relocate / coordinate the relocation of all existing facilities that are:

- (A) Parallel to a roadway in full control of access,
- (B) In physical conflict with the project,
- (C) Within the existing or proposed right of way and structurally inadequate, or
- (D) Within the existing or proposed right of way, any pipe used for pressure application and constructed from an unsuitable pipe material including asbestos cement, PVC SDR 26, and lead-jointed pipe.

Proposed / relocated underground facilities that are located beneath the pavement structure shall only be allowed to cross the roadway at as close to perpendicular as possible.

The Design-Build Team shall be responsible for coordination of utility installation, removal, and relocation within railroad right of ways or easements between the railroads and utility providers for all existing facilities in physical conflict with the project. (Reference the Railroad Coordination and Construction Scope of Work found elsewhere in this RFP).

The Design-Build Team shall be responsible for ensuring the utilities are relocated both horizontally and vertically, in accordance with the accepted utility relocation plans. Unless directed by the Department additional compensation for coordination and relocations after the initial relocation shall be at no additional cost to the Department.

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 service interruption of any utilities, 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 any utility adjustments, reconstruction, new installation or routine maintenance work that may be underway or take place during the progress of the contract.

The Design-Build Team shall coordinate Utilities work with other projects within or adjacent to the limits of this project (Reference the *Cooperation Between Contractors* Project Special Provision found elsewhere in this RFP).



## Utility 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><i>Utility Owner List</i></b> |  |  |
|----------------------------------|--|--|
| <b>Utility Type</b>              | <b>Utility Owner</b>   | <b>Cost Responsibility</b>                           |
| Water / Sewer                    | City of Belmont  | Design-Build Team                                    |
| Water / Sewer                    | City of Mount Holly  | Design-Build Team                                    |
| Water / Sewer                    | Two Rivers Utilities   | Design-Build Team                                    |
| Water / Sewer                    | Carolina Water Service of North Carolina (a.k.a. Utilities, Inc) | Design-Build Team                                    |
| Gas                              | Dominion Energy  | Utility Company or NCDOT (w / accepted Prior Rights) |
| Gas                              | Products Pipeline (a.k.a. Kinder Morgan)                         | Utility Company or NCDOT (w / accepted Prior Rights) |
| Gas (Transmission)               | Colonial Pipeline  | Utility Company or NCDOT (w / accepted Prior Rights) |
| Power (Transmission)             | Duke Energy  | Utility Company or NCDOT (w / accepted Prior Rights) |
| Power (Distribution)             | Duke Energy  | Utility Company or NCDOT (w / accepted Prior Rights) |
| CATV                             | Charter Communications   | Utility Company                                      |
| Telecommunications               | AT&T   | Utility Company or NCDOT (w / accepted Prior Rights) |
| Telecommunications               | AT&T Transmission / Long Distance                                | Utility Company or NCDOT (w / accepted Prior Rights) |
| Telecommunications               | Verizon (MCI)  | Utility Company or NCDOT (w / accepted Prior Rights) |
| Fiber Optic Network              | Conterra   | Utility Company                                      |
| Fiber Optic Network              | Lumen (Formerly Centurylink / Level 3)                           | Utility Company                                      |
| Fiber Optic Network              | Segra (Formerly Spirit)  | Utility Company                                      |

Please refer to the Utility Contact List in the *Materials Provided* folder for list of initial utility owner contact information.

### *Colonial Pipeline Coordination*

The Department has initiated utility relocation coordination efforts on this project with Colonial Pipeline. There is an executed Utility Preliminary Engineering Agreement (UPEA) for Colonial Pipeline. Colonial Pipeline has retained a firm to perform engineering design for their relocation(s). Colonial Pipeline has started to review their records and performed test pitting to locate their existing facilities within the project limits. The Design-Build Team shall be responsible for continued coordination efforts with Colonial Pipeline after award of the project.

The Department has received prior rights documentation from Colonial Pipeline and determined that Colonial Pipeline has prior rights outside the existing public right-of-way and is encroaching within the existing public right-of-way.

### **Standards & Guidelines**

Unless noted otherwise elsewhere in this RFP, the Design-Build Team utilities coordination and engineering designs shall, at a minimum, be in accordance with the standards and guidelines, effective on the Technical Proposal submittal date, 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) NCDOT *Roadway Standard Drawings*
- (G) *NCDEQ Public Water Supply* - Rules Governing Public Water Supply
- (H) *NCDEQ Division of Water Resources* - Title 15A - Environment and Natural Resources
- (I) *NCDEQ Division of Water Resources* – Minimum Design Criteria for Gravity Sewers
- (J) *NCDEQ Division of Water Resources* – Minimum Design Criteria for Pump Stations and Force Mains

## **WATER AND SEWER DESIGN**

After the Department accepts the Preliminary Roadway Plans developed by the Design-Build Team, the Utilities Coordinator shall conduct a pre-design meeting between the water and sewer utility owners, the Utilities Design Engineer, the Design-Build Team, and the appropriate NCDOT Utilities Unit and Alternative Delivery Unit representatives prior to the submission of the Preliminary Water and / or Sewer Plans.

The Design-Build Team, via the Utilities Design Engineer, shall prepare all water and sewer plans required for utility agreements and permits; prepare and submit all required permits directly to the regulatory 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 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 respective utility owner(s).

The Design-Build Team shall relocate / replace all commercial and residential backflow preventors impacted by the project in accordance with the local authority's design Policies and Regulations (i.e. Town, City, County, etc.). The Department will provide a list of field identified backflow devices located within the limits of the project. The locations of these devices are in a spreadsheet (*BFP Table – 2024-08-23*), provided by the Department, in the materials provided folder. Please confirm size and location with utility owner and parcel owner. Please be advised other backflow devices could be present within the project limits.

The relocation and 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 and specifications for each individual utility company that are current as of the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is the 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 acceptance by both NCDOT and the appropriate utility owner prior to installation. Protection of water and sewer facilities shall include, but not be limited to, encasement, lining and bridging.

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 or septic systems, all costs associated with the design and construction for relocation, extension, and 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.

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 *Standard Specifications*.

Any shutdowns that are required for connection to existing water or sewer shall be limited to a single 4-hour period. The Design Build Team shall provide temporary bypass water or sewer service if any disruption of service exceeds a single 4-hour period.

The Design-Build Team shall concurrently submit all water and sewer design submittals to the NCDOT State Utilities Manager, via the Alternative Delivery Unit, and to the appropriate utility owner for review and acceptance. All water and sewer design submittals shall include a title sheet, legend and notes sheets, detail sheets, plan sheets, profile sheets and special provisions, as required. All water and sewer design submittals shall be one full size set, submitted electronically in .pdf and .dgn format. 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 or sewer design submittal.

Prior to (re)submitting any subsequent water and sewer design submittals, the Design Build Team shall receive and address review comments from the Department and the utility owner for the previous submittal.

At a minimum, the water and / or sewer design submittals shall be as follows:

- (A) Preliminary Water and / or Sewer Design Submittal, shall be submitted after the Department accepts the 100% Hydraulic Plans.
- (B) Final Water and / or Sewer Design Submittal, shall be submitted after the Department accepts the Right of Way / 60% Roadway Plans.
- (C) Release for Construction Water and / or Sewer Design Submittal, shall be submitted after the Department accepts the Final Water and / or Sewer Plans.

The Design-Build Team shall provide the Agreement Package, which shall include the Release for Construction Plans, color coded in accordance with the NCDOT Agreement Plans Color Coding requirements, special provisions, and a construction estimate with unit quantities. The Department will send the appropriate utility agreement (Utility Construction Agreement (UCA) or Use & Occupancy Agreement (U&O)), with the Agreement Package, to the utility owner for their review and execution.

Upon completion of the water and sewer relocations and protective measures, the Design-Build Team shall provide the following:

- (A) Lump sum construction costs for the relocations and protective measures that are separated by individual utility owner and TIP project to the Department; and
- (B) 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 and the utility owner's requirements, whichever is more conservative. The As-Built Plans shall be provided in .pdf format and MicroStation (.dgn) format to the Department and in the CADD format and / or other format, paper, mylar, etc., as required by the utility owner.
- (C) Any procedures required to close-out permits for the water and sewer work including, but not limited to, signed and sealed as-built drawings and engineer's certification in the format required by the Permitting Agency.

All designs shall be developed in Bentley MicroStation format (.dgn) and in the same project coordinate system and unit of measure. AutoCAD (.dwg) files and Microstation files converted from AutoCAD (.dwg) will not be accepted.

## **UTILITIES COORDINATION**

The Utilities Coordinator shall be responsible for coordinating all utility relocations, removals, and 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 herein, and shall include all necessary utility agreements.

The Utilities Coordinator shall conduct regular utility coordination meetings, at least once a month, starting no later than 45 days after contract execution and continuing until all utility relocations are completed.

In accordance with the NCDOT's 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).

### **Utility Relocation Plans and Utilities Coordination Working Plans**

Excluding water and sewer conflicts, if the Design-Build Team's design or construction creates a utility conflict, the Design-Build Team shall request that the utility owner submit Utility Relocation Plans that show existing utilities and proposed utility relocations for acceptance by NCDOT, and by railroad companies where applicable. The Design-Build Team shall provide Roadway Design Plans to the utility owners for their use in developing the Utility Relocation Plans.

The Utilities Coordinator shall compile each of the Utility Relocation Plans into the Utilities Coordination Working Plans. The Utilities Coordination Working Plans shall also show the proposed water and sewer designs. Utilities Coordination Working Plans shall be submitted in .pdf format and .dgn format. At a minimum, the Utilities Coordination Working Plans submittals shall be as follows:

- (A) Preliminary Utilities Coordination Working Plans Submittal, submitted after the Department accepts the 100% Hydraulic Plans.
- (B) Utilities Coordination Working Plans Progress Submittal, submitted concurrently with the URAI and a minimum of 10 days prior to the Right of Way / 60% Roadway Plans submittal.
- (C) Final Utilities Coordination Working Plans Submittal, submitted after the Department accepts the Right of Way / 60% Roadway Plans submittal.

As part of the Utility Agreement packages, the Design-Build Team shall electronically submit a full-size set of the Utility Relocation Plans, in .pdf format, to the NCDOT State Utilities Manager, via the Alternative Delivery Unit, for review and acceptance. 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 accept the Utility Relocation Plans prior to any utility relocation work beginning. See Utility Agreements Section found elsewhere in this Scope of Work for additional requirements regarding utility agreement packages. After the review process is complete, the NCDOT Utilities Unit will submit an electronic copy of the authorization letter to the Design-Build Team. If the Utility Relocation Plans are accepted subject to changes, the Design-Build Team shall coordinate these changes with the appropriate utility owner.

### **Prior Rights and Compensable Interest**

The Design-Build Team shall verify / determine the prior rights and compensable interest for all utility relocations and submit prior rights recommendations to NCDOT for review prior to finalizing PUE limits and developing utility agreements.

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 (Utility occupying the same location for twenty (20) years plus outside the existing highway rights of way).
- (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.

### **Cable TV**

The cost in relocating CATV due to highway construction shall be the responsibility of the CATV Company except as follows:

- (A) 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; or
- (B) 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 acceptance for all service taps, lines and meters 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 acceptance prior to installation.

The Design-Build Team shall be responsible for all coordination activities, including permit applications and deposit / application / connection fees, required for the utility company to provide service taps and meters. The permit application shall be sent to the Resident Engineer for processing. 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.

**Utility Agreements**

If a utility company provides acceptable 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 accepted agreements for this project. The URA and Encroachment Agreement forms are available from the NCDOT Utilities Unit. Refer to the *NCDOT Utilities Accommodation Manual* for the different types of Encroachment Agreements available for use.

The Design-Build Team shall submit all utility agreements, and all supporting documents to the NCDOT State Utilities Manager, via the Alternative Delivery 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, accepted and signed electronically by the NCDOT State Utilities Manager, or designated representative, before being distributed to the field.

The Design-Build Team shall use 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*.

**Work Not Required by the Project and 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 estimated cost for the utility construction, the



Design-Build Team shall submit the following to the NCDOT State Utilities Manager, via the Alternative Delivery Unit, for further handling:

- One full size set of utility construction drawings, submitted electronically in .pdf format. The utility construction drawing set shall include a title sheet, legend and notes sheets, detail sheets, plan sheets, profile sheets and special provisions, as required.
- A letter from the utility owner agreeing to the plans and lump sum cost, and
- 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 estimated lump sum cost under a Supplemental Agreement. The necessary 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, 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.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****AWARD OF CONTRACT**

(1-16-18) (Rev. 4-10-24)

103

DB1 G01

Revise the *Standard Specifications* as follows:

**Page 1-24, Subarticle 103-4(A) General, 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 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the successful proposer the decision to award the contract to such proposer 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 successful proposer may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

**HAUL ROADS**

(7-16-24)

105

DB1 G04

Revise the *Standard Specifications* as follows:

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

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

**RAILROAD GRADE CROSSING**

(7-1-95) (Rev. 1-16-24)

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.

No separate payment will be made for conforming with the requirements of this Special Provision. The Design-Build Team shall contact the Resident Engineer and / or the NCDOT Rail Division - Engineering Coordination & Safety Branch - Surfaces & Encroachment Manager with any questions pertaining to the Right of Entry.

**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**

(1-19-21)

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.

**MAINTENANCE OF THE PROJECT**

(11-20-07) (Rev. 1-16-24)

104-10

DB1 G125

Revise the *Standard Specifications* as follows:

**Page 1-35, Article 104-10 Maintenance of the Project, line 3,** add the following after the first sentence of the first paragraph:

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

**Page 1-35, Article 104-10 MAINTENANCE OF THE PROJECT, line 8,** add the following as the last sentence of the first paragraph:

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

**Page 1-35, Article 104-10 MAINTENANCE OF THE PROJECT, lines 20-22,** replace the last sentence of the last paragraph with the following:

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

### **PLANT AND PEST QUARANTINES**

(3-18-03) (Rev. 3-18-25)

Z-04a

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

#### **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/divisions/plant-industry/plant-protection/plant-industry-plant-pest-quarantines> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

**Regulated Articles Include**

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

**ROCK AND BROKEN PAVEMENT FILLS**

(12-29-15) (Rev.1-16-24)

235

DB2 R85

Revise the *Standard Specifications* as follows:

**Page 2-23, Article 235-2 MATERIALS, add the following after Line 15:**

| Item  | Section |
|---|---------|
| 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.

r 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.

ollowed 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.

k, 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 inches of the subgrade or finished grade, whichever is lower.

### **INFILTRATION BASIN WITH BAFFLES**

(5-19-13)(Rev. 12-17-24)

#### **Description**

Provide an infiltration basin in accordance with the infiltration basin with baffles details to remove sediment from construction site runoff at locations shown in the erosion control plans developed by the Design-Build Team. Work includes constructing sediment basin, installation of coir fiber baffles, providing and placing geotextile spillway liner, providing coir fiber mat stabilization for the primary spillway outlet, disposing of excess materials, removing geotextile liner and coir fiber mat, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

#### **Materials**

| <b>Item</b>       | <b>Section</b> |
|-------------------|----------------|
| Staples           | 1060-8(D)      |
| Coir Fiber Mat    | 1060-14        |
| Coir Fiber Baffle | 1640           |

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

| <b>Property</b>              | <b>Test Method</b> | <b>Value</b> | <b>Unit</b>             |
|------------------------------|--------------------|--------------|-------------------------|
| Tensile Strength             | ASTM D4632         | 315          | lb.                     |
| Tensile Elongation (Maximum) | ASTM D4632         | 15           | %                       |
| Trapezoidal Tear             | ASTM D4533         | 120          | lbs.                    |
| CBR Puncture                 | ASTM D6241         | 900          | lbs.                    |
| UV Resistance                | ASTM D4355         | 70           | %                       |
| (% retained at 500 hrs.)     |                    |              |                         |
| Apparent Opening Size (AOS)  | ASTM D4751         | 40           | US Std. Sieve           |
| Permittivity                 | ASTM D4491         | 0.05         | sec <sup>-1</sup>       |
| Water Flow Rate              | ASTM D4491         | 4            | gal/min/ft <sup>2</sup> |

Provide stakes, reinforcement bars and staples in accordance with Article 1629-2 of the *Standard Specifications*.

## Construction Methods

Excavate basin according to the erosion control plans developed by the Design-Build Team with basin surface free of obstructions, debris, and pockets of low-density material. Excavation into or below the water table shall not occur, and avoid compacting the bottom of the basin with equipment tires, excavation bucket, etc. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Construct earth berm around perimeter of infiltration basin as shown in the infiltration basin with baffles detail and limit the earth berm height to three feet.

Construct the primary spillway according to the infiltration basin with baffles details in the erosion control plans developed by the Design-Build Team. Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least five inches deep and tamp firmly. Make vertical overlaps a minimum of 18 inches with upstream geotextile overlapping the downstream geotextile. Secure geotextile with staples. Place staples along outer edges and throughout the geotextile a maximum of three feet horizontally and vertically. Place geotextile on the bottom and across the entire width of the basin in accordance with the infiltration basin with baffles detail provided in the erosion control plans developed by the Design-Build Team.

At the primary spillway outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans developed by the Design-Build Team and as directed by the Engineer. Place anchors across the matting at the ends approximately one foot apart. Place anchors along the outer edges and down the center of the matting three feet apart.

### **CORRUGATED ALUMINUM ALLOY CULVERT PIPE**

(9-21-21) (Rev. 1-16-24)

305, 310

DB3 R34

Revise the *Standard Specifications* as follows:

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

| Item             | Section |
|------------------|---------|
| Waterborne Paint | 1080-9  |
| Hot Bitumen      | 1081-3  |

**Page 3-5, Article 305-3, CONSTRUCTION METHODS**, add the following after line 26:

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 shall 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. 01-16-24)

305, 310

DB3 R35

Revise the *Standard Specifications* 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**:

| Item                             | Section |
|----------------------------------|---------|
| Galvanized Corrugated Steel Pipe | 1032-1  |

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

| Item                             | Section |
|----------------------------------|---------|
| 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, III, IV, or V reinforced concrete pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

### **AUTOMATED FINE GRADING**

(9-1-11) (Rev. 1-16-24)

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 *Standard Specifications* 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.



**AGGREGATE SUBGRADE IN LIEU OF CHEMICAL STABILIZATION**

(6-16-15) (Rev. 1-16-24)

501, 505, 542

DB5 R17

**Description**

In lieu of chemical stabilization, replace eight inches of subgrade with Type 2 aggregate subgrade. This substitution shall be allowed in full typical section width and shall not result in chemically stabilized sections less than 1,000 feet in length, unless otherwise approved by the Engineer. This substitution shall not be allowed for chemically stabilized sections with geotextile for subgrade stabilization. Notify the Engineer at least 30 days in advance of starting aggregate subgrade in lieu of chemical stabilization. Define “subsoil” as the portion of the roadbed below the Class IV subgrade stabilization.

**Materials**

Refer to Division 10 of the *Standard Specifications* as follows.

| <b>Item</b>                                    | <b>Section</b> |
|--|----------------|
| Geotextile for Subgrade Stabilization, Type 5a | 1056           |

**Construction Methods**

Proof roll subsoil, install geotextile for subgrade stabilization and place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *Standard Specifications* for a Type 2 aggregate subgrade.

**FINAL SURFACE TESTING**

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

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 *Standard Specifications*. The North Carolina Hearne Straightedge will not be permitted.

**MILLED RUMBLE STRIPS ON ASPHALT CONCRETE SHOULDERS**

(11-19-24)

665

DB6 R56

Revise the *Standard Specifications* as follows:

**Page 6-53, Article 665-3 CONSTRUCTION METHODS**, lines 20-21, delete and replace the first sentence of the second paragraph with the following:

Provide rumble strips that have finished dimensions of 7 inches  $\pm$  1/2 inch wide in the direction of travel and the length measured perpendicular to the direction of travel as specified in the contract.

**SUBSURFACE DRAINAGE**

(9-1-11) (Rev. 9-14-17)

DB8 R05

Revise the *Standard Specifications* 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.

**IMPACT ATTENUATOR UNIT, TYPE TL-2**

(4-11-07) (Rev. 12-12-18)

DBI 8-43

**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 details in the plans developed by the Design-Build Team, the manufacturer's requirements, 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 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 2, in accordance with Article 106-2 of the 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)*.
2. Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *Standard Specifications*.

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.

**STEEL FENCE POSTS FOR WOVEN WIRE FENCE**

(11-19-24)

866

DB8 R84

**Description**

Use steel fence posts to install woven wire fence in accordance with Section 866 of the *Standard Specifications*, Roadway Standard Drawings No. 866.03, the details in the plans developed by the Design-Build Team and this project special provision.

**Materials**

Refer to Division 10 of the *Standard Specifications*.

**Item**

Metal Posts and Rails

**Section**

1050-3(B)

**Construction Methods**

Woven wire fence shall be constructed using 7.5-feet or 8-feet steel fence posts in accordance with the plans developed by the Design-Build Team, Article 866-3 of the *Standard Specifications* and as directed by the Engineer.

**ELECTRONIC TICKETING SYSTEM**

(7-16-24)(Rev. 12-17-24)

1020

DB10 R20

**Description**

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

**Electronic Ticketing Requirements**

- a. The electronic ticketing system must be fully integrated with the load read-out system at the plant. The system shall be designed so data inputs from scales cannot be altered by either the Design-Build Team or the Department.
- b. Material supplier must test to confirm that ticketing data can be shared from the originating system no less than 30 days prior to project start.
- c. After each truck is loaded, ticket data must be electronically captured, and ticket information uploaded via Application Programming Interface (API) to the Department.
- d. Obtain security token from NCDOT for access to E-Ticketing portal (to send tickets). To request a Security Key, fill out the below E-Ticketing Security Request Form:

**<https://forms.office.com/g/XnT7QeRtgt>**

- e. Obtain API from NCDOT containing the required e-ticketing data fields and format. Download the API from the NCDOT E-ticketing Webpage:

**<https://connect.ncdot.gov/projects/construction/E-Ticketing/Pages/default.aspx>**

- f. Provide all ticket information in real time and daily summaries to the Department's designated web portal. If the project contains locations with limited cellular service, an alternative course of action must be agreed upon.
- g. Electronic ticketing submissions must be sent between the Material Supplier and the Department.
- h. The electronic ticket shall contain the following information:

Date  
Time  
Contract Number  
Supplier Name  
Contractor Name  
Material  
JMF  
Gross Weight  
Tare Weight  
Net Weight  
Load Number  
Cumulative Weight  
Truck Number  
Weighmaster Certification  
Weighmaster Expiration  
Weighmaster Name  
Facility Name  
Plant Certification Number  
Ticket Number  
Hauling Firm (optional)  
Voided Ticket Number (if necessary)  
Original Ticket Number (if necessary)  
Supplier Revision (If necessary)

The Design-Build Team / supplier can use the electronic ticketing system of their choice to meet the requirements of this provision.

**GLASS BEAD GRADATION FOR PAVEMENT MARKINGS**

(9-17-24)

1087

DB10 R87

Revise the *Standard Specifications* as follows:

**Page 10-187, Subarticle 1087-4(C), Gradation & Roundness, after line 6,** delete and replace Table 1087-2 with the following:

| <b>TABLE 1087-2<br/>GLASS BEAD GRADATION REQUIREMENTS</b> |                               |                |
|---|-------------------------------|----------------|
| <b>Sieve Size</b>   | <b>Gradation Requirements</b> |                |
|   | <b>Minimum</b>                | <b>Maximum</b> |
| Passing #20   | 100%                          | --             |
| Retained on #30   | 5%                            | 15%            |
| Retained on #50   | 40%                           | 80%            |
| Retained on #80   | 15%                           | 40%            |
| Passing #80   | 0%                            | 10%            |
| Retained on #200  | 0%                            | 5%             |

**ELECTRICAL JUNCTION BOXES**

(6-18-24)

1091

DB10 R91

Revise the *Standard Specifications* as follows:

**Page 10-209, Subarticle 1091-5(A) General,** add the following after line 27:

Boxes and covers shall meet all requirements and specifications of ANSI/SCTE 77. Structural load tests shall meet the Tier 15 application type.

**Page 10-209, Subarticle 1091-5(B) Polymer Concrete (PC) Junction Boxes, lines 28,** delete and replace the subarticle title with the following:

**(B) Polymer Concrete (PC), Composite and Thermoplastic Junction Boxes**

**Page 10-209, Subarticle 1091-5(B) Polymer Concrete (PC) Junction Boxes,** add the following after line 28:

For PC junction boxes, use polymer concrete material made of an aggregate consisting of sand and gravel bound together with a polymer and reinforced with glass strands to fabricate box and cover components.

**Page 10-209, Subarticle 1091-5(B) Polymer Concrete (PC) Junction Boxes, line 29** replace “polymer concrete (PC) boxes” with “junction boxes”.

**Page 10-209, Subarticle 1091-5(B) Polymer Concrete (PC) Junction Boxes, lines 31-37,** delete the second and third paragraph.

**Page 10-209, Subarticle 1091-5(B) Polymer Concrete (PC) Junction Boxes, lines 40-41,** delete the fourth sentence of the fourth paragraph and replace with the following:

Bodies of junction boxes shall be a single piece.

Polymer concrete, composite and thermoplastic junction boxes are not required to be listed electrical devices.

### **TEMPORARY SHORING**

(2-20-07) (Rev. 1-16-24)

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 geotextiles or geogrids wrapped behind welded wire facing or geostrips 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 *Roadway Standard Drawing* No. 1170.01. Define “concrete barrier” as unanchored or anchored PCB or an approved equal. Define “temporary guardrail” as temporary steel beam guardrail that meets *Roadway Standard Drawing* No. 862.02.

## Materials

Refer to the *Standard Specifications*.

| Item                           | Section |
|--------------------------------|---------|
| Concrete Barrier Materials     | 1170-2  |
| Flowable Fill, Excavatable     | 1000-7  |
| Geosynthetics                  | 1056    |
| Grout, Type 1                  | 1003    |
| Portland Cement                | 1024-1  |
| Portland Cement Concrete       | 1000    |
| Select Materials               | 1016    |
| Steel Beam Guardrail Materials | 862-2   |

| Item                          | Section |
|-------------------------------|---------|
| Steel Plates                  | 1072-2  |
| Steel Sheet Piles and H-Piles | 1084    |
| Untreated Timber              | 1082-2  |
| Water                         | 1024-4  |
| Welded Wire Reinforcement     | 1070-3  |

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *Standard Specifications*. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 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 *Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the AASHTO *LRFD Bridge Construction Specifications*.

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 pounds of Portland cement. Provide grout with a compressive strength at 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 *Standard Specifications* and metallic strip reinforcement (“straps”) that meet ASTM A572 or A1011.

**Preconstruction Requirements**

(A) Concrete Barrier

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier 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 *Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout / ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary,

obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater or flood elevations shown in the plans 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 *Standard Specifications* and *Roadway Standard Drawing* No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and *Roadway Standard Drawing* Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

- (1) Horizontal wires of welded wire facing are level in all directions,
- (2) Shoring location is within 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 *Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

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 *Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute / American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

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 inches between the one and ten minute readings or less than 0.08 inches 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 *Standard Specifications*. 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 *Standard Specifications*. 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.

## **FLAGGERS**

(12-17-24)

1150

DB11 R50

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

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

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

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

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

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

**(A) Automated Flagging Assistance Devices (AFAD)**

**(1) AFAD General**

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

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

**(2) AFAD Type I System: RED / YELLOW**

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

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

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

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

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

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

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

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

### **(3) AFAD Type II System: STOP/SLOW**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**(B) Portable Traffic Signals (PTS) Units**

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

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

**Communication Requirements**

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

**Fault Mode Requirements**

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

**Remote Monitoring System**

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

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

**Trailer / Cart**

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

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

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

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

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

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

**Power System**

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

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

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

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

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

Provide documentation to the Engineer prior to deploying the device that the AFAD or PTS units operator(s) are qualified flagger(s) that have been properly trained through an NCDOT approved training agency or other NCDOT approved training provider and that the qualified flagger(s) have received manufacturer training to operate that specific device. This training shall include

proper installation, remote control operation, central control systems and maintenance of the AFAD or PTS units. The training shall take place off the project site where training conditions are removed from live traffic. The documentation shall include the names of the authorized trainer, the trainees, the device on which they have been trained and the date of the training. Provide updated documentation to the Engineer prior to deploying any additional operators.

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

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

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

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

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

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

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

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

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

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

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

### **AFAD Specific Construction Methods**

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

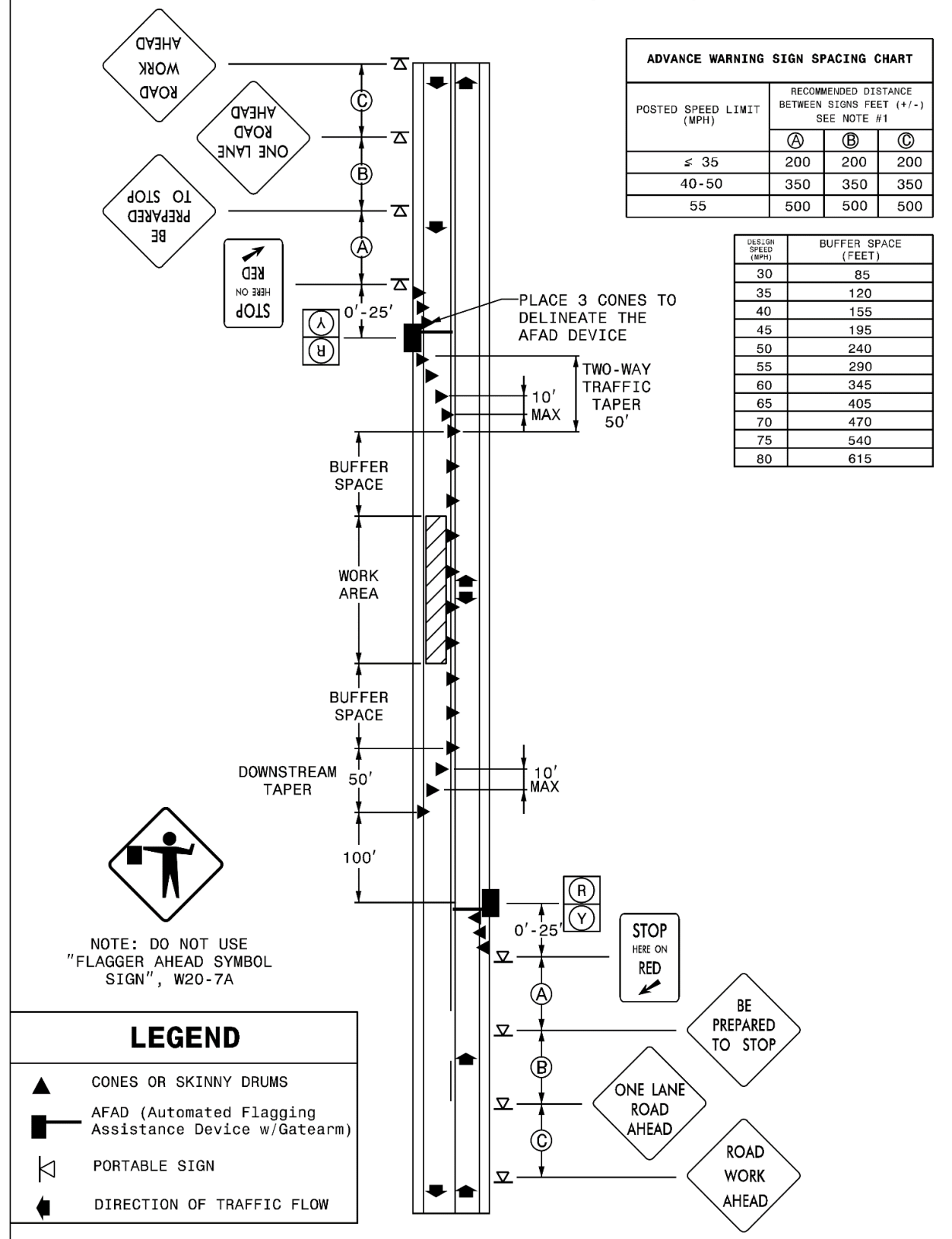
Multiple AFAD units may be controlled with **one** flagger / operator when the AFAD units meet each of the following requirements:

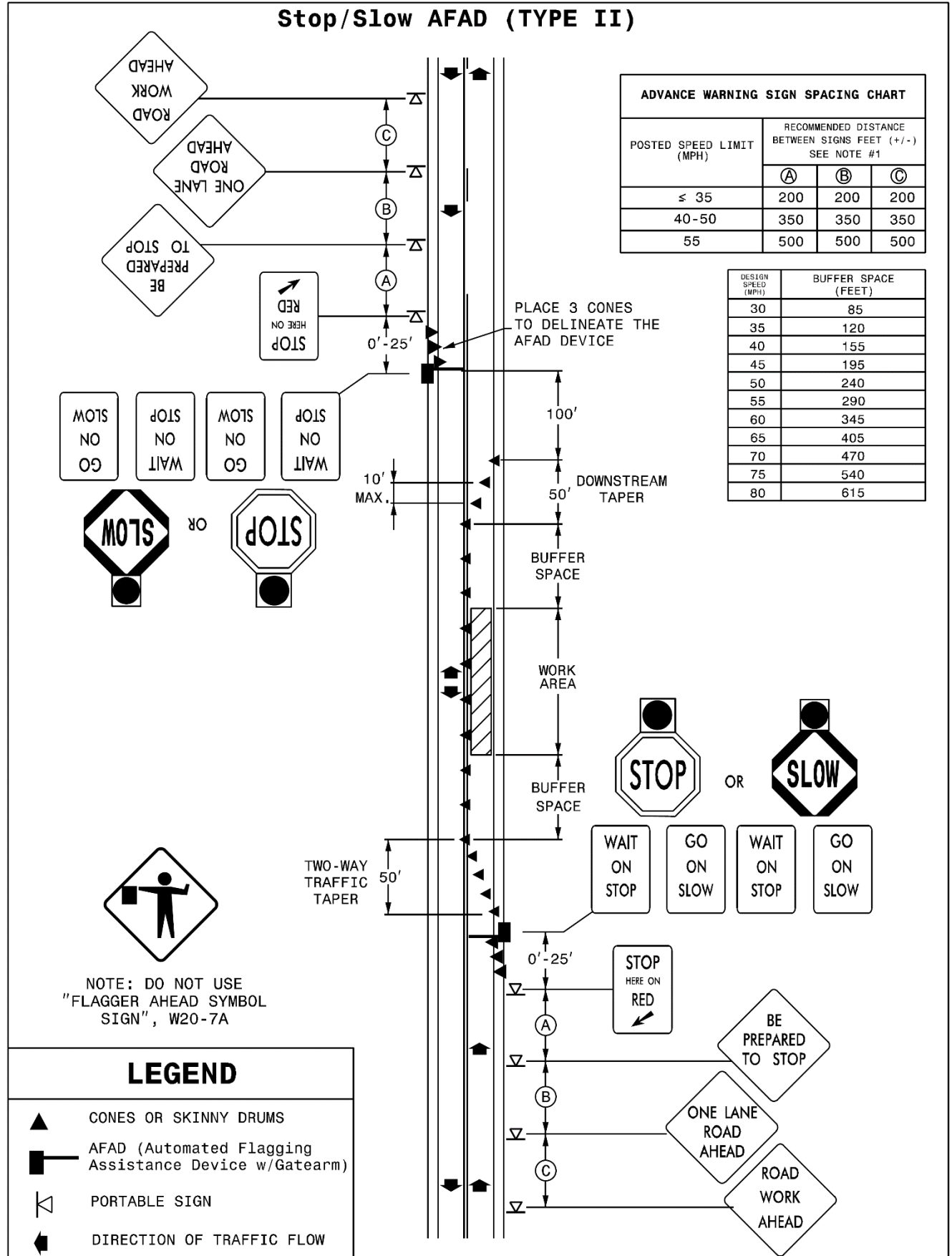
- (1) AFAD units are spaced no greater than the manufacturer's recommendations.
- (2) Both AFAD units can be seen at the same time from the flagger / operator's position, or the AFAD is operating on its own secure network with malfunction detection and notification to the flagger/operator.
- (3) The flagger / operator has an unobstructed view of approaching traffic in both directions from the flagger / operator position or the AFAD is operating on its own secure network, with cameras that provide the flagger / operator an unobstructed view of approaching traffic from both directions. The flagger / operator may control the AFAD units from a pilot vehicle.

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

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



**Red/Yellow Lens AFAD (TYPE I)**

**Stop/Slow AFAD (TYPE II)**

**PORTABLE CONCRETE BARRIER**

(12-17-24)

1170

SP11 R70

Revise the *Standard Specifications* as follows:

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

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

**WORK ZONE INSTALLER**

(7-20-21) (Rev. 1-16-24)

1101, 1150

DB11 R04

Revise the *Standard Specifications* as follows:

**Page 11-4, Article 1101-14, WORK ZONE INSTALLER, Lines 25 – 26**, delete the first sentence and replace with the following:

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 within the highway right of way.

**Page 11-4, Article 1101-14, WORK ZONE INSTALLER, Lines 42 – 43**, delete the first sentence and replace with the following:

The Design-Build Team shall provide the name and contact information of all qualified work zone installers to the Engineer prior to or at the preconstruction conference.

**SNOWPLOWABLE DELINEATION**

(10-15-24)

1253

DB12 R53

**Description**

Furnish, install and maintain snowplowable delineation.

There are five snowplowable delineation alternate options approved for use in North Carolina. They include the following markers and markings options:

- (1) Polycarbonate H-shaped Markers
- (2) Inlaid Raised Pavement Markers
- (3) 10-Foot Rumble Skips
- (4) Inlaid Cradle Markers
- (5) 10-Foot Inlaid Pavement Markings

Only one type of snowplowable delineation will be allowed on a single project.

## Materials

Refer to Division 10 of the *Standard Specifications*.

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

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

Do not use Polycarbonate H-shaped Marker option in the following counties: Buncombe, Burke, Graham, Haywood, Jackson, Macon, Madison, McDowell, Mitchell, Rutherford, and Yancey.

## Construction Methods

### (A) General

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

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

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

### (B) Polycarbonate H-shaped Markers and Inlaid Cradle Markers

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

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

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 polycarbonate H-shaped markers and inlaid cradle markers according to the manufacturer's recommendations.

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

Construct inlaid cradle markers in accordance with the details in the plans developed by the Design-Build Team and as directed by the Engineer.

#### **(C) Reflector Replacement**

The following requirements only apply to polycarbonate H-shaped markers and inlaid cradle markers.

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

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

#### **(D) Inlaid Raised Pavement Markers**

Cut groove in accordance with the details in the plans developed by the Design-Build Team and as directed by the Engineer.

Use adhesive recommended by the manufacturer to install markers into the groove in accordance with Section 1251. The raised pavement markers are incidental to inlaid raised pavement markers.

**(E) 10-Feet Rumble Skips**

Construct 10-foot rumble skips on asphalt concrete in accordance with Section 665 for all centerline and shoulder rumble skips, details in the plans developed by the Design-Build Team and as directed by the Engineer. Construct 10-foot rumble skips on Portland cement concrete in accordance with Section 730 for all centerline and shoulder rumble skips, details in the plans developed by the Design-Build Team and as directed by the Engineer. The milled rumble strips are incidental to the rumble skips. Using polyurea or extruded 90 mil thermoplastic construct pavement markings in accordance with Section 1205.

**(F) 10-Feet Inlaid Pavement Markings**

The groove in which the marking is to be placed shall be one inch wider than the marking to be placed and 10 mils deeper than the thickness of the marking.

When using this method, use enhanced reflective media. The following retroreflectivity values shall be met.

| <b>MINIMUM INITIAL REFLECTOMETER READINGS</b> |              |                            |
|---|--------------|----------------------------|
| <b>Item</b>                                   | <b>Color</b> | <b>Reflectivity</b>        |
| Enhanced Reflectivity Media                   | White        | 450 mcd/lux/m <sup>2</sup> |
|   | Yellow       | 350 mcd/lux/m <sup>2</sup> |

Using polyurea, extruded 90 mil thermoplastic or cold applied plastic construct pavement markings in accordance with Section 1205.

**Maintenance**

Maintain all installed snowplowable delineation before acceptance by the Engineer.

**COLD APPLIED CONTRAST PLASTIC PAVEMENT MARKING LINES**

(1-1-24)

DBI

**Description**

The Design-Build Team shall install Cold Applied Contrast Plastic Pavement Marking Lines, Type 2 or 3 (9") in accordance with the applicable requirements of Section 1087 and 1205 of the *Standard Specifications*, and as directed by the Engineer. This line shall be a 10-foot skip line with a contrast white / black line. The white line shall be six inches wide with a 1.5-inch black border on each side. Any alteration to this design must be approved by the Engineer prior to installation.

**Materials**

Refer to Article 1205-6 of the *Standard Specifications*.

**BLACK EPOXY PAVEMENT MARKING MATERIAL**

(1-16-24)

**Description**

This work shall consist of applying black epoxy pavement marking material on concrete.

**Epoxy Pavement Marking Material****(A) Formulation**

Use epoxy pavement marking material consisting of 100% solid two-part system formulated and designed to provide a simple volumetric mixing ratio of the two components.

**(B) Epoxide Value:** ASTM D1652

WPE of the epoxy resin shall be  $250 \pm 50$  for both white and yellow component A on a pigment free basis.

**(C) Amine Value** ASTM D2074

The total amine value of the curing agent (component B) shall be  $450 \pm 50$

**(D) Requirements****(1) Color**

|        |                          |
|--------|--------------------------|
| Black: | Shall meet ASTM standard |
|--------|--------------------------|

**(2) Hardness:** ASTM D2240

|                           |    |
|---------------------------|----|
| Minimum Shore D hardness: | 80 |
|---------------------------|----|

**(3) Abrasion Resistance:** ASTM C-501

|   |    |
|---|----|
| Minimum wear index of catalyzed sample: | 80 |
|---|----|

**(4) Adhesion to Concrete:** ASTM D4541

|                           |                      |
|---------------------------|----------------------|
| At 100% concrete failure: | Greater than 325 psi |
|---------------------------|----------------------|

- |                                   |               |
|-----------------------------------|---------------|
| (5) Tensile Strength:             | ASTM D638     |
| Minimum average tensile strength: | 6000 psi      |
| (6) Compressive Strength:         | ASTM D695     |
| Minimum compressive strength:     | 12000 psi     |
| (7) Drying Time:                  | ASTM D711     |
| Maximum drying time at 75 ±2° F:  | Ten minutes   |
| (8) Gel Time:                     | ASTM D2471    |
| Maximum gel time:                 | Three minutes |

(E) Material Certification: Type 3 Material Certification and Type 4 Material Certification

### **Construction Methods**

Epoxy Pavement Marking Material shall conform to the requirements of Section 1205 of the *Standard Specifications*.

#### **(A) Application Equipment**

Use epoxy application equipment, which is equipped with or capable of the following:

Precisely metering the two components in the ratio of proportion recommended by the manufacturer.

Producing the required amount of heat at the mixing head and gun tip.

Maintaining temperatures within the tolerances recommended.

Gauges for each proportioning pump so that any pressure difference can be easily monitored.

A minimum 24" long static mixer unit for proper mixing of the two components of the epoxy marking material.

Each component of the epoxy pavement marking shall be in a homogeneous state prior to mixing,

Have the capability to totally mix component A with component B immediately prior to the marking application.



Have the capability to spray pavement marking material and have the equipment mounted on a truck of sufficient size and stability with an adequate power source to produce uniform lines of the specified dimension.

A metering device to register the accumulated installed footage for each gun

**(B) Weather Limitations**

Apply epoxy pavement marking only when the ambient air temperature and the pavement surface temperature is a minimum of 35° F and rising.

**(C) Application**

Produce epoxy pavement marking lines that have a minimum dry thickness of 15 mils when placed on concrete pavements and 20 mils when placed on asphalt pavements.

Use **Type I** epoxy material (fast dry) for epoxy pavement markings except when otherwise specified in the contract documents.

**Type II** epoxy material may be used with lane closures as approved by the Engineer to allow for curing time.

Do not place epoxy markings on fresh asphalt pavements until 15 days have elapsed after the last asphalt layer is placed.

Using the epoxy application equipment, apply the pavement marking materials simultaneously. Hot-spray the epoxy resin, mixed in accordance with the manufacturer's recommendations, onto the pavement surface within an application temperature range recommended by the manufacturer. Inject retroreflective glass beads into the molten (liquid) Epoxy Marking.

Individual Components: Before mixing, heat the individual components to within the temperature range of 100° F to 170° F. Do not exceed the upper limit of the manufacturer's recommended heating temperature at any time under any circumstances.

Mixed Material: After mixing, ensure that the application temperatures for the combined materials at the gun tip are within the temperature range recommended by the manufacturer for the particular product used.

Produce marking, which upon cooling, has the ability to resist deformation caused by traffic throughout its entire length.

**(D) Observation Period**

Epoxy pavement markings shall be subject to a 30-day observation period.

Maintain responsibility for the pavement markings for a 30-day observation period beginning upon the satisfactory completion of all work required in the plans developed by the Design-Build Team. Guarantee the markings under the payment and performance bond in accordance with Article 105-17 of the *Standard Specifications*.

Have traffic operating on the facility during the entire 30-day observation period unless otherwise directed.

Provide pavement marking material, which during the 30-day observation period, shows no signs of failure due to blistering, excessive cracking, chipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, spilling, poor adhesion to the pavement materials, vehicular damage, debonding and normal wear.

Replace, at no additional expense to the Department, any pavement markings that do not perform satisfactorily under traffic during the 30-day observation period.

## **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 shall 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 shall satisfy both the NC Department of Labor (NCDOL) and the Department.

### **Achieving or Failing to Meet Training Goals**

The contractor shall 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 shall 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 shall be made for providing required training in accordance with these contract documents.

**STANDARD SPECIAL PROVISION****AVAILABILITY OF FUNDS - TERMINATION OF CONTRACTS**

(9-1-11)(Rev . 1-16-24)

Z-2

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

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

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

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) | Bermudagrass                   |
| Kobe Lespedeza                       | Browntop Millet                |
| Korean Lespedeza                     | German Millet - Strain R       |
| Weeping Lovegrass                    | Clover - Red / White / Crimson |
| Carpetgrass                          |                                |

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

Common or Sweet Sundangrass

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

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



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

Centipedegrass  
Crownvetch  
Pensacola Bahiagrass  
Creeping Red Fescue

Japanese Millet  
Reed Canary Grass  
Zoysia

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

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

**STANDARD SPECIAL PROVISION****ERRATA**

(1-16-24)

Z-4

Revise the 2024 NCDOT *Standard Specifications for Roads and Structures* as follows:

**Division 3**

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

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

**Division 9**

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

**Division 10**

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

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

**Division 11**

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

**Division 15**

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

**Division 16**

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

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

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

**STANDARD SPECIAL PROVISION****TITLE VI AND NONDISCRIMINATION:**

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

Z-6

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

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

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

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

**(a) Compliance with Regulations**

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

**(b) Nondiscrimination**

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

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

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

(d) Information and Reports

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

(e) Sanctions for Noncompliance:

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

- (i) Withholding payments to the contractor under the contract until the contractor complies; and/or
- (ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

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

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

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

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

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
  2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
  3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

“The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award.”
  4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
  5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
  6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.
- (b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))
- (c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))
- (d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.
1. Applicability

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

## 2. Eligibility

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

## 3. Time Limits and Filing Options

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

- (i) The date of the alleged act of discrimination; or
- (ii) The date when the person(s) became aware of the alleged discrimination; or
- (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

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

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

## 4. Format for Complaints

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

## 5. Discrimination Complaint Form

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

## 6. Complaint Basis

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

**TABLE 103-1  
COMPLAINT BASIS**

| Protected Categories   | Definition   | Examples   | Applicable Nondiscrimination Authorities   |
|--|--|--|--|
| Race and Ethnicity   | An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group   | Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White | Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. ( <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:</i> Sex under this program does not include sexual orientation.  | Women and Men  | 1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.  |
| Age  | Persons of any age   | 21-year-old person   | Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.   |
| Disability   | Physical or mental impairment, permanent or temporary, or perceived.   | Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic   | Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990   |
| Religion (in the context of employment)<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:</i> Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice. | Muslim, Christian, Sikh, Hindu, etc.   | Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. ( <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:

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



- (b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- (c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- (d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- (e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- (f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- (g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- (h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- (i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- (j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

**(4) Additional Title VI Assurances**

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

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

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

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]\* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].\*

(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
  - (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. \*
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*

(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. \*
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*

(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS**

(12-18-07)

Z-7

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)**

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female Participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations in *41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

**EMPLOYMENT GOALS FOR MINORITY  
AND FEMALE PARTICIPATION**

**Economic Areas**

**Area 023 29.7%**

Bertie County  
Camden County  
Chowan County  
Gates County  
Hertford County  
Pasquotank County  
Perquimans County

**Area 024 31.7%**

Beaufort County  
Carteret County  
Craven County  
Dare County  
Edgecombe County  
Green County  
Halifax County  
Hyde County  
Jones County  
Lenoir County  
Martin County  
Nash County  
Northampton County  
Pamlico County  
Pitt County  
Tyrrell County  
Washington County  
Wayne County  
Wilson County

**Area 025 23.5%**

Columbus County  
Duplin County  
Onslow County  
Pender County

**Area 026 33.5%**

Bladen County  
Hoke County  
Richmond County  
Robeson County  
Sampson County  
Scotland County

**Area 027 24.7%**

Chatham County  
Franklin County  
Granville County  
Harnett County  
Johnston County  
Lee County  
Person County  
Vance County  
Warren County

**Area 028 15.5%**

Alleghany County  
Ashe County  
Caswell County  
Davie County  
Montgomery County  
Moore County  
Rockingham County  
Surry County  
Watauga County  
Wilkes County

**Area 029 15.7%**

Alexander County  
Anson County  
Burke County  
Cabarrus County  
Caldwell County  
Catawba County  
Cleveland County  
Iredell County  
Lincoln County  
Polk County  
Rowan County  
Rutherford County  
Stanly County

**Area 0480 8.5%**

Buncombe County  
Madison County

**Area 030 6.3%**

Avery County  
Cherokee County  
Clay County  
Graham County  
Haywood County  
Henderson County  
Jackson County  
McDowell County  
Macon County  
Mitchell County  
Swain County  
Transylvania County  
Yancey County

**SMSA Areas****Area 5720 26.6%**

Currituck County

**Area 9200 20.7%**

Brunswick County

New Hanover County

**Area 2560 24.2%**

Cumberland County

**Area 6640 22.8%**

Durham County

Orange County

Wake County

**Area 1300 16.2%**

Alamance County

**Area 3120 16.4%**

Davidson County

Forsyth County

Guilford County

Randolph County

Stokes County

Yadkin County

**Area 1520 18.3%**

Gaston County

Mecklenburg County

Union County

**Goals for Female****Participation in Each Trade**

(Statewide) 6.9%

**STANDARD SPECIAL PROVISION****REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS**

FHWA-1273 -- Revised October 23, 2023

Z-8

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

**ATTACHMENTS**

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

**II. NONDISCRIMINATION** (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.



**1. Equal Employment Opportunity:** Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (*see* 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

#### **6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

#### **8. Reasonable Accommodation for Applicants /**

**Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

#### **9. Selection of Subcontractors, Procurement of Materials**

**and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

#### **10. Assurances Required:**

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to [DBAconformance@dol.gov](mailto:DBAconformance@dol.gov). The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to [DBAconformance@dol.gov](mailto:DBAconformance@dol.gov), refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.*

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

## 2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

### 3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHDL/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.



(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

#### 4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices* (1) *Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeymen under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

**6. Subcontracts.** The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

**9. Disputes concerning labor standards.** As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of eligibility.** a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

**11. Anti-retaliation.** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

## V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)\* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

\* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

### 3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

**4. Subcontracts.** The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

**5. Anti-retaliation.** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

## VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;



(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and  
 (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

## **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

## **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

**IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT** (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

**X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

**1. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction 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 to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

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**2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;

(2) 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, 2 CFR 180.800;

(3) 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 (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

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**3. Instructions for Certification – Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. 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 clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction 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 to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

\* \* \* \* \*

#### **4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

\* \* \* \* \*

#### **XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

#### **XII. USE OF UNITED STATES-FLAG VESSELS:**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS  
PREFERENCE FOR APPALACHIAN DEVELOPMENT  
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS  
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**STANDARD SPECIAL PROVISION**  
**MINIMUM WAGES**  
**GENERAL DECISION NC20250088 01/03/2025 NC88**

Z-088

Date: January 3, 2025

General Decision Number: NC20250088 01/03/2025 NC88

Superseded General Decision Numbers: NC20240088

State: North Carolina

Construction Type: HIGHWAY

**COUNTIES**

|          |             |            |
|----------|-------------|------------|
| Alamance | Forsyth     | Randolph   |
| Anson    | Gaston      | Rockingham |
| Cabarrus | Guilford    | Stokes     |
| Chatham  | Mecklenburg | Union      |
| Davie    | Orange      | Yadkin     |
| Durham   | Person      |            |

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

|   |  |
|---|--|
| If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022: | Executive Order 14026 generally applies to the contract.<br><br>The Design-Build Team must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025. |
| If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:         | Executive Order 13658 generally applies to the contract.<br><br>The Design-Build Team must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025. |

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance

of work on the contract does not appear on this wage determination, the Design-Build Team must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

**Modification Number**

0

**Publication Date**

01/03/2025

SUNC2014-003 11/14/2014

|   | <b>Rates</b> | <b>Fringes</b> |
|---|--------------|----------------|
| <b>BLASTER</b>                            | 18.64        |                |
| <b>CARPENTER</b>                          | 13.68 **     | .05            |
| <b>CEMENT MASON / CONCRETE FINISHER</b>   | 13.93 **     |                |
| <b>ELECTRICIAN</b>                        |              |                |
| Electrician                               | 18.79        | 2.72           |
| Telecommunications Technician             | 15.19 **     | 1.25           |
| <b>IRONWORKER</b>                         | 13.30 **     |                |
| <b>LABORER</b>                            |              |                |
| Asphalt Raker and Spreader                | 12.78 **     |                |
| Asphalt Screed / Jackman                  | 14.50 **     |                |
| Carpenter Tender                          | 12.51 **     | .27            |
| Cement Mason / Concrete Finisher Tender   | 11.04 **     |                |
| Common or General                         | 10.40 **     | .01            |
| Guardrail / Fence Installer               | 13.22 **     |                |
| Pipelayer                                 | 12.43 **     |                |
| Traffic Signal / Lighting Installer       | 15.65 **     | .24            |
| <b>PAINTER</b>                            |              |                |
| Bridge                                    | 23.77        |                |
| <b>POWER EQUIPMENT OPERATORS</b>          |              |                |
| Asphalt Broom Tractor                     | 10.00 **     |                |
| Bulldozer Fine                            | 16.13 **     |                |
| Bulldozer Rough                           | 14.36 **     |                |
| Concrete Grinder / Groover                | 17.92        |                |
| Crane Boom Trucks                         | 18.19        |                |
| Crane Other                               | 19.83        |                |
| Crane Rough / All-Terrain                 | 19.10        |                |
| Drill Operator Rock                       | 14.28 **     |                |
| Drill Operator Structure                  | 20.89        |                |
| Excavator Fine                            | 16.95        |                |
| Excavator Rough                           | 13.63 **     |                |
| Grader / Blade Fine                       | 19.84        |                |
| Grader / Blade Rough                      | 15.47 **     |                |
| Loader 2 Cubic Yards or Less              | 13.31 **     |                |
| Loader Greater Than 2 Cubic Yards         | 16.19 **     |                |
| Material Transfer Vehicle (Shuttle Buggy) | 15.44 **     |                |
| Mechanic                                  | 17.51        |                |
| Milling Machine                           | 15.22 **     |                |
| Off-Road Hauler / Water Tanker            | 11.83 **     |                |
| Oiler / Greaser                           | 14.16 **     |                |
| Pavement Marking Equipment                | 12.05 **     |                |
| Paver Asphalt                             | 15.97 **     |                |

|                                   | <b>Rates</b> | <b>Fringes</b> |
|-----------------------------------|--------------|----------------|
| Paver Concrete                    | 18.20        |                |
| Roller Asphalt Breakdown          | 12.79 **     |                |
| Roller Asphalt Finish             | 13.76 **     |                |
| Roller Other                      | 12.08 **     |                |
| Scraper Finish                    | 12.65 **     |                |
| Scraper Rough                     | 11.50 **     |                |
| Slip Form Machine                 | 19.60        |                |
| Tack Truck / Distributor Operator | 14.82 **     |                |
| <b>TRUCK DRIVER</b>               |              |                |
| GVWR of 26,000 Lbs or Less        | 11.45 **     |                |
| GVWR of 26,001 Lbs or Greater     | 13.57 **     | .03            |

**Welders** - Receive rate prescribed for craft performing operation to which welding is incidental.

\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than "SU", "UAVG", "SA", or "SC" denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the



local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The "SU" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

"SU" wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The "SA" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R. 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the "SA" identifier took effect under state law in the state from which the rates were adopted.

**WAGE DETERMINATION APPEALS PROCESS**

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to [davisbaconinfo@dol.gov](mailto:davisbaconinfo@dol.gov) or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to [BCWD-Office@dol.gov](mailto:BCWD-Office@dol.gov) or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via mail to [dba.reconsideration@dol.gov](mailto:dba.reconsideration@dol.gov) or by mail to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

END OF GENERAL DECISION

**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. 1-16-24)

**DIVISION ONE OF STANDARD SPECIFICATIONS**

**Division One of the 2024 NCDOT *Standard Specifications for Roads and Structures (Standard Specifications)* shall apply except as follows:**

**Definitions:** Throughout Division One of the *Standard Specifications*, 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.” Throughout Article 102-2, the term “State Contractual Services Engineer” is replaced with “State Prequalifications Engineer”. 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 / Subarticles 102-3(B), 102-4, 102-8(B), 102-9(C)(2), 103-2(B), and 103-4(B) of the *Standard Specifications* are deleted from Design-Build Contracts.

**Modifications:** The remainder of this Standard Special Provision includes modifications to Division One of the *Standard Specifications*.

**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 *Standard Specifications*.

**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-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 1-13, 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 1-18, 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 1-19, 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 (8) and (9) as follows:**

- (8) 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.

**(9) 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 1-24, 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 1-24, Subarticle 103-4(B), first paragraph, replace the first sentence with the following:**

A Proposer who desires to submit a Price Proposal on more than one project on which Price Proposals are to be opened in the same letting and who desires to avoid receiving an award of more projects than he is equipped to handle, may submit a Price Proposal on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the form Award Limits on Multiple Projects for each project subject to the award limit.

**Page 1-25, 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 1-26, 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 1-26 Article 104-3, replace “plans or details of construction” with “contract” in all instances within this Article.**

**Page 1-34, Article 104-8, add the following Subarticle to the end of this article:**

**(E) Coordination with CPM**

If the Design-Build Team requests additional compensation in accordance with Articles 104-3, 104-7, and this Article, a fragmentary logic diagram (fragnet) shall be prepared and submitted with such request. A fragnet is defined as the sequence of new activities that are proposed to be added to the current schedule to represent the alleged cost and potential time impact(s). The fragnet shall be developed with sufficient detail to clearly depict the alleged change to the current schedule of record.

The Design-Build Team shall prepare the fragnet depicting all activities and costs associated with the request for additional compensation. The fragnet shall identify all predecessor and successor activities, any changes in durations of existing activities and any activities added to or deleted from the current schedule or record as a direct result of the request for additional compensation.

If the request for additional compensation is agreeable to the Engineer, the Engineer will evaluate the provided fragnet within current schedule of record as follows:

- (1) The Design-Build Team shall provide the fragnet, supporting information and narrative describing how the fragnet is incorporated (predecessors and successors) into the schedule referenced below.
- (2) The Design-Build Team shall update the current schedule of record to the anticipated supplemental agreement effective date and provide this schedule to the Engineer for review.
- (3) The Design-Build Team shall provide a separate updated schedule, as defined in item 2 above, with the fragnet inserted.
- (4) The revised Scheduled Completion Date will be evaluated by the Engineer; and

- (5) If the associated time difference in the above Scheduled Completion Dates (items 2 and 3 above) results in a time extension, such extension will be provided within the supplemental agreement, unless modified through compensation for acceleration or other mitigation strategy. If project float is created by the work, it will be encompassed within the modified and updated schedule of record. Both the Design-Build Team and the NCDOT will have access to this float as detailed in Article 108-2 of this Standard Special Provision.

**Page 1-35, 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.

## **SECTION 105 CONTROL OF WORK**

**Pages 1-40, 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 1-41, 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 1-41, 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 1-43, 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 1-49, 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 1-50 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 1-59, replace the first sentence in the 2<sup>nd</sup> paragraph with the following:**

The Design-Build Team shall at its sole cost and expense obtain and furnish to the Department an original standard Association for Cooperative Operations Research and Development (ACORD) certificate of liability insurance evidencing commercial general liability with a limit for bodily injury and property damage in the amount of \$5,000,000 per occurrence and \$5,000,000 general aggregate, covering the Design-Build Team from claims or damages for bodily injury, personal injury, or for property damages that may arise from operating under the contract by the employees and agents of the Design-Build Team.

**Page 1-60, 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 1-63, delete Article 108-2 and replace with the following:**

### **108-2 COST-LOADED CRITICAL PATH METHOD PROJECT SCHEDULE**

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

The Design-Build Team shall create a Cost-Loaded Critical Path Method Project Schedule (CPM Schedule). The Design-Build Team shall include the work of subcontractors, vendors, suppliers, utilities, railroads, permitting agencies, NCDOT, and all other parties associated with the project in the CPM Schedule. Failure by the Design-Build Team to include any element of its work or the work of others required for project completion shall not excuse the Design-Build Team from completing the project by the Contract Completion Date(s). The Design-Build Team shall assign a dollar value to each activity in the CPM Schedule. In accordance with Article 109-4(A) of this Standard Special Provision, the Design-Build Team shall use the CPM Schedule to prepare its payment applications. The Design-Build Team shall provide adequate time in the CPM Schedule for all parties involved with the project to complete their work, including inspections, procurement activities and testing. The Design-Build Team's plan, as presented in the CPM Schedule, shall adhere to all contract requirements.

The Engineer's acceptance of any CPM Schedule shall not relieve the Design-Build Team of responsibility for the accuracy or feasibility of the CPM Schedule, shall not modify the contract requirements, shall not be construed as an endorsement or validation of the Design-Build Team's plan, and shall not guarantee that the project can be performed or completed as scheduled. The Engineer's acceptance of the Design-Build Team's CPM Schedules in no way attests to the validity of the assumptions, logic constraints, dependency, relationships, resource allocations, resource availability, manpower and equipment, or any other aspect of the means and methods of performing the work. The Design-Build Team is and shall remain solely responsible for the scheduling, planning, and execution of the work in order to meet the Project Milestones, the Intermediate Contract Times, and the Contract Completion Date(s).

The Design-Build Team shall not submit a resource leveled CPM Schedule for the purposes of payment, determining expected start and finish dates, or the longest path of the CPM Schedule. Rather, the longest path and expected start and finish dates shall be determined by logic, durations, and calendars.

**Materials** - Unless approved otherwise by the Department, in writing, the Design-Build Team shall produce every schedule referenced in this Article and / or submitted to the Engineer on a computer using software and files that are compatible with the most recent version of Primavera. Other software capable of providing the required information will be considered, but must be reviewed and approved by the Department prior to submitting a schedule produced with the alternate software.

**Definitions** - The following definitions apply solely to the terms used in this Article. The following definitions do not modify in any way the definitions provided elsewhere in the contract documents.

**Activity** - A discrete, identifiable task or event that takes time, has definable start and stop dates, furthers the work's progress, and can be used to plan, schedule, and monitor a project.

**Activity Calendar** - A set of days assigned to an activity on which work associated with the activity may be scheduled.

**Activity Code** - Additional information assigned to an activity for purposes of grouping or filtering related activities. Common codes include phase, area, responsibility, subcontractor, type of work, and sub phase.

**Activity ID** - A unique, alphanumeric, identification code assigned to an activity.

**Actual Dates** - Actual Starts and Actual Finishes of activities in the schedule.

**Actual Finish** - The date when the work represented by a specific activity in the schedule was actually finished.

**Actual Start** - The date when the work represented by a specific activity in the schedule was actually started.

**Activity Network Diagram** - A graphic representation of a CPM Schedule that shows the relationships among activities.

**Availability Date** - The contract Date of Availability provided in the *Contract Time and Liquidated Damages* Project Special Provisions found elsewhere in this FRP.

**Bar Chart** - A graphic representation of a schedule without relationships. A timescale appears along the horizontal axis.

**Baseline Schedule** - The first accepted CPM Schedule showing the accepted plan to complete the entire project.

**CPM of Record** - The most recent CPM Schedule accepted by the Engineer.

**Calendar Day** - A day shown on the calendar beginning and ending at midnight.

**Constraint** - A restriction imposed in a schedule, which fixes a value that would otherwise be calculated within the schedule. Examples of values that can be fixed by a constraint include float, start date, end date, and completion date.

**Contract Time** - The number of calendar days inclusive between the Availability Date and the Contract Completion Date(s).

**Contract Value** - The Design-Build Team's lump sum bid for the entire project and any additional dollar value added through Supplemental Agreement(s).

**Controlling Activity** - The first incomplete activity on the Critical Path. This term shall be considered synonymous with "Controlling Operation."

**Critical Delay** - A delay to an activity on the critical path that extends the Scheduled Completion Date(s).

**Critical Path** - The longest path of activities that determines the scheduled project completion date(s). Activities on the critical path are critical activities.

**Data Date** - The earliest possible date identified in a schedule from which remaining activities can proceed.

**Early Finish** - The earliest date an activity can finish based on its duration and its predecessors.

**Early Start** - The earliest date an activity can start based on its predecessors.

**Final Schedule** - The last monthly updated CPM Schedule containing actual start and finish dates for every activity.

**Free Float** - The amount of time an activity can be delayed without delaying the early state date of any successor activity.

**Lag** - An offset of time from the predecessor to the successor. Lag shall be a numerical value that is not assigned a description or activity number.

**Late Finish** - The latest date an activity can finish based on its successors without causing a delay to the Scheduled Completion Date(s) of the project.

**Late Start** - The latest date an activity can start based on its successors and duration without causing a delay to the Scheduled Completion Date(s) of the project.

**Logic** - Plural or singular reference to the predecessor and successor relationships between activities in the schedule.

**Milestone** - An activity with no duration that is typically used to represent the beginning or end of the project or an interim phase. Includes, but is not limited to, Intermediate Completion Dates and the Contract Completion Date(s).

**Open End** - The condition that exists when an activity has either no predecessor or no successor, or when an activity's only predecessor relationship is a finish-to-finish or only successor relationship is a start-to-start.

**Original Duration** - The original estimate of time, expressed in workdays, required to perform an activity.

**Preceding Work** - Work that must be performed prior to work being performed on the same project by other contractors or Design-Build Teams and under separate contract with the NCDOT.

**Predecessor** - An activity that is defined by schedule logic to precede another activity.

**Progress Schedule** - A CPM Schedule produced by incorporating the project's actual progress into the CPM of Record for purposes of reviewing payment applications prior to any major schedule revisions.

**Punch Work** - Minor corrective work typically performed at the end of construction that is necessary to bring the project into full compliance with the contract requirements.

**Relationship** - Interdependence between two activities. Relationships link an activity to predecessors and successors.

**Remaining Duration** - The estimated time, expressed in workdays, required to complete an activity.

**Revised Schedule** - A Progress Schedule with Schedule Revisions.

**Scheduled Completion Date(s)** - The completion date(s) forecast by the CPM Schedule. The CPM Schedule may also forecast Intermediate Completion Dates for Milestones, Phases, or other portions of the project.

**Schedule Representative** – An individual with CPM scheduling experience on projects of similar size, scope, complexity and having a thorough understanding of the Contract, plans, and associated project phasing and milestones. **Schedule Revision(s)** - A change in calendars, along with adding / deleting activities, the method of calculation, relationships, sequence, or original duration of activities in the schedule; or a change in the remaining duration of a work activity that is not caused by the actual progress of the activity. Revisions can be considered either Major or Minor as noted in Section F below.

**Schedule Update** - A CPM Schedule produced by the Design-Build Team and provided to the Engineer on regular intervals, not to exceed once per 35-days by incorporating the project's actual progress into the CPM of Record prior to any major schedule revisions.

**Successor** - An activity that is defined by schedule logic to succeed another activity.

**Total Float** - The amount of time an activity can be delayed without affecting the project's completion date(s) or an intermediate deadline (constraint); it is the difference between the late finish date and the early finish date.

#### **(B) Design-Build Team's Schedule Representative**

The Design-Build Team shall propose to the Engineer a person to serve as the Schedule Representative responsible for developing, updating and revising the Design-Build Team's CPM Schedule. The Design-Build Team shall propose a Schedule Representative with scheduling experience on projects of similar size, scope and complexity. The Schedule Representative shall have a thorough understanding of project phasing and milestones, as well as the project's budget / invoicing. The Schedule Representative may also serve as the project manager, so long as all the requirements of this Article can still be met. The proposed Schedule Representative's qualifications shall be submitted with the Technical Proposals for evaluation. The Engineer may reject a Schedule Representative that does not meet the minimum requirements of this Article. In such case, the Design-Team must designate another individual meeting the minimum requirements for a Schedule Representative prior to acceptance of the first CPM Schedule.

The Design-Build Team shall use the same Schedule Representative for the duration of the project unless submitted and approved by the Department in writing. If the accepted Schedule Representative is no longer assigned to the project, the Design-Build Team shall submit a new Schedule Representative for the Engineer's review within 14 days of receiving notice of the Schedule Representative's departure.

**(C) Interim Schedule**

The Design-Build Team may submit electronically to the Engineer an Interim Cost-Loaded Critical Path Method Project Schedule (Interim Schedule). The Interim Schedule shall be submitted electronically within 14 days of contract execution. The Interim Schedule shall be used to monitor the project progress and process the Design-Build Team's payment applications for up to 120 days. The use of an Interim Schedule is optional.

The Interim Schedule shall meet the following requirements:

- (1) The Interim Schedule shall start with an activity identified as "Availability Date."
- (2) The last activity in the Interim Schedule shall be identified as "Project Completion." The Design-Build Team shall plan the other activities in the schedule so that the late finish date of "Project Completion" is calculated to occur on the Contract Completion Date.
- (3) The Design-Build Team shall identify all major work components in the Interim Schedule as activities. For the Interim Schedule, the Design-Build Team may present large work components, such as "construction of the project," as a single activity in the schedule, so long as the Interim Schedule meets the other requirements of this Article.

The Design-Build Team shall identify the following for each activity in the Interim Schedule.

- (a) A unique alphanumeric activity ID
- (b) A description of the work associated with each activity ID
- (c) A duration
  - (i) The Design-Build Team shall limit activities expected to start in the first 120 days to a maximum duration of 20 workdays. The Design-Build Team shall subdivide activities expected to take longer than 20 days so as to provide more detail and to meet this requirement. Any duration provided by the Department, utilities, or other government agencies will be exempt from this requirement.
  - (ii) The Design-Build Team may assign any realistic durations for activities expected to start more than 120 days after the Availability Date.
- (d) Predecessors
- (e) Successors
- (f) Value of the Work
  - (i) The Design-Build Team shall assign an accurate dollar value to each activity expected to start within 120 days of the Availability Date based on estimated costs plus associated profit and overhead. The profit and overhead assigned by the Design-Build Team to the individual activities starting in the first 120 days shall be equal to or less than the mark-up applied to the work when establishing the Design-Build Team's lump sum bid for the entire project.
  - (ii) The Design-Build Team shall limit the value of an activity to \$500,000 for activities expected to start in the first 120 days. The Design-Build Team shall

subdivide activities starting in the first 120 days and with anticipated values over \$500,000 into two or more activities to meet this requirement. Mobilization, design activities and material procurement activities are except from this \$500,000 requirement.

- (iii) The Design-Build Team shall assign a dollar value to each activity in the Interim Schedule.
  - (iv) Activities may be assigned a value of zero dollars, as appropriate.
  - (v) The total value of all activities in the Interim Schedule shall be equal to the Design-Build Team's lump sum bid for the entire project.
  - (vi) Any activities that are incidental shall have a value of zero dollars.
- (4) The Design-Build Team shall assign each activity in the Interim Schedule at least one predecessor and one successor, except the first activity and the last activity in the schedule.
- (5) The Design-Build Team shall use scheduling software that adheres to the requirements found elsewhere in this Article to calculate the following data for each activity in the Interim Schedule:
- (a) Early Start
  - (b) Early Finish
  - (c) Late Start
  - (d) Late Finish
  - (e) Total Float
- (6) The Design-Build Team shall submit a brief written narrative with the Interim Schedule that explains the planned sequence of work, the critical path, proposed project phasing, and any other scheduling assumptions made by the Design-Build Team.

The Engineer may choose to reject the Interim Schedule if it does not conform to the requirements of this Article. If the Engineer rejects the Interim Schedule, the project shall be administered as if no Interim Schedule has been submitted.

#### **(D) Baseline Cost-Loaded Critical Path Method Schedule**

Within 60 days of contract execution, the Design-Build Team shall submit electronically to the Engineer a Baseline Cost-Loaded Critical Path Method Project Schedule (Baseline Schedule) meeting the requirements of this Article and using industry-accepted CPM scheduling practices as identified in the AGC's Construction Planning and Scheduling book, Second Edition. Within 21 days of receipt of the Design-Build Team's Baseline Schedule, the Engineer will complete the review. If the Engineer decides it is warranted, the Engineer will convene a joint review conference at which the Engineer and the Design-Build Team shall make any necessary corrections or adjustments to the Baseline Schedule. If a revision is necessary either from the Engineer's Review or the joint review conference, the Design-Build Team shall submit a revised Baseline Schedule electronically within seven days of such joint review conference and the Engineer will review the revised Baseline Schedule within seven days of re-submittal. The Design-Build Team and the Engineer shall repeat this process until an acceptable Baseline Schedule is established.

Once accepted, the Baseline Schedule becomes the first CPM of Record for the project. If an Interim Schedule was submitted and accepted by the Engineer, the accepted Baseline Schedule replaces the Interim Schedule for all purposes, including payment.

The Design-Build Team shall submit a Baseline Schedule that meets the following requirements.

- (1) The first activity in the schedule shall be the "Availability Date." The Design-Build Team shall constrain this activity to start on the contract Date of Availability identified elsewhere in this RFP. Except as indicated otherwise elsewhere in this Article or agreed in writing by the Engineer, the Design-Build Team shall not use constraints.
- (2) If the Design-Build Team proposes a Substantial Completion Date in the Technical Proposal, the schedule shall include an activity identified as Substantial Completion.
- (3) The Last Activity in the Schedule shall be identified as "Project Completion." The Design-Build Team shall plan the other activities in the schedule so that the expected finish of "Project Completion" is calculated to occur on the Contract Completion Date.
- (4) The Design-Build Team shall plan its work to meet all time-related contract requirements. This includes but is not limited to submittal review times, Milestones, Intermediate Contract Times, phasing requirements, and the date of Substantial Completion, as appropriate.
- (5) The Design-Build Team shall identify all the components of the work and the work of others on the project as activities in the Baseline Schedule. If the Engineer cannot identify a work item as an activity or as part of an activity in the schedule, then that work item shall be considered incidental.
- (6) The Design-Build Team shall designate the following for each activity in the Baseline Schedule, including:
  - (a) A unique alpha numeric activity ID
  - (b) A description of the work associated with each activity ID
  - (c) A duration
    - (i) Unless approved otherwise by the Engineer, the Design-Build Team shall limit construction activities to a maximum duration of 20 workdays. The Design-Build Team shall subdivide activities expected to take longer than 20 days so as to provide more detail and to meet this requirement. If for any reason the maximum 20-day duration cannot be achieved, the Design-Build Team shall provide a written request to the Engineer, explaining the reason for a duration over 20 workdays. Any duration provided by the Department, utilities, or other government agencies shall be exempt from this requirement. Waiting times for plant growth cure times, material procurement, and other activities assigned a zero-dollar value and no assignment of responsibility are also exempt from this requirement.
    - (ii) The Design-Build Team shall limit design activities to the required design submittal intervals or a maximum of 90 days, whichever is shorter. The



Design-Build Team shall subdivide activities expected to take longer so as to provide more detail.

- (iii) All activities with a dollar value greater than zero shall have a duration assigned to it, even if the duration is equal to zero.
- (d) Predecessors - Each activity except for “Availability Date” shall have at least one predecessor.
- (e) Successors - Each activity except for “Final Completion” shall have at least one successor.
- (f) Activity Calendar - The Activity Calendar shall clearly identify the days when work could be performed on the activity and the days when work cannot be performed on the activity, in addition to the number of hours per day for a given work week. Weather days shall be included as non-workdays in specific work type calendars. Weather calendars shall be agreed to by the Engineer. Weather shall not be accounted for in activity durations.
- (g) Activity Code - Each activity in the schedule shall be assigned an activity code for the following categories:
  - (i) Area of the Project
  - (ii) Structure within the Area of the Project
  - (iii) Phase of the Project
  - (iv) Work Type
  - (v) Responsibility for the Work
    - The Design-Build Team shall identify the entity responsible to perform each activity in the Baseline Schedule. Examples might include a particular subcontractor, the Department, the Design-Build Team, a design consultant, a utility company, etc.
    - If more than one entity is performing a particular activity, then the activity code shall identify both entities.
    - When the Baseline Schedule is submitted, the Design-Build Team shall provide a list to the Engineer of each activity code that assigns responsibility to entities that are not under the control of the Design-Build Team.
- (vi) Categories and Groupings
  - The Design-Build Team shall assign different categories for items in separate Divisions within the *Standard Specifications* and at least one type of work shall be classified as punch work.
  - The Design-Build Team shall choose a method of identifying the type of work that shall clearly communicate to the Engineer the nature of the work being performed.

## (h) Value of the Work

- (i) The Design-Build Team shall assign an accurate dollar value to each activity based on a reasonable assignment of the value of that work when compared to the overall work being performed on the project.
- (ii) The Design-Build Team shall not assign a dollar value to an activity less than the estimated cost to perform that work.
- (iii) The Design-Build Team shall not assign a dollar value to the work being performed by the Department or other third parties.
- (iv) Activities scheduled to occur early in the project shall be assigned the same or lesser value than similar activities scheduled to occur later in the project, unless otherwise approved by the Department, in writing.
- (v) The Design-Build Team shall limit the value of an activity to \$500,000. The Design-Build Team shall subdivide activities with anticipated values over \$500,000 into two or more activities to meet this requirement. Mobilization, some design activities, and materials procurement activities are exempt from this \$500,000 requirement.
- (vi) The Design-Build Team shall assign activities in the schedule representing tasks incidental to the performance of the work a value of zero dollars.
- (vii) Activities may be assigned a value of zero dollars when appropriate. Examples include the work of others, or tasks performed by subcontractors for which the contractor has no cost.
- (viii) Each Activity in the Baseline Schedule shall be cost loaded so that the sum of the budgeted total costs for each activity equals to the Contract Value. The budgeted total costs for each activity shall not change once the Baseline Schedule is approved as the first CPM of Record, unless authorized in writing by the Engineer.
- (ix) Any work performed that is not identified in the schedule shall have a value of zero dollars.
- (x) Any activities that are incidental shall have a value of zero dollars.
- (xi) The Design-Build Team shall be limited to the total percentage and distribution percentages defined in the *Mobilization* Project Special Provision found elsewhere in this RFP for mobilization. The Design-Build Team shall assign costs that correspond to the aforementioned percentages to “Mobilization, Pre-Permit” and “Mobilization, Post-Permit” activities.
- (xii) The Design-Build Team shall assign activities to both erosion and sedimentation control device installation and device maintenance. The activity for erosion and sedimentation control device maintenance shall span the duration of the project construction and shall be cost-loaded in a linear manner.
- (xiii) The Design-Build Team shall assign at least one-half of one percent of the lump sum bid for the entire project to the activity or activities representing punch work.
- (xiv) All costs assigned to activities shall be evaluated on a linear basis with regard to payment unless a payment curve is provided and approved. Such curves

shall be agreed to in the Baseline Schedule and shall not change unless authorized in writing by the Engineer.

- (7) The Design-Build Team shall assign each activity in the Baseline Schedule at least one predecessor and one successor, except the first activity, "Availability Date," and the last activity, "Project Completion."
- (8) The Design-Build Team shall not use start-to-finish relationships to connect predecessor and successor activities.
- (9) The Design-Build Team shall limit the use of start-to-start and finish-to-finish relationships to connect predecessor and successor activities. The Schedule Representative shall explain to the Engineer why a start-to-start or finish-to-finish relationship was used upon the Engineer's request.
- (10) The Design-Build Team shall produce a Baseline Schedule that does not contain open-ended activities, except for the first and last activity in the schedule.
- (11) The Design-Build Team shall not use negative lags in the Baseline Schedule. The Design-Build Team shall limit the use of lags in the Baseline Schedule, and shall not use a lag greater than ten days unless approved otherwise by the Engineer. If for any reason the maximum ten-day lag cannot be achieved, the Design-Build Team shall provide a written request to the Engineer, explaining the reason for a duration over ten days. The Schedule Representative shall explain why a lag was used in the narrative.
- (12) The Design-Build Team shall use scheduling software that adheres to the requirements found elsewhere in this Article to calculate the following data for each activity in the Baseline Schedule:
  - (a) Early Start
  - (b) Early Finish
  - (c) Late Start
  - (d) Late Finish
  - (e) Total Float
  - (f) Free Float
- (13) The longest path shall be dictated by schedule logic and durations, not by the leveling of resources or cost information.
- (14) The Design-Build Team shall submit a written narrative with the Baseline Schedule that explains the planned work sequence, the critical path, proposed project phasing, the activity calendars, maintenance of traffic, milestone dates, and the estimated payouts by month and by phase. In addition, the Design-Build Team shall explain in its written narrative how it has provided for procurement of materials, weather, permitting requirements, environmental requirements, coordination with other contractors, coordination with local municipalities, work to be performed in whole or in part by Department or other government agencies, work to be performed by the utility companies, and any other scheduling assumptions made by the Design-Build Team.

The Engineer will review the Baseline Schedule submitted by the Design-Build Team for compliance with the contract requirements. The Engineer may reject the Baseline Schedule if it does not adhere to the contract requirements or if it makes unreasonable demands on the

Department or third parties on the project without their written acknowledgement or agreement to such demands or requirements. Examples of unreasonable demands might include, but is not limited to, the simultaneous review of numerous submittals, short durations for utilities to perform work, shutting down adjacent roadways, or limiting access to private land owners. The Engineer may reject a schedule that over-utilizes start-to-start and finish-to-finish relationships to connect predecessor and successor activities if, in the opinion of the Engineer, the use of these logic relationships obscures the relationships between activities. The Engineer may reject a schedule that over-utilizes lags, if in the opinion of the Engineer, lags are being used to replace necessary activities or obscuring how one activity relates to the next.

The Engineer will also review the values assigned to the activities for balance. The Engineer may reject the Baseline Schedule if, in the opinion of the Engineer, the values assigned to activities expected to be completed early in the project exceed the value assigned to the same or similar activities expected to finish late in the project, without explanation.

The Design-Build Team shall be responsible for the timely preparation of a Baseline Schedule that fully complies with the requirements of this Article and the contract. The Engineer may take action under Articles 108-7 of the *Standard Specifications* if the Design-Build Team has not prepared an acceptable Baseline Schedule within 180 days from the Availability Date.

#### **(E) Schedule Updates**

As the basis of its payment application request and as a requirement of this Article, the Design-Build Team shall submit electronically to the Engineer a regular Schedule Update to the CPM of Record using accepted scheduling practices. The Engineer will determine the frequency and date of the Schedule Updates - not to exceed two updates per month and to occur at least once within any 35-day period. The Design-Build Team shall continue to provide the Engineer Schedule Updates until the final schedule is approved with 100% completion of all activities and all the project work. The Design-Build Team shall submit a Schedule Update within seven calendar days of its data date. The Engineer shall review the payment application and provide a response to the Design-Build Team within seven calendar days of the submission. Upon the Engineer's acceptance, the Schedule Update shall become the new CPM of Record, replacing the previous CPM of Record, and shall be considered used from its data date until the data date of the next schedule accepted by the Engineer.

The Design-Build Team shall incorporate the following information into the previous CPM of Record and submit this as its Schedule Update:

- (1) An updated data date
- (2) The actual start of any activity that started prior to the data date of the Schedule Update
- (3) The actual finish of any activity that finished prior to the data date of the Schedule Update

- (4) The new remaining duration of any activity that began, but did not finish prior to the data date of the Schedule Update
- (5) The percent complete for every activity in the CPM Schedule - The Design-Build Team shall use both activity percent complete and resource percent complete for activities representing the purchase of materials, and shall identify the resource percent complete of activities representing the purchase of materials for undelivered; delivered or fabricated; or installed material as 0%, 95% or 100% complete, respectively.
- (6) The Design-Build Team shall use scheduling software that adheres to the requirements found elsewhere in this Article to calculate the following data for each of the remaining activities in the Schedule Update:
  - (a) Early Start
  - (b) Early Finish
  - (c) Late Start
  - (d) Late Finish
  - (e) Total Float
  - (f) Free Float

The Design-Build Team shall provide a narrative as part of the Schedule Update, in addition to any of the other requirements identified in Article 109-4(A) of this Standard Special Provision for partial payment requests. The Design-Build Team shall include in the Schedule Update narrative a description of the work performed during the update period; the status of any outstanding permits; the current critical path; any delays or disruptions experienced during the update period to Intermediate Contract Dates, Substantial Completion Date, and / or Final Completion Date; any foreseeable delays or disruptions; and any "Minor Revisions" made during the update period that have previously been accepted by the Engineer. A discussion of delays in the Schedule Update's narrative shall not constitute a written request for additional time or notice of intent to file a claim as required by the contract.

The Design-Build Team shall not incorporate any revisions into a Schedule Update unless the revisions are minor and have been previously accepted by the Engineer. The Schedule Update narrative shall include documentation of any revisions previously verbally approved by the Engineer.

If the Design-Build Team chooses to revise the CPM of Record, the revised schedule shall be submitted separately from and within seven calendar days of the Schedule Update. The revised CPM of Record shall have the same data date as the most recent CPM of Record and reflect the progress achieved up to that point in time.

The Engineer may reject a Schedule Update that 1) incorporates "Major Revisions" that were not previously accepted by the Engineer, 2) includes actual dates on or after the data date, and / or 3) records incomplete or incorrect information on the work progress.

#### **(F) Revisions to the CPM of Record**

In accordance with the requirements in this Article, the Design-Build Team shall revise the CPM of Record. With prior approval from the Engineer, the Design-Build Team may revise the CPM of Record for other circumstances.

A minor revision shall be defined as a revision that does not affect the critical path of the work on the project, does not affect work activities that may soon become critical, does not significantly affect third parties, does not significantly affect the Department, and / or does not increase or lower the dollar values assigned to the activities in the schedule. For minor revisions, the Schedule Representative shall contact the Engineer and explain the revision. If the Engineer determines that the revision is minor, the Engineer will verbally approve the revision. The Design-Build Team shall incorporate revisions verbally approved by the Engineer into the next Schedule Update, and include a summary of the changes, the approver's name and the approval date in the narrative. The Engineer's determination as to whether a revision is minor or major shall be final.

All revisions that are not minor revisions shall be defined as major revisions. For major revisions, the Design-Build Team shall submit to the Engineer a revised CPM Schedule that meets all the requirements of the Baseline Schedule and is updated to reflect current progress. The Design-Build Team shall submit all revised CPM Schedules within seven days of its data date unless otherwise agreed by the Engineer, in writing. The Design-Build Team shall include a narrative with the revised CPM Schedule describing each revision and the reason for each revision. Every revision that was made to the revised CPM Schedule shall be listed in the narrative. The Design-Build Team shall also include in the narrative any foreseeable problems that may need to be overcome when implementing the CPM Schedule revision. A discussion of delays and potential delays in the revised CPM Schedule narrative shall not constitute a written request for additional time or satisfy any requirement for written notice to file a claim as required by the contract.

If the Design-Build Team is re-allocating the dollar values assigned to activities, it shall include for the Engineer's review and approval a list of the activities affected by the revision, a list of any new activities added or deleted, and the difference in dollar value assigned to each activity. For changed work where the dollar value is disputed, the Design-Build Team shall assign dollar values to its work activities as directed by the Engineer, but shall include the designation "D-C" at the beginning of the activity's description for each activity affected by the change. For changes settled through a Supplemental Agreement, the Design-Build Team shall assign the agreed dollar amount among the new or existing activities, and shall include the designation SA# (where # represents the number of the Supplemental Agreement) at the beginning of the activity's description for each activity affected by the change.

Within seven calendar days of submittal, the Engineer shall accept or reject proposed CPM Schedule revision(s). Upon the Engineer's acceptance, the revised CPM Schedule shall become the CPM of Record, and shall be used from its data date until the data date of the next CPM Schedule revision accepted by the Engineer.

The Department will not pay additional costs for any revisions to the CPM Schedule regardless of what condition or change prompted the revision(s). The cost to create, revise, and update the CPM Schedule shall be an administrative requirement included as part of the Design-Build Team's lump sum bid for the entire project. The Design-Build Team shall allocate sufficient resources to timely administer the CPM Schedule, including but not limited to all revisions, as required.

The Engineer will accept CPM Schedule revisions that appear to accurately reflect the Design-Build Team's current plan for completing the work on the project. The Engineer may accept a revised CPM Schedule that indicates the project is currently expected to finish earlier or later than required by the contract. However, the Engineer's acceptance of the Design-Build Teams' schedules does not relieve the Design-Build Team from its obligations to perform under the contract terms including but not limited to completion of the work within the contract time; or as granting, rejecting, or in any way acting on the Design-Build Team's requests for adjustment to the date(s) for completion of the work.

The Engineer may reject any CPM Schedule revision that 1) does not, in the opinion of the Engineer, accurately reflect the Design-Build Team's current plan of construction; 2) requires additional and / or revised actions on the part of third parties or the Department; 3) changes the dollar value assigned to an activity, unless the Design-Build Team has correctly allocated this amount into new activities for additional detail; 4) materially alters the projected payout of the project; and / or 5) submitted more than seven calendar days after its data date, unless the Engineer had previously agreed to waive this requirement.

#### **(G) Use of the CPM of Record to Assess Project Delays**

If the Design-Build Team submits a written request for an extension to the contract time in accordance with Article 108-10 of this Standard Special Provision, the Engineer will rely upon the CPM of Record in effect at the time the delay is recognized or occurs, whichever is sooner, to assess the effects of changes and revisions or other potential causes of delay to the Scheduled Completion Date(s).

For purposes of calculating and withholding anticipated liquidated damages, as identified in the *Standard Specifications*, and as may be amended by this Standard Special Provision, the Engineer will rely on the Scheduled Completion Date(s) identified in the CPM of Record.

**Page 1-64, 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 a Monitoring Spreadsheet for the DBE Open-Ended Performance Plan (OEPP) within thirty (30) days of construction.

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 1-64, 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 1-65, Article 108-6, replace “40%” with “30%” in the 1<sup>st</sup> paragraph.**

**Page 1-66, Article 108-6, replace “35%” with “25%” in the 2<sup>nd</sup> paragraph.**

**Pages 1-67, 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.

**\*\*NOTE\*\*** Deleted Subarticle 108-10(B)

**Page 1-69, delete Article 108-10 and replace with the following:**

## **108-10 CONTRACT TIME AND INTERMEDIATE CONTRACT TIME**

### **(A) General**

The contract time will be as defined in Section 101. No extensions to the completion date will be authorized except as allowed by this Article. No modifications in the date of availability will be made for any reason whatsoever.

Intermediate contract time, as defined in Section 101, will be that as allowed in the contract to complete a part, portion or phase of the total work covered in the contract. Intermediate completion dates and intermediate completion times set forth in the contract may be extended on the same basis as completion dates and as described in this Article.

When the liquidated damages stipulated in the contract are to be on an hourly basis, extensions, as described in this Article, will be considered on an hourly basis.

The Engineer will rely upon the CPM of Record in effect at the time the delay is recognized or occurs, whichever is earlier, to assess the effects of changes and revisions or other potential causes of delay to the scheduled completion date(s)

The Engineer will use the CPM of Record and the following guidelines to assess delays to the project:

- 1) The controlling operation of the work shall be the first activity on the critical path of the CPM of Record.
- 2) The Engineer will not grant a time extension for delays that result from schedule revisions of any sort, unless the revisions are necessary to mitigate unforeseeable and otherwise excusable delay, are required to incorporate changes to the work agreed to by the Engineer, or the revisions are expressly requested by the Engineer.
- 3) The Design-Build Team shall create the CPM of Record and shall be responsible for the accuracy and reliability of the CPM of Record. The Engineer will not grant a time extension for delays that result from improper planning, incorrect sequences, scheduling errors, scheduling omissions, missing work portions in the CPM of Record, or any other cause related to the Design-Build Team's failure to properly manage and / or schedule the work or the work of others. The Engineer will not consider a request for additional time from the Design-Build Team that relies on the assumption that the CPM of Record is inaccurate or erroneous.
- 4) When there are two or more causes for a critical delay, or in the case that two paths or activities are concurrently critical, the Engineer will only grant a time extension if all the

causes for the critical delay are determined to be excusable per 108-10(B), in the Department's sole discretion.

- 5) The critical path is dynamic. The Engineer will assess the critical path on each day of an alleged delay. Only delays to the critical path will be eligible for consideration of a time extension.
- 6) The Engineer will use the CPM of Record in effect at the time of the delay to assess project delays after the occurrence. The Engineer will not use rejected schedules, later approved schedules, or new schedules, including "impacted" or "collapsed schedules,"
- 7) Float belongs to the project and shall be shared between the Design-Build Team and the Department on a first-come, first-served basis until it is depleted. Float shall not be for the exclusive use or benefit of either the NCDOT or the Design-Build Team.

**(A) Completion Date, Substantial Completion Date, Intermediate Completion Date and Intermediate Completion Time Extensions**

Only delays to activities which affect the completion date(s), Substantial Completion Date, intermediate contract date(s) and / or intermediate completion time(s) shall be considered for an extension of contract time. No extensions will be granted until a delay occurs which impacts the project's critical path, consumes all available float, and / or extends the work beyond the contract completion date(s), intermediate completion date(s), and / or intermediate completion time(s). Any extension to the completion date(s), intermediate completion date(s), and / or intermediate completion time(s) will be based on the number of calendar days the contract completion date(s), intermediate completion date(s), and / or intermediate completion time(s) is impacted as determined by the Engineer's analysis. No extension of the contract completion date(s), intermediate completion date(s), and / or intermediate completion time(s) will be allowed for any reason except as provided for below:

- 1) If the Design-Build Team's current controlling operation(s) are delayed by circumstances originating from work required under the contract and beyond the Design-Build Team's control, and without the Design-Build Team's fault or negligence, the Design-Build Team may, at any time prior to payment of the final estimate, make a written request to the Engineer for an extension of the contract completion date(s), intermediate completion date(s), and / or intermediated completion time(s). This request shall include the following:
  - a) The circumstances resulting in the alleged delay and documentation of said circumstances as may be required by the Engineer
  - b) The controlling operation(s) alleged to have been delayed
  - c) The calendar dates or calendar dates and times on which the controlling operation(s) were delayed
  - d) The number of calendar days or hours by which the Design-Build Team is requesting the contract completion date(s), intermediate completion date(s) and / or intermediate completion time(s) to be extended

If the Engineer determines that the controlling operation(s) were delayed because of circumstances beyond the control of, and without the Design-Build Team's fault or negligence, and that the Design-Build Team has pursued the work in accordance with Article 108-1 of the *Standard Specifications*, the Engineer may extend the contract completion date(s), intermediate completion date(s), and / or the intermediated completion time(s), unless otherwise precluded by other contract provisions.

The Engineer will consider an extension in the completion date(s), Substantial Completion Date, intermediate completion date(s), and / or intermediate completion time(s) involving an intermediate contract time of more than 96 hours if the Design-Build Team's current controlling operation(s) is delayed in excess of 40 percent of the total contract time (days), as defined in Section 101 of the *Standard Specification*, or the total intermediate contract time (hours), as defined in Section 101 of the *Standard Specification*; due to weather or conditions resulting from weather. Only the delay time in excess of this percentage shall be considered for an extension. No other consideration will be given for extensions in the completion date(s), intermediate completion date(s), and / or intermediate completion time(s) due to delays caused by weather.

Where the intermediate contract time is 96 hours or less, no consideration whatsoever will be given for an extension in the intermediate contract time due to weather or conditions resulting from weather.

- 2) If the Engineer ordered changes in the work from that originally contemplated in the contract and those changes result in a reduction in quantities, elimination of items, additional work and / or extra work the Engineer will allow an extension in the contract completion date(s), Substantial Completion Date, intermediate completion date(s), and / or intermediate completion time(s) as the Engineer may deem warranted by such changes. Pursuit of the work with adequate forces and equipment and efficiency of the Design-Build Team's operations will be considered by the Engineer in determining an extension in the contract completion date(s), Substantial Completion Date, intermediate completion date(s), and / or intermediate completion time(s). It shall be, however, the Design-Build Team's responsibility to show just cause for an extension in the contract completion date(s), Substantial Completion Date, intermediate completion date(s), and / or intermediate completion time(s) due to the aforesaid conditions.

The Design-Build Team's plea that insufficient contract time (days), intermediate contract time (days), and / or intermediate contract time (hours) was specified in the contract shall not be considered as a valid reason for an extension in the completion date, Substantial Completion Date, intermediate completion date, and / or intermediate completion time.

When all work on the project is totally complete, with the exception of an item or items on which work is precluded by seasonal limitations set forth in the contract, the Engineer may, provided that the Design-Build Team has diligently pursued the work with adequate forces and equipment, waive the assessment of liquidated damages during the period of time from the date all work other than an item(s) precluded by seasonal limitations was completed until the seasonal limitations expiration date. The Design-Build Team shall make the request to waive the

assessment of liquidated damages in writing prior to the requested waiver beginning date. The non-assessment of liquidated damages during the aforesaid period shall not operate to waive any other liquidated damages that may be assessable or any other contract terms.

**Page 1-74, delete Subarticle 108-13(D)(2) in its entirety.**

## **SECTION 109 MEASUREMENT AND PAYMENT**

**Page 1-75, 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 1-80, delete Subarticle 109-4(A) and replace with the following:**

### **109-4            PARTIAL PAYMENTS**

#### **(A)    General**

Partial payments will be based upon the Engineer's review of the Design-Build Team's payment requests. The Design-Build Team will prepare a payment request at least once each month on the date established by the Engineer. Partial payments may be made twice each month if in the judgement 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, excluding mobilization, 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.

The Design-Build Team shall use the most recent CPM of Record to estimate the value of the work performed and will submit this estimate as its payment request to the Engineer. The Design-Build Team shall submit the estimate of the value of Work performed and the Progressed CPM Schedule for each partial payment request.

Failure to submit either part of the partial payment request will result in the Engineer withholding payment. With each payment request, the Design-Build Team shall certify that it has reviewed the Cost-Loaded CPM, that the payment request presents an accurate assessment of the level of completion of each work activity for which payment is being sought, and that the dollar value assigned to each work activity is reasonable and consistent with the dollar values assigned to all other work activities. The Engineer will only accept payment requests that have been certified by the Design-Build Team.

The Design-Build Team will maintain and update the Cost-Loaded CPM as further described in Article 108-2 of this Special Provision.

If an Interim Schedule was submitted in accordance with Article 108-2 of this Standard Special Provision and this Schedule was accepted by the Engineer, the Design-Build Team may estimate the value of the work performed using the Interim Schedule for the first 120 days after the Notice of Proceed. After 120 days, the Engineer will not process partial payment requests until the Design-Build Team develops a Baseline Cost-Loaded CPM and the Engineer accepts this schedule.

If the Design Build Team did not submit an Interim Schedule acceptable to the Engineer, The Department will issue payments for the mobilization costs (reference Article 800-2 of the Standard Specifications and the Project Special Provision, Mobilization), but will not otherwise process partial payment requests until the Design-Build Team submits an Baseline Cost-Loaded CPM and this CPM is accepted by the Engineer. The Design-Build Team's failure to develop an acceptable, Baseline Cost-Loaded CPM may result in the Engineer withholding payment.

Interest will not be paid to the Design-Build Team on payments that are withheld in accordance with the requirements of this Special Provision or any other provision of the contract. The Design-Build Team is not entitled to payment, damages, or any other form of compensation due to the withholding of partial payments in accordance with the requirements of this Special Provision or any other provision of the contract.

The Engineer will withhold an amount sufficient to cover anticipated liquidated damages as determined by the Engineer.

**Page 1-81, 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 1-83, Article 109-10, add the following as bullets (E), (F) and (G) under the 1<sup>st</sup> paragraph.**

- (E) As-Built Plans
- (F) All documents required elsewhere in this RFP
- (G) Documents or guarantees to support any warranty provided by the Design Build Team

County: GASTON

| Line #         | Item Number  | Sec # | Description  | Quantity      | Unit Cost | Amount |
|----------------|--------------|-------|--|---------------|-----------|--------|
| CONTRACT ITEMS |              |       |  |               |           |        |
| 0001           | 0000900000-N | SP    | GENERIC MISCELLANEOUS ITEM<br>DESIGN AND CONSTRUCTION I-5719B            | Lump Sum      | L.S.      |        |
| 0002           | 0000900000-N | SP    | GENERIC MISCELLANEOUS ITEM<br>DESIGN AND CONSTRUCTION U-5800             | Lump Sum      | L.S.      |        |
| 0003           | 8280000000-E | 440   | APPROX ..... LBS STRUCTURAL<br>STEEL                                     | 154,000<br>LS |           |        |
| 0004           | 8296000000-N | 442   | POLLUTION CONTROL  | Lump Sum      | L.S.      |        |
| 0005           | 8559000000-E | SP    | CLASS II, SURFACE PREPARATION  | 145.3<br>SY   |           |        |
| 0006           | 8566000000-E | SP    | CLASS III, SURFACE PREPARATION   | 1<br>SY       |           |        |
| 0007           | 8657000000-N | 430   | ELASTOMERIC BEARINGS   | Lump Sum      | L.S.      |        |
| 0008           | 8660000000-E | SP    | CONCRETE REPAIRS   | 45.7<br>CF    |           |        |
| 0009           | 8664000000-E | SP    | SHOTCRETE REPAIRS  | 86.7<br>CF    |           |        |
| 0010           | 8678000000-E | SP    | EPOXY RESIN INJECTION  | 136<br>LF     |           |        |
| 0011           | 8860000000-N | SP    | GENERIC STRUCTURE ITEM<br>CLEANING AND REPAINTING OF<br>BRIDGE NO 350143 | Lump Sum      | L.S.      |        |
| 0012           | 8860000000-N | SP    | GENERIC STRUCTURE ITEM<br>DRIFT REMOVAL                                  | Lump Sum      | L.S.      |        |
| 0013           | 8860000000-N | SP    | GENERIC STRUCTURE ITEM<br>PAINTING CONTAINMENT FOR<br>BRIDGE NO 350143   | Lump Sum      | L.S.      |        |
| 0014           | 8867000000-E | SP    | GENERIC STRUCTURE ITEM<br>EXPANSION JOINT SEAL REPAIR                    | 218<br>LF     |           |        |
| 0015           | 8867000000-E | SP    | GENERIC STRUCTURE ITEM<br>FOAM JOINT SEALS FOR<br>PRESERVATION           | 973<br>LF     |           |        |
| 0016           | 8867000000-E | SP    | GENERIC STRUCTURE ITEM<br>SILICONE JOINT SEALANT FOR SLOPE<br>PROTECTION | 148<br>LF     |           |        |

County: GASTON

| Line # | Item Number  | Sec # | Description   | Quantity    | Unit Cost | Amount |
|--------|--------------|-------|---|-------------|-----------|--------|
| 0017   | 8892000000-E | SP    | GENERIC STRUCTURE ITEM<br>EPOXY COATING                             | 3,377<br>SF |           |        |
| 0018   | 8897000000-N | SP    | GENERIC STRUCTURE ITEM<br>TYPE 1 BRIDGE JACKING BRIDGE NO<br>350143 | 1<br>EA     |           |        |
| 0019   | 8897000000-N | SP    | GENERIC STRUCTURE ITEM<br>TYPE 2 BRIDGE JACKING BRIDGE NO<br>350143 | 26<br>EA    |           |        |

1327/Apr11/Q159164.7/D148228800000/E19

Total Amount Of Bid For Entire Project :



**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                | Gal / Ton | 0.55                        | Tons                   |
| Aggregate Base Course                          | Gal / Ton | 0.55                        | Tons                   |
| Sub-Ballast                                    | Gal / Ton | 0.55                        | Tons                   |
| Erosion Control Stone                          | Gal / Ton | 0.55                        | Tons                   |
| Rip Rap  | Gal / Ton | 0.55                        | Tons                   |
| Aggregate for Cement Treated Base Course       | Gal / Ton | 0.55                        | Tons                   |
| 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                   |
| * Ultra-Thin Bonded Wearing Course             | 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 *Standard Specifications*.
☐ The above quantities represent the estimate of total quantities for each item, as pertaining to Fuel Price Adjustments, for 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 DBE SUBCONTRACTORS</b> |          |                  |                          |                          | Sheet _____ of _____ |
|--------------------------------------|----------|------------------|--------------------------|--------------------------|----------------------|
| Firm Name and Address                | 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 DBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF DBE SUBCONTRACTORS</b> |  |          |                  |                             |                             |
|--------------------------------------|--|----------|------------------|-----------------------------|-----------------------------|
| Firm Name and Address                |  | Item No. | Item Description | * Agreed upon<br>Unit Price | ** Dollar Volume of<br>Item |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |
| Name<br><br>Address                  |  |          |                  |                             |                             |

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no DBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF DBE SUBCONTRACTORS</b> |          |                  |                          |                          | Sheet _____ of _____ |
|--------------------------------------|----------|------------------|--------------------------|--------------------------|----------------------|
| Firm Name and Address                | 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 DBE participation must so indicate this on the form by entering the word or number *zero*.**

| <b>LISTING OF DBE SUBCONTRACTORS</b> |  |          |                  |                          |                          |
|--------------------------------------|--|----------|------------------|--------------------------|--------------------------|
| Firm Name and Address                |  | 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 DBE subcontractor, and these prices will be used to determine the percentage of the DBE participation in the contract.

\*\* Dollar Volume of DBE Subcontractor \$ \_\_\_\_\_

Percentage of Total Construction Cost \_\_\_\_\_ %

(Including Right of Way Acquisition Services)

\*\* - Must have entry even if figure to be entered is zero.

\*\* - *If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.  
If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.*

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no DBE participation must so indicate this on the form by entering the word or number *zero*.**

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION****CORPORATION**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. §133-24* within the last three years, and that the prequalified bidder intends to do the work with his own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

---

Full name of Corporation

---

Address as prequalified

Attest \_\_\_\_\_  
Signature of **Secretary, Assistant Secretary**  
*Select appropriate title*

By \_\_\_\_\_  
Signature of **President, Vice President, Assistant Vice President**  
*Select appropriate title*

---

Print or type Signer's name

---

Print or type Signer's name

**CORPORATE SEAL**

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION****PARTNERSHIP**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

---

Full name of  
Partnership

---

Address as  
prequalified

---

Signature of Witness

---

Signature of Partner

---

Print or type Signer's name

---

Print or type Signer's name

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION****LIMITED LIABILITY COMPANY**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

---

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



**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION****JOINT VENTURE (2) or (3)**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

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                 |                         |
|     | <i>If Corporation, affix Corporate Seal</i> | and                     |
| (3) |   | Name of Contractor      |
|     | Address as prequalified                     |                         |
|     | Signature of Witness or Attest              | By                      |
|     |   | Signature of Contractor |
|     | Print or type Signer's Name                 |                         |
|     | <i>If Corporation, affix Corporate Seal</i> | and                     |
| (4) |   | Name of Contractor      |
|     | Address as prequalified                     |                         |
|     | Signature of Witness or Attest              | By                      |
|     |   | Signature of Contractor |
|     | Print or type Signer's Name                 |                         |
|     | <i>If Corporation, affix Corporate Seal</i> | and                     |

**CORPORATE SEAL(S)**

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION****INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

Name of Prequalified Bidder

---

Print or type Individual Name

Trading and doing business as

---

Full name of Firm

---

Address as prequalified

---

Signature of Witness

---

Signature of Prequalified Bidder, Individual

---

Print or type Signer's Name

---

Print or type Signer's Name

**NON-COLLUSION, DEBARMENT GIFT BAN CERTIFICATION****INDIVIDUAL DOING BUSINESS IN HIS OWN NAME**

The prequalified bidder, declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee 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 prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the prequalified bidder is attesting his 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 PREQUALIFIED BIDDER**

Name of Prequalified Bidder

---

Print or type Individual Name

---

Address as prequalified

---

Signature of Prequalified Bidder, 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.:**     **C205001**

**County:**            **Gaston County**

ACCEPTED BY THE  
DEPARTMENT OF TRANSPORTATION

---

Contract Officer

---

Date

Execution of Contract and Bonds  
Approved as to Form:

---

Attorney General

Signature Sheet (Bid - Acceptance by Department)